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HERAUSGEGEBEN VON LUCA GIULIANI  
MIT BERICHTEN UND BEITRÄGEN VON

Gro Vang Amdam ♦ Eva Liina Asu-García ♦ Rajeev Bhargava  
Katherine Boo ♦ Alfred Brendel ♦ Penelope Brown ♦ Maria Luisa Catoni  
Dale F. Eickelman ♦ Jens Eisert ♦ Yehuda Elkana ♦ Marie Farge  
Annegret Fauser ♦ David Freedberg ♦ Boris Gasparov ♦ Daniel Halberstam  
Orna Harari ♦ Jonathan Harvey ♦ Binyamin Hochner ♦ Bert Hölldobler  
Wolfgang Hoffmann-Riem ♦ Vincent M. Janik ♦ Ewa Lajer-Burcharth  
Manfred D. Laubichler ♦ Olof Leimar ♦ Angelika Linke  
Timothy A. Linksvayer ♦ Steven M. Lukes ♦ Ion Manolescu  
Martin Mosebach ♦ Kiran Nagarkar ♦ Tobias J. Osborne ♦ Robert E. Page jr.  
Marcia Pally ♦ Frank Pasemann ♦ Claus Pias ♦ Andrei G. Pleșu  
Vasilis Politis ♦ Martin Puchner ♦ Ulrich Schollwöck ♦ Tanja Schwander  
Dieter Thomä ♦ Galin Tihanov ♦ Arndt von Twickel  
Adam S. Wilkins ♦ Harald Wolf ♦ Yogendra Singh Yadav  
Sergiy Yakovenko ♦ Klaus Zuberbühler

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## VORWORT DES HERAUSGEBERS

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Am 11. Mai 2010 hielt Binyamin Hochner seinen Vortrag im Dienstagskolloquium: Es ging um Oktopusse, um deren Motorik, Selbststeuerung und kognitive Fähigkeiten; das vielfach begabte, in unvergesslichen Bildern zur Anschauung gebrachte Tier scheint sich mit metaphorischen Saugnäpfen im Gedächtnis vieler Zuhörer festgesetzt zu haben. So verweist etwa Wolfgang Hoffmann-Riem in diesem Jahrbuch auf den Oktopus Paul, der mit vollendeter, rätselhafter Sicherheit Siege und Niederlage der Deutschen Elf bei der Fußballweltmeisterschaft in Südafrika voraussagte (107): Er zitiert dies als ein irritierendes Beispiel für ein vollkommenes Wissen, das für den Wissenden selbst vollkommen unnütz bleibt, und erinnert uns daran, dass menschliches Wissen immer nur ein partielles ist und in einem prekären, letztlich undurchschaubaren Verhältnis zum Nichtwissen steht. Ganz andere Assoziationen erweckt der Oktopus bei Alfred Brendel, der den Kephelopoden wegen seiner „Vielfingrigkeit und Wandlungsfähigkeit [...] jedem Pianisten als *beau idéal* ans Herz“ legen möchte (35). Wenn man für diesen Jahrgang nach einem Totemtier suchen wollte, hätte der Oktopus wenig Konkurrenz.

Wie so oft, waren die Schwerpunktgruppen auch 2009/10 naturwissenschaftlich ausgerichtet. Eine kleine Gruppe von Physikern befasste sich mit Problemen der Quantentheorie: Eine Disziplin, die am Kolleg bisher kaum vertreten gewesen ist. Gut vertreten waren hingegen auch diesmal, wie in den letzten Jahren, die Biologen; zu ihnen gehörte Tanja Schwander, deren Doktorarbeit von der European Society for Evolutionary Biology mit dem renommierten John-Maynard-Smith-Preis ausgezeichnet worden war. Die ESEB und das Wissenschaftskolleg hatten miteinander verabredet, dass der Preis, der alle zwei Jahre vergeben wird, mit einem Short-Term Fellowship am Kolleg einher-

geht. Tanja Schwander ist die erste Preisträgerin, die infolge dieser Abmachung zu uns gestoßen ist; andere werden in den nächsten Jahren folgen.

Jeder Jahrgang am Wissenschaftskolleg entwickelt eine eigene, unverwechselbare Gruppengestalt. In manchen Jahren wachsen die Fellows rasch zu einer einzigen Gemeinschaft zusammen; andere Jahrgänge gliedern sich in Untergruppen, die in produktiver Spannung zueinander verharren. 2009/10 hat sich in den Kolloquiumsdiskussionen eine Polarisierung bemerkbar gemacht, die – zu meiner großen Überraschung – den alten Topos der zwei Kulturen von C. P. Snow bzw. die noch ältere, auf Dilthey zurückgehende Gegenüberstellung von Geistes- und Naturwissenschaften wieder aufleben ließ. So bezeichnet etwa Galin Tihanov den Dialog zwischen beiden als „immensely difficult task that requires an awful lot of concerted effort and hard work over several years“ (205; zum Unterschied in den Sprechweisen und Methoden vgl. auch 128, 186, 191 f., 197 f.). Aber würde der direkteste Ausweg nicht darin bestehen, sich der betreffenden Kategorisierung von vornherein zu verweigern, und die zwei Lager als imaginäre Produkte einer pauschalisierenden Polemik zu dekonstruieren? Man sollte nicht vergessen, dass die von Dilthey geprägte Bezeichnung „Geisteswissenschaften“ ursprünglich den Charakter eines Kampfbegriffs hatte, der gegen die empfundene Übermacht der Naturwissenschaften ins Feld geführt werden sollte; der Begriff zielte nicht auf Verständigung, sondern auf Abgrenzung, und er hat diesen Charakter bis heute nicht ganz abgestreift.

Nach einem kunstwissenschaftlichen Kolloquiumsvortrag stellte Klaus Zuberbühler, der über die vokale Kommunikation unter Primaten forscht, die lakonische Frage: „How can you know that you are right?“ (128; auch in einer sokratisch angehauchten Variante überliefert: „How do you know that what you say isn't wrong?“, 186; ich selbst habe einen abermals abweichenden Wortlaut in Erinnerung: „How can I know that you are right?“). Mit dieser Gretchenfrage habe er, so empfanden nicht wenige, die „Kluft zwischen geisteswissenschaftlichem und naturwissenschaftlichem Selbst- und Fremdverständnis auf den wunden Punkt gebracht“ (Angelika Linke, 128 f.). Aber ist das wirklich ein wunder Punkt, und worin besteht die Kluft? Die Zuberbühlersche Frage ist nicht nur fächerübergreifend legitim sondern schlechterdings notwendig. Natürlich kann man als Hermeneutiker darauf hinweisen, dass man sich des Wahrheitsgehalts einer Aussage nie ganz sicher sein kann (aber das ist bei Physikern und Biologen auch nicht anders). Dies vorausgesetzt, sollte dennoch Konsens darüber bestehen, dass eine Aussage den Spielregeln wissenschaftlicher Diskussion nur dann entspricht, wenn sie in einem Begründungsparadigma verankert ist, sich auf ein explizierbares Problem bezieht und eine plau-

sible Lösung dafür liefert. Klaus Zuberbühler hätte genauso gut fragen können: „Worin liegen die Plausibilitätskriterien für das, was Du gesagt hast?“ Darauf wird niemand erwidern wollen: „Diese Frage ist in meinem Fach nicht üblich.“

Es könnte allerdings sein, dass der Gegensatz zwischen „science“ und „humanities“ primär auf einer abstrakten Ebene wirksam ist, die gerade wegen ihrer Abstraktheit der Gefahr ideologischer Durchzüge ausgesetzt ist. Die Erfahrung (auch und gerade in diesem Jahr) zeigt, dass ein solcher Gegensatz dazu neigt, sich zu verflüchtigen, sobald es um konkrete Fragen geht. Das ideale Beispiel dafür liefert eine spontane, von Penelope Brown und Steven Lukes ins Leben gerufene Arbeitsgruppe, an der Vertreter unterschiedlichster Disziplinen beteiligt waren, und die über das ganze Jahr aktiv gewesen ist; gemeinsam ging man der einfachen, grundlegenden Frage nach: „What makes humans unique?“ Der Horizont hätte kaum weiter gefasst gewesen sein können: Zu den besprochenen Themen gehörten „cooperation, language, theory of mind, social cognition, play, social emotions (shame, guilt, pride), coalitions, morality, music, culture“ (Penny Brown, 38; vgl. auch 114, 124, 137 f., 184, 252). Von einem Abgrund zwischen den Fachkulturen oder von gegenseitiger Sprachlosigkeit ist in diesem Zusammenhang niemals die Rede. Umso größer scheinen Lust- und Lerngewinn gewesen zu sein. So schreibt Angelika Linke: „Wo wir hingesehen haben, sind die Unterscheidungen [d.h. der Versuch, zwischen Mensch und Tier eine klare Linie zu ziehen] undeutlich und die Konzepte selbst – Sprache, Intention, Empathie ... – problematisch geworden. Das hätte zu Frustrationen führen können. Aber wir haben die Diskussionen genossen. Und schon am späten Nachmittag Wein dazu getrunken. Und keine Protokolle geführt und uns keinen gemeinsamen Aufsatz vorgenommen“ (129).

*Keinen* gemeinsamen Aufsatz zu planen, sollte im Übrigen nicht unbedingt als Zeichen eskapistischer Leistungsverweigerung verstanden werden: Es könnte sich um eine sehr verständliche Reaktion auf aktuelle Strukturveränderungen handeln. Im globalen Wissenschaftsbetrieb wird nicht nur immer mehr geschrieben, sondern umgekehrt auch immer weniger gelesen. Am deutlichsten geworden ist mir dieses Phänomen durch Gespräche mit den Quantenphysikern: Der quantitative Output in ihrem Fach sei so groß, dass er schlechterdings nicht mehr zu bewältigen sei; Lesen sei unter diesen Bedingungen unwirtschaftlich, weil es von der eigentlichen Forschung abhalte. Gerade im Kreis der Spitzenforscher ist eine konsequente Re-Oralisierung zu beobachten: Man nimmt das zur Kenntnis, was man auf der letzten internationalen Konferenz hört oder empfohlen bekommt (so auch Ulrich Schollwöck, 190). Unter veränderten globalen Bedingungen erin-

nert das lebhaft an Zustände im 18. Jahrhundert. Es könnte bedeuten, dass die unmittelbare Kommunikation im Gespräch oder via E-Mail wichtiger wird als ein Artikel in *Science* (von dem konsequenterweise vermutet werden sollte, dass nicht einmal er wirklich gelesen wird, weil alle potentiellen Leser mit Schreiben beschäftigt sind). Und wenn das schon für *Science* gilt, wie viel mehr noch für dieses *Jahrbuch 2009/10*: Ein Grund mehr, das Vorwort kurz zu halten.

Deshalb nur eine letzte Bemerkung. Die Stadt Berlin spielt in den Berichten der Fellows von Jahr zu Jahr eine wachsende Rolle. Die Freude über Opernhäuser und Philharmonie, über Museen und Theater sowie über den (für viele unerwartet) internationalen Charakter Berlins haben fast schon topischen Charakter. Ungewöhnlich aber, und besonders lesenswert fand ich, was der indische Schriftsteller Kiran Nagarkar über seinen Besuch der Gedenkstätte *Gleis 17* im S-Bahnhof Grunewald schreibt (149 f.): präzise, nüchtern und fassungslos. Dafür kann man nur dankbar sein.

Luca Giuliani



## THREADED TOGETHER

Just like a group of Fellows, families, and guests from around the globe coming together at the Wiko and being forged into a world of their own over the course of a year, a quilt merges different and sometimes even disparate elements into a new, hybrid creation in which unexpected juxtapositions and harmonious correspondences form fascinating patterns across its surface. And, whereas in a quilt threads hold these richly diverse elements together, at the Wiko the Fellows are threaded into a coherent whole through the immense and often barely visible care and support of its wonderful staff. As a gesture of our deep appreciation for the inventive, thoughtful and ever-magical generosity of the Wiko's staff, the Fellows, families and guests of 2009–10 have joined together in creating this quilt as a symbolic offering of our collective thanks.



A quilt designed by Annegret Fauser and Harald Wolf. Quilt top created by Annegret Fauser. Quilting by Birgit Bradler.





*Arbeitsberichte*



THE ROLE OF EPIGENETICS  
IN SOCIAL INSECTS EVO DEVO  
GRO VANG AMDAM

---

Education: 2003, Doctor scientiarum, Theoretical Biology, Norwegian University of Life Sciences. Current appointments: 2007–present, Associate Professor, School of Life Sciences, Arizona State University; 2008–present, Associate Professor-II, Department of Chemistry, Biotechnology and Food Science, Norwegian University of Life Sciences. Current support: The PEW Charitable Trust, United States – Israel Binational Science Foundation, Research Council of Norway, EU FP7, National Institute of Health, Smithsonian Tropical Research Institute/Arizona State University, Norwegian University of Life Sciences. Publications: T. A. Linksvayer, O. Rueppell, A. Siegel, O. Kaftanoglu, R. E. Page and G. V. Amdam. “The genetic basis for transgressive ovary size in honey bee workers.” *Genetics* 183 (2009). A. Patel, M. K. Fondrk, O. Kaftanoglu, C. Emore, G. Hunt, K. Frederick and G. V. Amdam. “The making of a queen: TOR pathway is a key player in diphenic caste development.” *PLoS ONE*, 2007, June 6: 2(6): e509. G. V. Amdam, A. Csondes, M. K. Fondrk, and R. E. Page. “Complex social behaviour derived from maternal reproductive traits.” *Nature* 439 (2006.). – Address: Department of Chemistry, Biotech. and Food Science, Norwegian University of Life Sciences, Post Office Box 5003, 1432 Ås, Norway. E-mail: gro.amdam@umb.no

*Objective.* For my fellowship at Wiko, I proposed a project to achieve a better understanding of the roles of epigenetics in social insect evo devo. My goal was motivated by recent work by my group and my collaborators, which suggested that selection on epigenetic regulators can be central to the evolution of honey bee social behaviour.

*Visitors and interactions at Wiko.* My work benefited greatly from the visits of Dr. Andrew Feinberg from Johns Hopkins University USA, who is an expert on epigenetic plasticity; of B. S. Ingrid Spilde, popular science writer for the website [www.forskning.no](http://www.forskning.no) in Norway, and of Dr. Thomas Flatt, a productive young scientist at the University of Veterinary Medicine in Vienna, Austria who studies the evolution and current regulation of life-history variation in *Drosophila melanogaster*.

My three visitors stayed at Wiko, each for 3–4 days, and all interacted with other Wiko Fellows and/or the Wiko staff. My collaboration with Andrew Feinberg is moving forward with the submission of two manuscripts this fall. Ingrid Spilde published this article about Wiko: <http://www.forskning.no/artikler/2010/mars/243758>. Thomas Flatt provided very useful feedback on my writing at Wiko as well as afterward.

Andrew Feinberg and I next developed an experiment to test the effects of the environmental factors on the epigenome. These experiments have been conducted, they were successful, and we are co-authoring a manuscript to publish the results. In brief, our data show that epigenetic DNA methylation patterns in the brains of honey bees respond to changes in the social environment. The patterns, furthermore, appear to be associated with differences in the DNA splice variants that are produced by the methylated genes. Such alternative splicing can have profound effects on phenotypes.

These are very exciting findings, and we can now move forward toward the goal of understanding how epigenetics contributes during the evolution and current regulation of sociality in insects.

In addition to my interactions with Feinberg, Spilde and Flatt, I enjoyed my discussions with the resident Fellows, particularly Drs. Page, Raghavendra, Wilkins and Linksvayer. Unfortunately, I could rarely attend the meals at Wiko due to a food allergy. I feel, however, that my stay was very good also socially.

*Progress.* At Wiko, my progress was primarily in developing a framework to address how honey bee phenotypes are affected by environmental factors, with a focus on interindividual interactions and social stress. My thoughts on this topic are summarized in my paper submitted to *Aging Cell* (see summary of writing).

*Summary.* My Fellowship at Wiko was very useful for me as a scientist and as a person. It enabled me to think about aspects of what I do that I rarely or never have time to consider. I appreciate the opportunities and inspirations this has given me, and I am very thankful for it.

*Articles published or prepared while Fellow at Wiko*

1. Wang, Y., N. S. Mutti, K. E. Ihle, A. Siegel, A. G. Dolezal, O. Kaftanoglu, and G. V. Amdam (2010). "Down-regulation of honeybee IRS gene biases behavior toward food rich in protein." *PLoS Genetics*. 6, e1000896. Featured in *Nature Research Highlights* (vol. 464, p. 961) and *Science News* (vol. 177/9, 16).
2. Amdam, G. V., E. Fennern, N. Baker, and B. Rascón (2010). "Honeybee associative learning performance and metabolic stress resilience are positively associated." *PLoS ONE* 5, e9740.
3. Münch, D. and G. V. Amdam (2010). "The curious case of aging plasticity in honey bees." *FEBS Letters* 584, 2496–2503.
4. Wang, Y., O. Kaftanoglu, A. J. Siegel, R. E. Page, and G. V. Amdam (December 2010). "Surgically increased ovarian mass in the honey bee confirms link between reproductive physiology and worker behavior." *Journal of Insect Physiology* 56, 12: 1816–1824.
5. Havukainen, H., Ø. Halskau, L. Skjaerven, B. Smedal, and G. V. Amdam (2011). "Deconstructing honeybee vitellogenin: novel 40 kDa fragment assigned to its N-terminus." *Journal of Experimental Biology* 214, 582–592.
6. Tolfsen, C. C., N. Baker, C. Kreibich, and G. V. Amdam. "Flight restriction prevents associative learning deficits but not changes in brain protein adduct-formation during honeybee ageing." *Journal of Experimental Biology* (in revision).
7. Amdam, G. V. "Social context, stress, and plasticity of aging." *Aging Cell* (in revision).
8. Baker, N., F. Wolschin, and G. V. Amdam. "Age-related learning deficits can be reversed in honeybees *Apis mellifera*." *Journal of Experimental Biology* (submitted).



AT WIKO WITH A BABY  
EVA LIINA ASU-GARCÍA

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Eva Liina Asu-García is a pronunciation linguist. She was born in 1971 in Tartu, Estonia and studied English and Swedish Language and Literature at the University of Tartu (BA 1995) and English and Applied Linguistics at the University of Cambridge (M.Phil. 1997). She received her Ph.D. in Linguistics from the University of Cambridge in 2004 and was a post-doctoral researcher at the Institute of the Estonian Language, Tallinn (2005–06) and a pronunciation linguist at the BBC Pronunciation Unit, London (2006–07). Since September 2007 she has been working as a Research Associate in Phonetics at the Institute of Estonian and General Linguistics, University of Tartu. Her research focuses on the experimental study of prosodic features of languages (intonation, rhythm, quantity). – Address: Institute of Estonian and General Linguistics, University of Tartu, Ülikooli 18, 50090 Tartu, Estonia. E-mail: [eva-liina.asu@ut.ee](mailto:eva-liina.asu@ut.ee)

We arrived in Berlin when the chestnut trees lining the streets in Grunewald were in full bloom and preparations for the *Abschiedsfest* had already started. Exactly 12 weeks before, I had given birth to our baby daughter Martha Johanna. It just goes to show that a lot can happen in a year, as I had accepted the fellowship offer well before I even knew I was pregnant. It probably was a bit insane of me to still decide to accept the fellowship and venture abroad with such a small infant in tow. Practicalities aside, I remember the nagging feeling of guilt when thinking about having to take my baby away from the surroundings she had gotten used to in her first weeks of life, worrying about how she would take the journey and how we would cope far from the support of family and friends. But in the end everything went rather smoothly, and we all enjoyed our three months in

Berlin. Needless to say, the whole Wiko adventure with a baby would not have been possible if my husband Alfonso had not been able to accompany me.

Of the three of us, it was actually Martha Johanna who settled in fastest and immediately seemed to feel at home in our flat in Villa Walther. In some way she became as if my ID during our stay at Wiko – the Fellow with a baby. Most of the time when staff or other Fellows greeted or approached me at Wiko, they did not ask how I was, but instead how the baby was doing. Inevitably our little baby was the centre of our existence even at Wiko, and our life and work had to be accommodated around her feeding and nap times.

Thinking back to my time at Wiko, what comes to mind first is the almost unrealistically helpful and attentive staff and of course the excellent conditions that are created for carrying out research. Wiko is in every sense an academic spa, where all these wonderful people work to make your every little wish (be it practical or impractical) come true. One of the things I still feel slightly sorry about is that, due to the nature of my research, I did not have a need to make use of the wonderful library resources available. Also that I could not spend more time in my office. I had initially opted for a separate office, but it soon became apparent that it made more sense to work at my desk in the apartment, as no valuable time was lost getting there and back, and I could be easily at hand if needed.

My project at Wiko was part of a larger project, which I am currently leading at the University of Tartu. The main goal of this research is to focus on the study of word and sentence prosody in spontaneous language usage of Estonian varieties spoken on the islands. The analysis incorporates variation and various interactions at work between different prosodic features (e.g. quantity and syllable duration, or intonation and quantity). The work is experimental, and as we are investigating spontaneous speech it involves working through a lot of data. While at Wiko, I focussed above all on labelling recordings from the Island of Kihnu. Kihnu is a tiny island off the west coast of Estonia, where even today people wear their traditional folk costume on a daily basis. The intonation of this variety is distinctly different from that of other dialects of Estonian. The final goal of this work is to publish a book about phonetic characteristics of this dialect. The time at Wiko was extremely valuable because it gave me the opportunity to make a good start with the analysis.

A positive Wiko experience that has to be mentioned was the German tuition. Even if I joined in in mid-May and only had time to attend an hour a week, I found the lessons nevertheless extremely useful. I had studied some German as an undergraduate, but had

abandoned it for Dutch. Now in Berlin, for the first time in my life, I actually attempted speaking German, and found it fun. Also, attending the classes and lunches at the German table was a great way to get to know some other Fellows and spouses.

It can be difficult to join a group that has had several months to solidify at the stage when many are already thinking about leaving. I remember being asked a few weeks into my fellowship whether I felt fully integrated with the Wiko community. I'm not sure that full integration was possible at all at that point and considering our circumstances, but I think that during the time available our family became at least partially integrated. In fact, in a somewhat curious way, Alfonso and I merged as if into one Fellow: except for family dinners, we could never participate in anything together (as one of us always stayed with the baby), but between the two of us we managed to take part in all the Tuesday colloquia, most meals and several evening lectures. We both enjoyed meeting so many interesting people and hearing about such a wide range of topics. We certainly learnt a lot about many things, and many aspects of Wiko reminded us of our former college life at Cambridge.

On a more personal level, our time at Wiko gave us an opportunity to really grow into our role as parents, to grow into a family. We probably spent more time together than ever before. I fondly remember our long walks with the pram along the streets in our leafy neighbourhood, near the lakes and in the Grunewald forest. As to the bustling cultural life of Berlin, we had to miss most of it; opera, concerts or theatre were out of reach for the tired parents of a small infant.

The three months, which was far too short a time for major academic achievements or even for an opportunity to talk to all the other Fellows, was a long time for Martha Johanna. By the time we left Wiko in the middle of the summer heat, she had spent just a little longer than half of her life in Germany. Her list of accomplishments from that period outshone our's by far and included such important milestones as turning, grabbing and babbling. At Wiko, she said her very first word: *emme*.

Towards the end of our time we all felt so much at home that we started to miss Wiko even before we left. We hope to return at some point in our lives.





SECULAR HEAVEN  
RAJEEV BHARGAVA

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Rajeev Bhargava, BA (Delhi), M.Phil., D.Phil. (Oxford), is Senior Fellow and Director at the Centre for the Study of Developing Societies, Delhi. He was formerly Professor at the Jawaharlal Nehru University and, between 2001 and 2005, Professor of Political Theory and Head of the Department of Political Science, University of Delhi. He has held visiting fellowships at Harvard, Columbia, Jerusalem, Bristol and Paris. He is on the advisory board of several institutions and programmes and was a consultant to the UNDP report on cultural liberty. His publications include *Individualism in Social Science* (Clarendon Press, Oxford, 1992); *Secularism and its Critics*, ed. (OUP, New Delhi, 1998); *What Is Political Theory and Why Do We Need It?* (OUP, Delhi, 2010); and *The Promise of India's Secular Democracy* (OUP, Delhi, 2010). – Address: Centre for the Study of Developing Societies, 29, Rajpur Road, 110054 New Delhi, India. E-mail: rbhargav4@gmail.com

Imagining heaven is not easy. Living in it is, I discovered. I once wondered if heaven was where fullness is achieved. I now know that secular heavens are sites of abundance – of generosity, civility, mutuality, friendship, trust, conversations, romance, books, food, wine, dark and deep woods, water, serenity and elective solitude. Alas, there is no right to permanent residence in secular heavens. The hour of arrival is also the hour of departure!

Days before I took up the fellowship in Berlin, I had submitted to OUP the manuscript of a two-volume collection of my essays. But much work remained to be done and the introduction still had to be written. Queries that began arriving by mid-October had to be addressed. Proofs arrived by November eager to be scrutinized. The index was wait-

ing in the wings. The initial months at Wiko were spent attending and giving finishing touches to the two books. Any other work could really begin only after the release of the books – which happened in January in Delhi.

On my return, I gave my Wiko colloquium. After this, I had two options before me. First, to complete a manuscript on “Contemporary Secularisms”. Much of my work on this topic was finished, with several articles already published. I had only to give this material the form of a monograph. I needed a minimum of 3–4 months for this and another book would have been ready by the end of May, perhaps June. This was a safe bet. Unfortunately, it would have meant spending the entire year at Wiko on a theme with which my thought and imagination were virtually exhausted. The second option, to begin serious work on a ten-year project on “Forms of Secularity before Indian Secularism”, was far more exciting. Wiko provided a glorious opportunity to begin this work but it also meant taking huge risks.

Before this, my research life can be divided into two phases. The first focused on interpretative, explanatory social theory and resulted in a book on “Methodological Individualism”. The second began in the late 80’s when I was compelled to deal with contemporary political issues in India, such as political secularism, minority rights and Truth Commissions. These I approached normatively, very much in the spirit of Anglo-Saxon analytical philosophy.

The new project was different from anything I had done in the past. It required me to delve into the ancient past with a pronounced examination of texts in their specific social surroundings. It meant reconstructing the background social imaginaries of specific political conjunctures in the history of the subcontinent. Herein were conceived and imagined new ways of co-existence of multiple religious communities. It meant evolving a social history of ancient and medieval India, an evocation of the radically differing worlds not only of Ashoka and Akbar, but also of the ordinary people they governed. I had to attempt to retrieve beliefs and feelings of persons long dead and who left little evidence of what they thought or felt, to accomplish a phenomenology of Indian secularity. This was more “Indian” than anything I have ever done before. It meant relearning languages learnt in school and quickly forgotten. It also meant I had to hone different scholarly skills. More than anything else it meant a deliberate, foolhardy journey into a wholly unknown rainforest, one that few have dared to visit, perhaps a deep, very deep abyss. Was this a worthwhile voyage or reckless adventure? It is still difficult to say what will come of this uncertain gamble.

There is another way of approaching my prospective research project. As I see it, at certain crucial junctures in Indian history, certain conceptual spaces emerged that had the potential to contribute, under certain conditions, to the growth of modern secularism. These spaces enabled multiple historical agents over a period of time to imagine new concepts, provided they had the motivation to do so. Soon enough, over a period of time, different concepts belonging retrospectively to one family, or resembling one another, were generated. At crucial junctures, all these elements drawn from different periods and therefore from different conceptual spaces were forged into a broad conception. Such a conception may or may not have crystallized around a single word, but it exists. To trace these different trajectories and offer a narrative of the different sources of “secular” and “secularities” is crucial. So, what I wish to eventually write is a non-teleological conceptual history of what we today call secularism. Is this possible? I do not know, but what I do know is that it can only be accomplished by an effort involving many people over several generations. I also know that only an institutional setting such as Wiko can give a 55-year-old academic the confidence to climb this Everest. At any rate, even if not a single word gets written and nothing is achieved, the sheer pleasure of reading and learning about distant worlds will have been rewarding in itself, I thought. I was not wrong. I am glad I chose the second wild option. This has been a transformative experience for me.

I have begun raising a number of questions, of which I list only a few here. First, what could “secularity” mean in a context still suffused with “polytheistic” beliefs and practices? How do we make sense of the monotheistic/polytheistic distinction in Hindu and Buddhist thought, given that these terms and the distinction between them emerge in the 17th- and 18th-century debates in Europe?

Second, assuming once again that “polytheism” and “monotheism” have some relevance in the Indian context, would it be fair to say that the suppleness, flexibility and inclusiveness of Hinduism, the fact that it has no creed, is due largely to its polytheistic features? Surely, the presence of several Gods does not entail suppleness, flexibility and open-endedness. There could be fierce competition between rival gods and their followers, fierce pride in one’s own chosen god. Monotheism may in fact be a resolution of this conflict. So, why does polytheism lead to open-endedness – and under what conditions does it do so? What sense can one make of this in the period 500 BCE–500 CE in India?

Third, there is massive evidence that the “pagan” masses hated and eventually persecuted Christians (in the early CE). So “polytheistic” people are not obviously immune from inflicting violence. What evidence is there of violence by “Hindus” towards those

who were different from them? Say, the Syrian Christians? Or the Jews? How did they behave towards Arab traders when they first came into close contact with them?

Fourth, we know that in several parts of the world, monotheism emerged out of and in opposition to polytheism. In so far as these terms make sense in India, what is the historical pattern of relationships between the two? Was there ever a context in which God was believed to exist without the existence of several gods? How were gods and God conceived? How did the meaning of equivalent terms change?

Fifth, to say that there was an axial revolution in India, too, is not saying very much. We have to ask what this means in the Indian context. What is the quality and degree of axiality? What were the precise conditions in which people “stepped backward and looked beyond”? What social conditions underwent this axial change? What happened after this change? To what extent was there rupture between the pre-axial and the post-axial?

Sixth, what does heresy mean in the Indian context? If “true” or “false” religion made no sense here, then what were the relevant contrasts? Pure/impure? Auspicious/inauspicious? Malechha? How were the impure and the inauspicious treated? What was the quality of relations between the pure and the impure and between the impure among themselves?

Seventh, several scholars appear to use the misleading term “toleration” to designate the quality of social relations between different groups or the type of political secularity extant in the Asokan period. What is the correct term in Prakrit or Sanskrit and what is the complex concept underlying it? The attempt to answer questions such as these will occupy me for many years. But the journey is already invigorating.

Inevitably, there were also moments of frustration and regret. At Wiko, liberated from “admin” and administrative worries, I became an ordinary reader and writer once more. This was a great relief. But alas, habits die hard. For reasons I cannot fully explain, I successively succumbed to a few rather unscholarly, time-consuming temptations. I had no prior experience of international academic NGOs and felt it was important to learn about them, so I agreed to chair the External Review Committee of a South-South academic exchange program, SEFIS, run by the Dutch. Second, I consented to be on the selection committee for a professorship at the University of Göttingen. Both of these were rewarding in their own ways but came with a heavy opportunity cost. I could have done so much more for my new project in the time eaten up by these. Wiko Fellows must ruth-

lessly decline offers, no matter how significant, that detract from their primary work. Every minute at Wiko is too precious to not service one's own passion and interest.

Tani and I regret missing out on something else. We spent nearly 10 months at Wiko. Spending 11 would have been better. Had we arrived on 1st September, like some others did, we would have enjoyed a whole month of good weather, learnt German and made even better friends.

Certain unexpected bonuses at Wiko were exhilarating – late night table tennis games after wine and dinner on Thursdays, cooking for friends – always a pleasure, the splendid piano recitals. Because Wiko extends the same facilities to the spouses of Fellows, Tani was able to rework her novel in her own office, and more importantly I was always at hand whenever she needed. Fellowship at Wiko also enabled us to remain close by Vanya and Aranyani, our daughters who were reading at Oxford. We spent memorable time together in the sylvan environs of Villa Walther whenever we were insulated from the rest of the world by snow or the ash cloud! Because of these visits and Aranyani's dance performance at the start of the year, both the girls were so much at home at Wiko that they were virtually Fellows themselves!



OFF THE WESTERN EXPRESS  
KATHERINE BOO

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Katherine Boo has been a staff writer at *The New Yorker* since 2003 and a contributor since 2001. Her writing focuses on issues of poverty, opportunity, social and economic policy, and education. Her article “The Marriage Cure”, on marriage seminars for the poor in Oklahoma City, received a National Magazine Award for Feature Writing in 2004. Before joining *The New Yorker*, Boo was a writer and editor for the *Washington Post*, where, for a decade, she was a member of the Outlook and Investigative staffs. She was also an editor and writer for the *Washington City Paper* and *The Washington Monthly*. In 2000, she received the Pulitzer Prize for Public Service, and, in 2002, she was awarded a MacArthur fellowship, in recognition of her body of work on the disadvantaged. – Address: 1227 O Street NW, Washington DC, 20005, USA.

E-mail: [katherinejboo@gmail.com](mailto:katherinejboo@gmail.com)

I came to the Wiko after two and a half years of difficult reporting in the slums of Mumbai, feeling tired, antisocial, and stopped up with events for which I couldn’t find words. On arrival, I doubted strongly that stories reported in huts and sheds full of garbage would emerge in a Villa Walther skypad overlooking a lake. But stories did come out, and a book deadline got met. This had a great deal to do with the ensorcelling environment of the Wiko, and the practical support and criticism from some remarkable women among the Fellows and spouses.

Although I use narratives in hopes of engaging an otherwise indifferent readership, my hope in the slum reporting was to be something other than a professional empathy, chronicling poverty qua poverty, with the requisite moments of flies-in-the-eyes abject-

ness. My abiding interest, in India and elsewhere, is in the infrastructure of opportunity that allows people to exercise their capabilities and get out of poverty. As India's break-neck growth promised new distributions of wealth and opportunity, I followed four dozen families in a single slum as they made choices – planned, improvised, re-thought, adjusted – in hopes of improving their social position. The chief impediments the slum dwellers encountered in those efforts led me to broader investigations of public institutions, from the police department to the judiciary to the apparati of public health, education, and elections. With a dual approach of observation and document-based research, I attempted to take a very rough measure of the gap between lived experience and the official statistical record by which India's growth is widely understood.

To the slum dwellers, most of whom were engaged in the scavenging trades, public institutions functioned as volatile private markets – markets that people with low purchasing power approached at great risk. As Central Government schemes proliferated to rectify educational and income inequality, and were in turn subverted at the local level, I came to believe that in a country with the second-fastest growth rate in the world, the under-reported redistribution was not that of wealth or opportunity, but of the effects of institutional corruption.

I also came to believe more strongly than before in the efficacy of market-based hope as a political instrument. The urban poor believed that interactions with a capricious government were more likely to harm than to help them, a condition under which market competition came to be seen as by far the fairer and more reliable means of alleviating poverty. The low expectations for government served that government nicely; it could continue to be cryptic and unaccountable. Meanwhile the market competition in which popular hopes resided pitted poor people against each other, weakening collective connotations of justice. A profoundly unequal urban society was in no near danger of imploding.

“And all like that,” as Mumbaikars say when they've talked themselves out. I remain surprised to have a book to refer to at the end of my six months at the Wiko and count those months as the most productive, and among the most pleasurable, of my working life.



## DER PIANIST ALS OKTOPUS ALFRED BRENDEL

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Geboren 1931 in Nordmähren. Frühe Klavierstudien in Zagreb und Graz. Erster Klavierabend „Die Fuge im Klavierwerk“, Graz 1948. Meisterkurse bei Edwin Fischer. Seit 1952 Schallplatten und CDs für Vox-Turnabout, Vanguard und vor allem Philips-Decca. Lebt seit 1971 in London. Zahlreiche Beethoven- und Schubert-Zyklen. Einführung des Klavierkonzerts von Schönberg auf drei Kontinenten. Liederabende mit Prey, Fischer-Dieskau und Goerne. Regelmäßiger Gast der großen europäischen und amerikanischen Orchester bis Dezember 2007. Hans von Bülow-Medaille der Berliner Philharmoniker, Ehrenmitgliedschaft der Wiener Philharmoniker. Ehrendoktor London University, Oxford, Yale usw. Mitglied des Ordens Pour le mérite und der Deutschen Akademie für Sprache und Dichtung. Frankfurter Musikpreis, Leonie Sonning-Preis, Ernst von Siemens-Preis, Praemium Imperiale. Buchpublikationen (Essays, Gespräche, Gedichte) seit 1976 bei Robson, Piper, Hanser, Faber, Adelphi, Princeton, Cornell. Gesammelte Gedichte bei Hanser, Bourgois, Phaidon Press. – Adresse: 13 Well Walk, London NW3 1BY, Großbritannien

### I.

Was vermag ein Pianist? Er macht ein ganzes Musikstück in allen seinen Stimmen, Rhythmen und Harmonien allein lebendig, eine Gabe, die sonst nur noch Dirigenten und Organisten zufällt. (Solostücke für Streicher oder Bläser bleiben Ausnahmen.) Wo bei „Lebendigmachen“ hier nicht bedeuten soll, das Stück sei noch tot, solange das Ingenium des Interpreten es nicht zum Leben erweckt. Nein, das Werk lebt schon weitge-



hend, wenn auch latent, in der Niederschrift des Komponisten. Der Interpret darf es wachküssen; dies ist seine Lust und Verantwortung.

Vom Dirigenten unterscheidet ihn, dass er alle Töne eigenhändig erzeugen darf bzw. muss. Der Reichtum der Klavierliteratur hat seinen guten Grund. Hier „beherrscht“ ein einziger Spieler das Stück. Dazu steht das Instrument stellvertretend für jedes musikalische Timbre. Es will verwandelt werden, ist Orchester, Riesenharfe, Gesangsstimme. Es beschwört die Elemente, beherbergt den Regenbogen.

„Belebe die Werke, ohne ihnen Gewalt anzutun“, riet der große Pianist Edwin Fischer, seinerzeit ein Bewohner Grunewalds. Form und Struktur ist darzustellen, nicht weniger jedoch ihr Charakter. Der Physiker Max Born schrieb an Einstein, im Menschen seien Gefühl und Verstand „unheilvoll vermischt“. Im großen Kunstwerk erfolgt diese Vermischung nicht unheilvoll, sondern erhebend und befreiend.

Wenn ein bekannter Musiker behauptet: „Die Musik vor 1800 spricht, die Musik danach malt“, dann frage ich: Und wo bleibt der Gesang? Bach hat seine zweistimmigen Inventionen und dreistimmigen Sinfonien ausdrücklich als Lehrstücke für das kantabile Spiel bezeichnet. Auch das Klavier kann singen. In meinem Musikverständnis ist, zumindest vor dem 20. Jahrhundert, der Gesang das Herz der Musik. Leopold Mozart schreibt in seiner Violinschule, „die Singmusik“ solle „allzeit das Augenmerk aller Instrumentalisten sein“ und empfiehlt „bei der Abänderung des Striches den Bogen auf der Violin zu lassen und folglich einen Strich mit dem anderen wohl zu verbinden.“ (V,14).

## II.

Was tut ein Pianist, wenn er nicht Klavier spielt? Er komponiert, spieß Schmetterlinge auf oder schneidet Rosen, fährt schnelle Autos oder bastelt Origami. Manchmal ist er, wie Paderewski, der Präsident von Polen. Oder er widmet sich dem Damenflor, trinkt Cognac, betet und hilft mit größter Selbstlosigkeit seinen komponierenden Kollegen wie Franz Liszt. Auch Schreiber gibt es unter den Spielern. Ich selbst habe seit langem ein literarisches Zweitleben geführt, ein Leben, das für mich kaum weniger prägend war als das musikalische. Als Konzertpianist im Ruhestand führe ich nun dieses literarische Dasein weiter, halte aber auch Vorträge über die Spielgewohnheiten mancher Kollegen oder die Bedeutung von Charakter in der Musik und berate ein paar jüngere Pianisten. Besonders gern arbeite ich mit Streichquartetten. Es ist schön, vier individuelle Spieler in einem Konzept zusammenzuführen.

Von der Tretmühle des Konzertierens befreit, hatte ich nun endlich das Glück, drei Monate lang am Wissenschaftskolleg zu sein. Hier konnte ich meine eigenen Schriften und Notizen wieder durchlesen und damit die Grundlage schaffen für weitere und zusammenfassende Arbeiten über Interpretation. Zugleich konnte ich die englische Ausgabe meiner gesammelten Gedichte für den Druck fertigmachen und einige dieser Gedichte in einer Lesung zweisprachig vorführen. In einem Vortrag über „Das umgekehrt Erhabene“ – so eine von Jean Pauls Formeln für den Humor – untersuchte ich die komischen Möglichkeiten absoluter Musik.

Für mich hat das Wiko etwas von einer Luftspiegelung. Die Illusion der Aufklärer, der Mensch und die Welt seien gut, oder sie könnten es immerhin werden, scheint hier auf geheimnisvolle Weise verwirklicht. Sind brillante Wissenschaftler immer so menschenfreundlich? Die Entspantheit der Fellows findet ihre Entsprechung (oder ihr Vorbild?) im Charme der Mitarbeiter des Hauses, sei es in der wunderschönen Bibliothek oder im Empfangsbüro, dessen Damen einem sofort durch ihren Anblick den Tag versüßen. Gespräche und Kolloquien ergänzen Bekanntes oder erschließen Neues, über die deutsche Frühromantik etwa, über den „Diskuswerfer“ (mit Luca Giuliani, der sich selbst als Modell für Position und Bewegung der Statue auf einen Tisch schwang) oder über die evolutionären Qualitäten von Oktopussen, deren ungeahnte Agilität und Farbigkeit in hinreißenden Projektionen zum Vorschein kam. Die Vielfingrigkeit und Wandlungsfähigkeit dieser Geschöpfe sei jedem Pianisten als *beau idéal* ans Herz gelegt.

### III.

Unsere Dankbarkeit ist groß.



WRITING ABOUT CONVERSATION WHILE  
DOING IT: AN ANTHROPOLOGIST IN  
WONDERLAND  
PENELOPE BROWN

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Penelope Brown is a Senior Researcher, emeritus, at the Max Planck Institute for Psycholinguistics in Nijmegen, The Netherlands. She was born and educated in the United States, receiving her Ph.D. in Linguistic Anthropology in 1979 from the University of California, Berkeley. She has worked for many years in the Tzeltal Maya community of Tenejapa, in southern Mexico, on research that broadly addresses relationships between language, culture and cognition and ranges across spatial language and cognition, cross-cultural comparison of conversational structure and inference, the systematics of social interaction and child language acquisition and socialization. She is (with Stephen Levinson) author of *Politeness: Some Universals in Language Usage*, and editor (with Melissa Bowerman) of *Crosslinguistic Perspectives on Argument Structure: Implications for Language Acquisition*. She is currently writing two books based on her long-term research in Tenejapa, one on Tzeltal conversation, the other on spatial language and cognition. – Address: Max Planck Institute for Psycholinguistics, PB 310, 6500 AH Nijmegen, The Netherlands. E-mail: pbrown@mpi.nl

The invitation to spend a year at the Wiko came at a particularly opportune time for me, when I was facing “retirement” and wondering what I would do with myself for the next 30 years (I come from a long-lived family). Although I was already immersed in writing a book on Tzeltal space, I proposed a different project for the Wiko, one that I had been thinking about intermittently since my doctoral research in Tenejapa, Mexico in the early ’70s: a book on the characteristics of Tzeltal conversation, in what respects it is similar to conversation in other languages and cultures and in what ways it is different. Funnily

enough, my prior experience with the Wiko included a wonderful conference organized by Esther Goody when she was a Fellow here in 1989–90, where my contribution was about politeness and irony in Tzeltal conversation. Coming here 20 years later I have returned to matters closely related to this theme.

Once here, I set aside my space book and for ten months thought and read and dreamed about conversation, ordinary everyday talk. I also did plenty of it, and I put on my anthropological hat more than once to observe how my conspecifics communicate with one another in seminars vs. over the dinner table vs. in German class vs. in the Café Floh vs. on bicycles on the way to the lake. Retreating to my monastic cell (in this very luxurious monastery), working without any pressures and with relatively few interruptions, reading very widely, engaging in discussions on any and every topic with my fellow Fellows – the feelings during this year re-evoked those of my first few months at college, age 16, entering a new and wide-open intellectual and social world.

My research agenda was, I thought, relatively clear at the start: write a book on interactional principles and conversational structure in Tzeltal Mayan, the language spoken in southern Mexico where I've conducted fieldwork for nearly 40 years. Taking as data videotaped recordings of naturally occurring Tzeltal interactions, the idea is to examine particular conversational practices – turn-taking processes, mechanisms for repairing misunderstandings, ways of conveying a speaker's knowledge, stance, attitude toward what they are saying, ways of performing particular speech acts like questions, requests, complaints – and analysing them from a conversation analytic (CA) perspective. Looking at language usage in all its multimodal richness (speech, intonation, gesture, gaze, facial expression) and embedded in its ethnographic context, I would examine these diverse aspects with an eye to the sorts of issues verbal interaction raises for humans everywhere and the sorts of solutions that are commonly found. The focus, then, as initially construed, was on the interplay of universal principles and cultural specifics in social interaction, and the aim was to contribute to a crosslinguistic base for conversation analysis and for social interaction more generally.

So much for the plan. Two sources of distraction derailed this original intention somewhat. One was the informal biweekly discussion group on “What makes humans unique?” convened by the sociologist Steven Lukes and comprising a spontaneously assembled group of Fellows hoping for some interdisciplinary insights into this perennially gripping topic. In this group we tried to address the evolutionary origins of putatively human-specific traits by looking at what precursors or analogous behaviours other animals have

evolved, reading articles in the biological, anthropological and psychological literature ranging across many topics – cooperation, language, theory of mind, social cognition, play, social emotions (shame, guilt, pride), coalitions, morality, music, culture. Lubricated with a glass of wine we discussed these issues energetically and enthusiastically, never coming to any definitive conclusions but getting a good sense of one another’s perspective, expertise and biases. The process motivated me to think about my own project more widely in terms of the nature of the human communication system in contrast to those of nonhuman animals.

The second source of derailment was comments I received in response to my colloquium, and other discussions, which made me think more deeply about what I was aiming for. My colloquium was about “feedback” in conversation – words like “uhuh”, “yes”, “yeah”, “yup”, eye contact, repeats – as ways of establishing and maintaining common ground. I looked at this in conversation data from two small-scale societies – the Tzeltal Maya of Mexico and the Rossel Islanders of Papua New Guinea – trying to show how culture shapes solutions to generic interactional problems like turn-taking and response systems, by demonstrating how different linguistic repertoires, gaze practices and cultural preoccupations in these two societies combine to produce distinct “styles” of interaction. In response to my argument that what Rossel Islanders do with intense face-to-face gaze and rapid visual signals like nods and eyebrow flashes, Tenejapans do with gaze avoidance and extensive next-turn repetition, my fellow Fellows asked questions and made comments like the following:

Do we really need to look at these small remote nonliterate cultures? Can’t we find universals by looking just in one culture or in one of the major cultures of the world? (Galín)

Could we have a measure of the amount of communication per moment – Rossels seem to pack much more in. Is this – the compression ratio of information – something that differs across languages? (Adam) Klaus also asked: Are Rossel Islanders in general quicker – more information-full per minute – than Tzeltal speakers, and could you generalize this to the two kinds of feedback (especially visual vs. non-visual)?

What does it take to override the threat meaning of mutual gaze that all primates have? Is there evidence that Rossels have had to do something extra to re-value gaze? Or that the Tzeltal gaze-aversion practice is more natural? (Vincent)

Do people in these two cultures have different views of space and the body – it would seem so. What’s the same? What’s different? Why? (Ewa)

Are you looking for causal effects of interactional style, not just correlations? And is there something deeper than interactional style at stake? Like social relationships? (Steven)

Couldn’t you treat these characteristics (+/- mutual gaze, etc.) as traits and trace their evolutionary development, just like is done with linguistic traits? Or is this more imperialism from biology? (Manfred)

Such comments, informed by their speaker’s own domain of expertise and interests, raised issues remarkably different from those I was used to considering and made me sit back and take stock.

In response to these sorts of challenges, progress on writing was interrupted while I read up about animal communication, biological methods in linguistics, the anthropology of hunters and gatherers, Steven’s book on morality, crosscultural work on shame, guilt and play. The structure of my own book widened, deepened and acquired a more biological basis. I wrote chapters on questions, person reference, feedback and repetition; other chapters are still in various degrees of half-formed transitional state. An international conference on Conversation Analysis that I attended in Mannheim in July – which turned out to be huge, some 10 parallel sessions stretched over a week – at least showed me that there will be an audience for the book I’m writing.

Other collaborative MPI projects summoned me: I wrote two papers unrelated to my book project – on the language of perception and on Tzeltal spatial metaphors for time. I revised and/or got into press eight others, on put/take verbs in Tzeltal, three child language papers, and – more closely related to my book – my comparative Tzeltal/Rossel baby interaction study, papers on feedback, Tzeltal questions and conversational repeats in three Mesoamerican languages. I also thought about writing a novel about my field-work family in Mexico.

Various people asked me how being here has influenced my working style – given that I work in a research institute, what is so different between work here and work at the MPI? The difference is profound. Here at the Wiko one has the time to pursue ideas wherever they lead, to follow the leads from paper to paper, to formulate one’s own perspective in relation to the literature, having had ample time to dwell on, ponder, and argue with the literature. It’s a freedom of time-to-think that I don’t remember having since

writing my Ph.D. dissertation: one goes where the thoughts lead, not worrying about deadlines or space limitations. If you have to weed out much of what you've read when you settle down to writing, that doesn't matter, the process still influences the coherence with which you formulate your own position. That's point one. Point two of course is the cross-disciplinary fertilization – who knows if talking and reading about, e.g., evolution and animal behavior will strongly influence my own work in the long run? But it's fascinating. And trying to explain one's intellectual obsessions to people with entirely different ones is both engaging and salutary.

Other aspects of the Berlin experience that I found wonderful: opera and museums (30 concerts!), walking, cycling and swimming in the Grunewald, cooking with my housemates in the Villa Jaffé, Eva's lessons in German history and culture along with discussions about German semantics, syntax and style. A bird-watching expedition eastward, with breaking-up ice flowing majestically down the Oder. Iceland's Eyjafjallajökull volcano, of which I heartily approved: It's excellent to be reminded that the earth is far stronger than the creatures who inhabit her. Nostalgic trips to places I had haunted while living in Berlin with my family 20 years before – Dahlem, Zehlendorf, the John F. Kennedy school, the Schlachtensee, the FU and the Ibero-Amerikanisches Institut, as well as downtown treats like Turkish restaurants in Kreuzberg and the KaDeWe's 6th floor.

Not that there were no hitches: excessive complaints about food, which Adam and I, as Fellow "representatives", had to parry. A bitterly long cold winter. No less than five colds, two complicated with bronchitis. Arguing about the colloquium format: after much discussion it became clear that you can't satisfy everyone. Some like precision and compactness, some (like me) like pretty pictures and an overview sense of what the work is about. At one colloquium X fell asleep, Y said he didn't understand a single word and Z spluttered with indignation when I asked him what he thought of it. I thought it was great, very interesting and delightfully delivered. But over lunch I sat with four Fellows who got nothing out of it, they said. I guess my vacuum-cleaner mentality (nursed by an American liberal arts education) isn't shared by everyone. I do think that the "hard" scientists bend over backwards to make their work intelligible to the rest of us, in a way that the humanists don't necessarily do; speakers in the humanities don't always seem to feel the need to introduce what they do by saying what the framing questions are or why this might be interesting to non-specialists.

Towards the end of the year I created a bestiary of this year's group (those whom I knew well enough to characterize), trying to capture their particular flavour of charm, disgruntlement, flamboyance, reserve or complacency. These are their social/interactional characters (as opposed to intellectual, which is something else altogether); the analogy here is to the Mayan animal soul companion that characterizes an individual's personality and shares his fate. This year's fellows and spouses, I reckon, include six kinds of dogs (labrador, golden retriever, terrier, Berner Sennenhund, Afghan hound, Newfoundland), a father duck, a chimpanzee, a chipmunk, a grizzly bear, a songbird, a walrus, an elephant seal, a rabbit, a marmot, a badger, a fox, a small rodent – e.g. fieldmouse – an elk, a lioness, a bear, an otter, a bonobo, a moose, a tiger, a solitary wasp, a jaguar/leopard, a lizard, a peacock, an anteater, a crow or raven, turtledoves, a beaver, a coyote, a meerkat and an antelope. Who's who? – can you guess?

The closest thing to the feeling of being here at the Wiko is the memory of my first steps into the wide world, leaving home and entering college: intellectual excitement, wonder, delight, the broadening of horizons. This Wiko year has been productive, eye-opening and immensely fun. I'm grateful for the superb infrastructure, the warm, supportive, friendly atmosphere and especially for the freedom to do one's own thing, whatever that might turn out to be.

I still don't know what I'll do with the next 30 years, but finishing this book is top of the list.





MELÉTE TÒ PAN  
MARIA LUISA CATONI

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Maria Luisa Catoni is fixed-term Professor (Professore Straordinario) of Ancient Art History and Archaeology at IMT (Institutions, Markets, Technologies – Institute for Advanced Studies Lucca) and Coordinator of the Ph.D. Program in Management and Development of Cultural Heritage. She has taught Iconography of Ancient Art at Pisa University and held a researcher appointment at the Scuola Normale Superiore, where she received her education in Classics and Art History. Her research interests center on four main areas: 1) The status of artefacts, images and texts as documents that historians and art historians use to reconstruct specific social interactions and contexts in Antiquity. 2) The reuse and manipulation of ancient values, ideas and images in post-ancient Western civilization and art. 3) The history of protection of cultural heritage in a comparative European perspective. 4) The comparison between ancient Greek theories of mimesis and contemporary theories of perception based on neurophysiology, evolutionary biology and psychology. Publications: *Bere vino puro: Immagini del simposio* (2010). *La comunicazione non verbale nella Grecia antica* (2008). *Schemata: Comunicazione non verbale nella Grecia Antica* (2005). – Address: Scuola Normale Superiore, Piazza dei Cavalieri 7, 56126 Pisa, Italy. E-mail: m.catoni@sns.it

*Melète tò pan* (Take care of the whole) is a sentence of one of the Seven Wise Men that seems to me to guide the Wissenschaftskolleg. A very short while after my arrival at the Wiko, I began wondering how the people who work here are selected, whether with the aid of some secret tool or whether, rather, they all merge here spontaneously, led by some hidden, mysterious, magic spell. It gradually becomes clear that they are the tuning fork,

a discrete almost hidden one: They set the pitch, creating a harmony where rigour, lightness, professionalism, humour, seriousness, helpfulness, intellectual involvement, genuine curiosity, immense patience, continuous and generous attention, build an ensemble of rare gracefulness. Grace is what describes the Wissenschaftskolleg at best.

Every imaginable need – for discussion, for exchange or for practical help – is met with great friendliness and simplicity: nothing seems to bore, bother or surprise the people working here, not even after a year of the same questions, awkwardness, neuroses, obsessions, lack of competence. *Meléte tò pan* applies to a whole that includes the Institute itself, its wonderful library “with no walls” (made extraordinarily efficient by the competence and passion of the people working in it), the other institutions in Berlin, the institutes devoted to research that the Wiko promotes around the world. The wonder is an unusual care for details, no matter the dimension of the context the Wissenschaftskolleg gets involved in.

Again, it must be a magic spell wafting on the Wiko that makes it, in a way, a mirror of the city of Berlin. A pleasant, surprising discovery for me: the intense energy of the city – with its museums, exhibitions, concerts, lectures, with its construction sites, stations, S-Bahn, U-Bahn, buses, with its universities, embassies and administrative buildings – makes a strange contrast with the silent, friendly streets of the city-centre districts, which one can bike through, especially when the intense smell of the trees hits again, along with a daylight one is no longer used to, after those long, dark winter days – yet beautiful, as I realized once they have passed by; or with the long walks around the lakes or along the Spree; or with the monumental space of Treptower Park or the overwhelming silence of Weißensee.

This intense mixture of energy and calm, sound and silence, nature and buildings is inflected at the Wiko in a special way: the many activities going on in or made available to the Fellows by the Kolleg (lectures, concerts, colloquia, lunches, discussion groups, conversations) mix with the intense, silent concentration one can enjoy; the location of the offices and apartments produces a suspension between isolation and interaction and, most importantly, the freedom to enjoy both.

Conversation and exchange matter for real, here. And this gives a refreshing feeling, which revitalizes the trust in and the love for research. I often found myself engaged in furious discussions, which allowed me to get to know my Co-Fellows and compelled me to read books I never thought I would read in my entire life.

Informal conversations – happening in the most casual ways and places – have been particularly involving and stimulating for me, especially the ones with my Co-Fellow scientists. In general, the way different disciplines face and address the relationship between general conclusions and/or preconceptions, on the one hand, and empirical data, on the other, has become increasingly problematic for me during this year. Increasingly clear to me has become also the problem of the separation of disciplines on which the academic systems I know are based, a separation that unnecessarily and absurdly affects the way research is carried out. The former problem has been a crucial ingredient in the collapse of my initial hypotheses related to my research project on women in Antiquity, which changed its entire physiognomy during this year. It basically lost its exclusive focus on Antiquity, after I realized that the modern history of the problem has had a substantial role in shaping the very physiognomy of the problem itself. In this context, the discussions with Yehuda Elkana, Luca Giuliani and Reinhart Meyer-Kalkus have been instrumental. The result will be a series of articles on Euripides' *Hippolytos*; on two passages of a treatise on women included in the Hippocratic corpus; on an iconographic formula attested on a group of funerary stelai, which permits a methodological reflection on iconographic innovations; and a study on how the problem of women in Antiquity has played a role, since the 18th century, in addressing much bigger, pressing political issues.

The second problem, my increasing intolerance for the separation of disciplines and the effect it has on research, was channelled to a constructive scope by the discussion group I had the chance to participate in for the whole year, on the Reform of Universities' Curricula, organized by Yehuda Elkana and coordinated by Manfred Laubichler and Yogendra Yadav. Thanks to their concrete and factual approach, a number of concrete experimental institutional initiatives and two documents have been produced.

The relationship between the Wiko and the outside world is something I discovered little by little. I was given the precious chance to present and discuss my works on Schemata in Antiquity, on ancient Greek vases, and on the Greek Symposion both at the Wiko and at other Institutions: the result has been that I developed a new interest in topics I considered, by then, rather remote from me; most importantly, I gained precious interlocutors, such as Horst Bredekamp and some of the Fellows of the Kolleg-Forschergruppe "Bildakt und Verkörperung" at the Humboldt University, whom I find challenging and inspirational.

As far as my project on the Greek Symposion goes, when I arrived at the Wiko I had already finished a book on the subject, which had already gone to the Italian publisher.

But the Wiko habit of discussing struck again: I engaged in an incredibly valuable, challenging, harsh and energizing discussion with Luca Giuliani on some specific pieces analyzed in the book on the Symposium; I could discuss with my Co-Fellows working in the field of law, Ellen Katz, Daniel Halberstam and Wolfgang Hoffmann-Riem, on topics such as the relationship between norm and violation as reflected in law; I was given an invaluable contribution by Dieter Thomä on the notion of negative ethics and its potential significance. The result was a delay in the publication of the book, which will come out only next October, but in a form that treasures many invaluable contributions I received at the Wiko.

Also a new project took shape during my stay here: thanks to Reinhart Meyer-Kalkus I was able to visit the Bibliotheca Classica in St. Petersburg, and thanks to the invaluable help of Alexander Verlinski I was able to look at some objects in the Hermitage, which will make an important contribution to my research on Greek painting, which I started last year.

Apart from some specific effects on my research that I can see, name and list, the discussions I enjoyed at the Wiko have been a continuous source of inspiration, curiosity and learning: discussions ranging from social insects to schismatic wasps, from morals and customs to constitutional differences, from aurality and literacy to Myron's discobolos, from the language of the great apes to the power of images to the power an author has over his narration, from the predictability of the future in physics to the Tzeltal verbal and nonverbal language, from the concept of greediness to the performance of irony in music.



MAINSTREAMING ISLAM: TAKING  
CHARGE OF THE FAITH  
DALE F. EICKELMAN

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Dale F. Eickelman was educated at Dartmouth College (AB, 1964), McGill University (MA, Islamic Studies, 1967) and the University of Chicago (Ph.D., Anthropology, 1971). He has been Ralph and Richard Lazarus Professor of Anthropology and Human Relations at Dartmouth College since 1989. He is a former President of the Middle East Studies Association of North America, a member of the Institute for Advanced Study, Princeton (1976–77), a Guggenheim Fellow (1992), a Fellow at the Woodrow Wilson International Center for Scholars (1996–97), a Fellow of the Wissenschaftskolleg (2000–01), and a Carnegie Fellow (2009–11). Books include *Moroccan Islam: Tradition and Society in a Pilgrimage Center* (University of Texas Press, 1976), *Knowledge and Power in Morocco* (Princeton University Press, 1985), *Muslim Travellers: Pilgrimage, Migration and the Religious Imagination*, co-edited with James Piscatori (University of California Press, 1990), *Muslim Politics*, co-authored with James Piscatori (Princeton University Press, 1996; new edition 2004), *New Media in the Muslim World: The Emerging Public Sphere*, co-edited with Jon W. Anderson (Indiana University Press, 2nd ed. 2003), *The Middle East and Central Asia: An Anthropological Approach*, 4th ed. (Prentice Hall, 2002) and, co-edited with Armando Salvatore, *Public Islam and the Common Good* (Brill, 2004). – Address: Department of Anthropology, Dartmouth College, 6047 Silsby, Hanover NH 03755-3547, USA. E-mail: Dale.f.eickelman@dartmouth.edu

My second stay at Wiko (January through early April) had a satisfying outcome, although – as I anticipated – no neat conclusion. My prior 2000–01 stay was for the entire academic year, so I already knew the rhythm of activity at Wiko. Indeed, the earlier stay was

followed by a two-year collective project, “Public Islam and the Common Good,” financed by the Humboldt-Stiftung but administered by Wiko. In a sense, I feel that I never left Berlin completely.

My 2010 Wiko residence came at the middle of a concurrent two-year Carnegie Corporation fellowship, the point where I began shifting gears from research to writing. Some scholars have a “big bang” approach to writing and follow a set outline. My approach is spiral. I have core arguments, but my presentation of them shifts as I learn more and try out ideas on different audiences.

My main idea is that the most profound transformations in the Muslim world today occur through the actions of middle-class professionals and religious intellectuals not trained in the conventional religious sciences. They are taking charge of developing their faith and practices for a modern, even postmodern, world that is as challenging for Muslims as for non-Muslims. We are familiar with fundamentalists, radicals and secularists, but less so with intellectuals rethinking religion outside traditional boundaries, organizers shaping new movements, others working quietly behind the scenes in support roles and reformers facing major institutional challenges as they go public.

The focus on ideas and organizational forms has been well studied by many, including myself. My current objective is to explore the impact of the concrete sets of skills and aptitudes now being cultivated among members of the educated middle classes, religious and non-religious, clerical and non-clerical, in majority-Muslim countries – and those active in Europe and North America. These skills contribute to mainstreaming Islam, the production of what is less exotic and therefore more normal and acceptable, which is itself a form of social and religious tolerance.

There are four major features that I am exploring, chosen in part by prior access to often challenging research environments. First are intellectuals who “take charge” of developing ideas and persuading large audiences in states where organized non-governmental movements are strongly discouraged. In Syria, for example, intellectuals who act on their own, whether religious or secular, are allowed considerable liberty to write if they avoid criticism of the government. The clerics in Najaf, Iraq, increasingly are likewise reaching outside the conventional contours of advanced religious study.

The second set of skills is the overt, up-front organizing of people and communicating effectively. States, including both liberal and totalitarian ones, depend on middle-class professionals just as successful religious and civic movements do, as in Indonesia and Morocco. State-sponsored efforts at religious dialogue, such as the Saudi-initiated 2008 inter-

faith conference in Madrid and the intrafaith 2004 “Amman Message” of Jordan’s King Abdallah calling for moderation, are organized and managed by middle-class professionals, as are non-state interfaith initiatives, such as those of the followers of Fethullah Gülen in Turkey and elsewhere. Forums and organizations that promote ideas and the exchange of ideas, such as the Arab Thought Forum for Palestinians, represent such up-front organizing. The civil society debate intersects with organizing for mainstreaming Islam, but it is not simply identifiable with that debate since the focus is not on civility in itself or democratization, but with the “selling” of the ideas and practices of a certain way of putting faith to work in society.

A third related skill is working quietly behind the scenes to further an interest or cause where weak forms of civic empowerment are linked to strong forms of structure, such as in the United Arab Emirates, where major state-sponsored initiatives are underway to use the “Islamic Studies” curriculum of primary and secondary schools to create a template for inculcating values of critical thinking, gender parity and religious tolerance. Likewise, the February 2004 revision of Moroccan family law, the *mudawwana*, to enhance the rights of women, was in preparation for years but enacted only in the wake of major terrorist attacks in Casablanca in May 2003.

A final skill is that of publicity trumping secrecy. Turkey’s Fethullah Gülen, initially trained as a state-sponsored preacher and recently named as one of the world’s top 100 intellectuals, has inspired a network of schools, newspapers and radio and television outlets to convey to his followers a respect for educational excellence and religious tolerance. Publicity can overcome the suspicion of groups and ideas, and in this way it contributes significantly to “normalizing” groups and ideas. Mainstreaming, however, also exacts a price. The advocates of mainstreaming can be criticized for vagueness and a lack of specificity, especially as “mainstream” Islam often downplays cultural specificities in favour of an affirmation of individual empowerment. Opponents to mainstreaming can vaunt their outsider status. Such opposition can be tenacious.

I settled quickly into a work routine at Wiko, although I forgot that Berlin sidewalks are not salted or otherwise chemically treated against ice. At first I mistook as ski enthusiasts the large numbers of pedestrians in Grunewald using hiking poles. After a few slips I understood why the poles were ubiquitous.

When not sliding on sidewalks, I completed an article on my project for *Encounters*, a new English-language journal published in Abu Dhabi, and a review essay also on the same topic. I regularly met with Berlin-area colleagues whose interests complemented my

own. One colleague, Jörn Thielmann (Erlangen), joined me for a week at Wiko, where we began work on a fifth edition of my *The Middle East and North Africa*, which he will co-author and subsequently translate into German. I also gave a keynote presentation at the “Time for Medialisation” conference co-sponsored by the Berlin Graduate School for Muslim Societies and Cultures and several Berlin-area institutions in early April. Berlin brought sharply into focus the goal of my “Mainstreaming Islam” project, and the weekly colloquium of Wiko Fellows presenting their work to non-specialists and specialists reminded me of the breadth of critical audience to which we should all aspire.





QUANTENSPRÜNGE IM GRUNEWALD  
JENS EISERT

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1970 in Ludwigshafen geboren als Deutscher und Schwede. 1991–97 Studium der Physik und Mathematik in Freiburg und an der University of Connecticut, 1998–2001 Promotion über Quanteninformationstheorie in Potsdam, 2001–03 Feodor-Lynen Fellow am Imperial College London, 2003–05 Juniorprofessor an der Universität Potsdam, 2005–08 Lecturer am Imperial College London, 2008–09 W3-Professor für Quantentheorie an der Universität Potsdam. Eiserts wissenschaftliche Arbeit wurde mehrfach ausgezeichnet, etwa durch einen Fulbright-Grant, den Michelson Prize, ein Feodor-Lynen Fellowship und einen European Young Research Investigator Award. Seine Forschungsinteressen liegen in der Quanten-Informationstheorie, der Quanten-Vielteilchentheorie und der Quantenoptik. Bisher entstanden mehr als 100 wissenschaftliche Arbeiten. – Adresse: Institut für Physik und Astronomie, Universität Potsdam, Karl-Liebknecht-Straße 24/25, 14476 Potsdam-Golm. E-mail: jense@qipc.org

Es ist still geworden, längst hat sich die Nacht über den Grunewald gesenkt. Ich sitze in meinem „Turmzimmer“ hoch oben direkt unter dem Dach der „weißen Villa“ – einer Ende des 19. Jahrhunderts gebauten und in den 70ern im Stile der Zeit umgebauten prächtigen Villa. Stapel von Papier sind vor mir aufgetürmt, vollgekritzelt bei dem Versuch, ein schwieriges Problem zu lösen. Dabei gibt es durchaus neue Einsichten: Im Zentrum des Tages stand eine stundenlange enthusiastische Diskussion mit Tobias Osborne, meinem Freund, Kollegen und Büronachbarn in der Villa Jaffé, während der wir aufgewühlt an der Tafel standen oder durch den Raum auf- und abgingen. Manches ist schon

viel klarer geworden, nun alles in Formeln zu fassen, ist das Vorhaben für den Abend; Fortschritt will sich, wie immer, nur langsam einstellen. Es war ein guter Tag.

Wie es viele gute Tage gab. Das Jahr am Wissenschaftskolleg war ein besonderes Jahr, in vielfacher Hinsicht. Natürlich ist das wirklich Besondere, das einen Aufenthalt am Wissenschaftskolleg ausmacht, die Begegnung mit den Fellows, die es für das jeweilige Jahr bevölkern. Kreative und warmherzige Menschen voller Energie und Ideen, die aus aller Welt für ein Jahr nach Berlin kommen, die verschiedensten Vorstellungen mitbringend, aber geeint in dem Bewusstsein, dass sie in ihrem Fach Besonderes leisten wollen. Sie alle haben sich für dieses Jahr viel vorgenommen. Besondere Menschen waren auch meine beiden unmittelbaren Kollegen Tobias Osborne und Ulrich Schollwöck aus der Schwerpunktgruppe „Klassische Simulation quantenmechanischer Systeme: Klassische Informationen versus Quanteninformation“. Etwas Besonderes war auch die freundliche, familiäre Atmosphäre, die die Angestellten am Wissenschaftskolleg schufen, wie etwa – pars pro toto – der energiegeladene und freundliche Reinhart Meyer-Kalkus oder der ideengetriebene und stets den rechten Ton findende Rektor Luca Giuliani.

Dieses Jahr war eine Herausforderung, nicht zuletzt deswegen, weil wohl die meisten Fellows eine homogenere akademische Umwelt gewohnt sind. Mir ging das kaum anders: Es werden plötzlich Methoden in Frage gestellt, verschiedene Vorstellungen erörtert, legitime Schlussweisen neu interpretiert. Welches sind die Methoden, die sinnhaft zur Klärung einer Frage beitragen können? Dinge, die sonst selbstverständlich waren, sind es nun nicht mehr. Zuweilen sind wir drei Quantenphysiker Exoten, die etwas tun, das rätselhaft, kurios und fremd erscheint. Behauptungen über die Verbindung der Quantenmechanik mit unsichtbaren rosa Elefanten kommen auf. Es wird gelacht, herausgefordert, eine These vertreten, wieder gelacht. Zuweilen blitzt die Idee auf, es könnte wirklich die „Zwei Kulturen“ geben, die die Geistes- und Naturwissenschaften trennt, wie sie Snow einst sah; und dann sitzt man wieder gemeinsam am Tisch und findet viele Gemeinsamkeiten. Vor allem auch an den langen entspannten und doch geistreichen Gesprächen an den Donnerstagabenden: Nie verließ ich den Tisch ohne einen neuen Gedanken. Eine intellektuelle Herausforderung war das Jahr aber vor allem durch meine beiden Kollegen aus der Schwerpunktgruppe.

Vor meiner Berufung als Fellow ans Wissenschaftskollegs arbeitete ich am Imperial College in London. Noch bevor ich mein Fellowship in Berlin antrat, nahm ich ironischerweise eine Professur im Berliner Raum, nämlich an der Universität Potsdam, an. Es ist nicht zu leugnen, dass mein Jahr dadurch reichlich durcheinandergebracht wurde.

Durch die räumliche Nähe war ich am Wissenschaftskolleg für meine Kollegen am Potsdamer Institut sichtbar wie in einem Glastank und ganz und gar nicht abgeschottet von den alltäglichen universitären Pflichten, wie meine Co-Fellows. Das war auf eine Art großartig, denn so konnte ich mit meinen Mitarbeiterinnen und Mitarbeitern an der Universität weiterhin zusammenarbeiten. Aber manchmal führte dies eben auch zu einer gewissen Zerrissenheit.

Berlin war für mich keine fremde Stadt, die es zu erkunden galt, sondern eher eine bekannte und geschätzte Nachbarstadt, die vom Inselleben in Grunewald aus gesehen so nah und doch zuweilen so fern zu liegen schien. Manche erlebten Berlin nur entlang der Streckenführung des M19-Busses; „Mein Berlin“ lag auch in Berlin-Mitte, wo sich meine reguläre Wohnung befand (und immer noch befindet).

Inhaltlich war das Jahr ein sehr kreatives, obwohl sich vieles in eine andere Richtung entwickelte als geplant. Projekte, die wir uns vorgenommen hatten, verliefen im Sande, andere stellten sich als schwieriger heraus als gedacht. Wieder andere entstanden ganz neu. Ein zentraler Gedanke, der sich durch die Arbeit am Wissenschaftskolleg zog, ist der, gewissermaßen den Ort des Konfigurationsraumes zu finden und zu identifizieren, in dem sich komplexe Quanten-Vielteilchensysteme tatsächlich aufhalten. Dieses Ziel schien zunächst unerreichbar zu sein. Im Formalismus der Quantenmechanik werden Zustände physikalischer Systeme – also Systeme der Festkörperphysik oder auch einzelne Atome und Ionen – im sogenannten Hilbertraum beschrieben, einem formalen mathematischen Raum, der die kuriose Eigenschaft besitzt, dass seine Dimension immens schnell mit der Anzahl der involvierten Freiheitsgrade skaliert. Genauer gesagt, sie wächst exponentiell, also in einer Weise, die eine detaillierte Beschreibung schon von moderat großen Systemen von vornherein völlig unmöglich macht. Zum Beispiel ist die Dimension des Konfigurationsraums eines einzelnen Spins – also gewissermaßen eines quantenmechanischen Kreisels – zwei, die von zwei Spins vier, und die von 100 Spins, was immer noch ein winziges System darstellt, schon mehr als

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eine astronomisch große Zahl. Natürlich kann man auch solche Systeme naiv nicht mehr auf Rechnern modellieren, alleine deshalb weil sich so viele Zahlen nicht speichern und verarbeiten lassen.

Die zentrale neue Einsicht bestand nun darin, diesen eigentlichen Konfigurationsraum der Natur als Fiktion anzuerkennen: Die Natur lebt gar nicht in ihm, sondern in einem viel kleineren Unterraum, der zu beliebig genauer Approximation die physikalische Situation schon richtig darstellt. Besser noch: Diese Unterräume lassen sich mathematisch gut fassen – durch sogenannte Tensornetzwerke – und effizient beschreiben. Wenn man diesen Gedanken weiterführt, heißt dies: Um Grundzustände oder andere wichtige physikalische Zustände zu finden, muss man die Nadel nicht mehr in einem absurd großen Heuhaufen suchen, den zu fassen sich durch die obigen großen Zahlen über Dimensionen verbietet, sondern man kann in einem winzigen Teil dieses Haufens suchen, von dem man weiß, dass sich die Nadel dort sicher befindet. Das war durchaus ein „Quantensprung“ einer Einsicht.

Diese Idee – krude wie sie zunächst zu sein scheint – ist in nicht-perturbativen Theorien recht neu: Die ersten Ansätze gehen auf Arbeiten in den frühen 90er-Jahren zurück. Erst in den letzten Jahren wurden aber all die Implikationen gesehen, die schließlich zu fundamentalen Einsichten führten. Dies war der Kern unserer Arbeit: Was haben die „effektiven Freiheitsgrade“ mit Verschränkung, also echt quantenmechanischen Korrelationen zu tun? Wie ist die Struktur von Korrelationen in komplexen Quantensystemen? Was kann man aus Sicht der Informatik darüber sagen, wie schwierig eine Beschreibung etwa von ungeordneten Systemen ist? Andererseits ergeben sich so neue mächtige Simulationsalgorithmen, um numerisch komplexe Systeme zu beschreiben, wie etwa fermionische Systeme. Hier konnten wir in dem Jahr viele Fortschritte machen. Ideen, wie man Quantenfelder in einem solchen Sinne regularisieren kann und neue Simulationsverfahren finden kann, standen im Zentrum vor allem in der Arbeit mit Tobias Osborne. Alte Fragen der Quantenfeldtheorie konnten wir auf diese Weise frisch angehen und neue Antworten auf alte, zum Teil ungelöste Fragen finden.

In der jüngsten Literatur wurde viel darüber geschrieben, wie schwierig es sein kann, Grundzustände zu finden. Die obigen Ideen ernst nehmend und auf ihnen aufbauend, fanden wir eine neue Klasse von Modellen, die man exakt lösen kann. Dies ist ein wichtiges Hilfsmittel, um die genaue Grenze zwischen „einfach“ und „unlösbar schwierig“ (in der Sprache der theoretischen Informatik) auf der Landkarte der physikalischen Systeme ziehen zu können.

Mit Ulrich Schollwöck standen ähnliche Fragen im Vordergrund, vor allem motiviert durch Fragen des Nichtgleichgewichts. Hier ist die zentrale Motivation, zwei große fundamentale Theorien, die Quantenmechanik und die statistische Mechanik, zusammen-

zubringen. In vielerlei Hinsicht befinden sich diese bisher bloß in einer Art friedlicher Koexistenz, weil die eigentliche Frage, wie man auf der Basis dynamischer Gesetze und einer mikroskopischen Theorie die Ensembles der statistischen Mechanik erhält, nicht zufriedenstellend beantwortet war. Arbeiten, die Ulrich Schollwöck und ich zusammen mit Experimentalphysikern in München durchführen konnten, gehen in Richtung einer Klärung und diskutieren auch erstmals experimentelle Befunde von kalten Atomen im Nichtgleichgewicht, für die starke Korrelationen eine Rolle spielen. Die elementare Frage, „warum die Natur aussieht, wie sie aussieht“, stand und steht also auch hier im Vordergrund. Eine für unsere Ideen wichtige Arbeit konnten wir am Wissenschaftskolleg fast abschließen, und die endgültige Fertigstellung wird in nächster Zeit erfolgen.

Rückblickend war mein Jahr am Wissenschaftskolleg eine kreative Zeit, voller neuer Fragen und Ideen. Im Mittelpunkt der Woche standen nicht zuletzt auch die Dienstagskolloquien, die fast immer inspirierend waren. Auch das eigene Kolloquium zu halten – im Turmzimmer tagelang vorbereitet – war durchaus ein bemerkenswertes Erlebnis. Es beeindruckte mich nachhaltig, wie viele scharfsinnig und präzise formulierte Fragen nach der Rolle des absoluten Zufalls in der Natur in der nachfolgenden Diskussionsrunde gestellt wurden.

Dürfte ich noch einmal am Wissenschaftskolleg sein, würde ich die Zeit vielleicht besser planen und sicherstellen, dass ich in noch konzentrierterer Weise dort sein kann. Aber ich will die Zeit, wie sie war, ganz sicher nicht missen. Es war ein wichtiges Jahr. Vielen herzlichen Dank dafür.

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- Caruso, F., J. Eisert, V. Giovannetti und A. S. Holevo. „The optimal unitary dilation for bosonic Gaussian channels.“ arXiv:1007.4797.
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- Mari, A. und J. Eisert. „Gently modulating opto-mechanical systems.“ *Phys. Rev. Lett.* 103, 213603 (2009).
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THE UNIVERSITY OF THE 21ST CENTURY:  
CONTENTS AND CURRICULA  
YEHUDA ELKANA

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Yehuda Elkana was born in Yugoslavia in 1934; after the war and a year in a concentration camp, he immigrated to Israel in 1948. He studied Physics, Mathematics and History of Science, publishing his doctoral thesis “On the Emergence of the Energy Concept” at Harvard University Press in 1968. For one year, he taught at Harvard University. 1968–93 he taught at and chaired the Department of History and Philosophy of Science at the Hebrew University. Fellow of the Center for Advanced Study in the Behavioral Sciences, 1973–74; Visiting Fellow at All Souls College, Oxford, 1977–78; 1981–91, Director of the Cohn Institute for the History and Philosophy of Science and Ideas, Tel Aviv University. 1968–93, Director of the Van Leer Jerusalem Institute. 1988/89, Fellow at the Wissenschaftskolleg zu Berlin; 1987–2006, Permanent Fellow there. He was a Member of the Academic Advisory Board of the Collegium Budapest and its Deputy Chairman; he is a corresponding member of the International Academy for the History of Science. Elkana was founding editor of *Science in Context* and has written several books and numerous articles. 1995–99 he and Helga Nowotny shared the Professur für Wissenschaftsphilosophie und Wissenschaftsforschung at the ETH Zurich. 1999–2009, President and Rector of the Central European University in Budapest. – Address: Wissenschaftskolleg zu Berlin, Wallotstraße 19, 14193 Berlin. E-mail: yehudaelkana@gmail.com

Originally, I had hoped to have with me in the Academic Year 2009/10 several Fellows who know much about the topic, and who had rich experience in their academic careers in working also on curricula and problems of higher education, in addition to being leading scholars in their own right. Unfortunately, for various personal reasons, three of them

could not come to Berlin, but luckily, Marie Farge, a leading world expert on turbulence and wavelets with no direct teaching experience, but many hours invested in deep thinking on curricular and other university issues, was able to join us at the Kolleg.

At a very early stage, I presented to my fellow Fellows my research plans and my theses and invited those interested to join me in a year-long seminar dedicated to these topics. To my pleasant surprise, fifteen Fellows joined the seminar – all eminent scholars in their fields, but most of them had spent very little time in their academic career building curricula. The spectrum included different disciplines, different nationalities and different academic backgrounds. However, the Dean of the School of Life Sciences at Arizona State University, Robert Page, and a senior professor of the same school, Manfred Laubichler, were directly involved because they were working on developing a new undergraduate curriculum for their school. Also two Indian scholars – both political scientists – the Director of the Delhi Center for the Study of Developing Societies (CSDS), Rajeev Bhargava, and a Senior Fellow there, Yogendra Yadav, took great interest, being very worried about the direction that Indian higher education was taking: the Indian Government is investing millions in establishing new universities, without having given much thought to the problem of what to teach there.

Other Fellow-participants were: Marie Farge, Maria Luisa Catoni, Galin Tihanov, Claus Pias and Adam Wilkins (another eminent biologist who had given some thought to the teaching of evolutionary theory, among other biological topics). Participants who joined the group from outside were Madhulika Banerjee, University of Delhi; Nancy Budwig from Clark University; Liviu Matei, the COO of the Central European University in Budapest; Hans Weiler, Stanford Professor and President emeritus of Viadrina; Agi Besetzky and Hannes Kloepper. Reinhart Meyer-Kalkus and Matthias Bergmann, both from Wiko, accompanied the seminar. All took a lively part in the discussions.

Yogendra Yadav proposed that we aim at publishing a Manifesto. After many discussions within the group, it was decided to work on two complementary papers: a short Manifesto, consisting of 11 bullet points with an introduction, and a longer paper, written in essay form to be published in the relevant periodical(s). Actually, from that point onwards, the work of the group consisted in preparing the two documents. (The shorter Manifest is attached at the end.)

It was decided that a website should be established inviting international discussion and criticism from all who are interested. The website will be handled by the project director, Hannes Kloepper; and through the Leuphana University of Lüneburg, a grant



proposal will be submitted to the Stiftung Mercator, Essen for this position and the expenses around it. So far, much of the technical assistance for setting up the site was provided pro-bono by ASU. A network has been created of universities that endorsed the Manifesto and expressed interest in trying out experimentally the various curricula that will be constructed relying on the principles of the Manifesto; so far the members are: Leuphana University Lüneburg, Jacobs University Bremen and Arizona State University. We have submitted various papers by way of information both to *Nature* (at their suggestion to have a letter to the editor with the Manifesto as a link) and to Science Education Forum.

An important meeting between Washington policy experts and German scholars took place at Wiko on 5–6 June. In addition to four distinguished policy experts from America, on the German side, Professor Strohschneider, the Chair of the Wissenschaftsrat; Sascha Spoun, the President of Leuphana; Helga Nowotny, the President of the European Research Council; and representatives of the Volkswagenstiftung and of the Stiftung Mercator took part.

The Wissenschaftskolleg, according to its policy, supports its Fellows, but takes no responsibility for the contents of the product. I convened several times the heads of Israeli universities, and a major workshop was held at the end of May in Jerusalem, sponsored by the Van Leer Jerusalem Institute and the Israel Democracy Institute. The Planning and Budget Committee of Israeli Higher Education, in the person of its Director, Manuel Trachtenberg, also participated and it will fund the project in part in Israel. The Rector of the Hebrew University of Jerusalem, Menahem Ben-Sasson, has invited me to house the project under its aegis, and in all probability it will serve as a venue for trying out curricula, thus joining the network. If this works out – and it now looks like it will – I will spend half of my time in Jerusalem and half in Berlin.

In Berlin, my base will be at Wiko in my capacity as Senior Adviser to the Rector, but I am also affiliated with Department I of the Max Planck Institute for the History of Science, Berlin working on Higher Education in an age of Globalization. I have also been invited as a part-time Guest Professor both at Leuphana University Lüneburg and at Jacobs University Bremen. In January 2011, a workshop dedicated to these same topics will be held in Delhi, under the auspices of the CSDS.

In the Academic Year 2010/11 I will announce a seminar at Wiko, and if there will be interested Fellows, we will again work the whole year. All in all, it seems that the time is

ripe for introducing major changes in the curricula of undergraduate education worldwide.

### Principles for Rethinking Undergraduate Curricula for the 21st Century: A Manifesto

The current crisis of the university is intellectual. It is a crisis of purpose, focus and content, rooted in fundamental confusion about all three. As a consequence, curricula are largely separate from research, subjects are taught in disciplinary isolation, knowledge is conflated with information and is more often than not presented as static rather than dynamic. Furthermore, universities are largely reactive rather than providing clear forward-looking visions and critical perspectives. The crisis is all the more visible today, as the pace of social, intellectual and technological change inside and outside the universities is increasingly out of step. While universities worldwide are undergoing many, often radical, structural transformations, ranging from the Bologna Process in Europe and the Exzellenzinitiative in Germany to the rapid expansion of universities in India and China, the accelerating decline of public investments in universities in the United States and elsewhere and an ever-growing demand for university access everywhere, much less attention has been paid to university curricula. But for the university as a community of scholars and students, the curriculum is its central function and the key to its internal renewal. Universities are embedded in multiple institutional, economic, financial, political and research networks. All of these generate pressures and constraints as well as opportunities. The curriculum, however, is the core domain of the university itself.

Here we present a set of eleven overlapping principles designed to inform an international dialogue and to guide an experimental process of redesigning university undergraduate curricula worldwide. There can be no standard formula for implementation of these principles given the huge diversity of institutional structures and cultural differences amongst universities, but these principles, we believe, provide the foundational concepts for what needs to be done.

- As a central guideline, teach disciplines rigorously in introductory courses together with a set of parallel seminars devoted to complex real life problems that transcend disciplinary boundaries.

- Teach knowledge in its social, cultural and political contexts. Teach not just the factual subject matter, but also highlight the challenges, open questions and uncertainties of each discipline.
- Create awareness of the great problems humanity is facing (hunger, poverty, public health, sustainability, climate change, water resources, security etc.) and show that no single discipline can adequately address any of them.
- Use these challenges to demonstrate and rigorously practice interdisciplinarity, avoiding the dangers of interdisciplinary dilettantism.
- Treat knowledge historically and examine critically how it is generated, acquired and used. Emphasize that different cultures have their own traditions and different ways of knowing. Do not treat knowledge as static and embedded in a fixed canon.
- Provide all students with a fundamental understanding of the basics of the natural and social sciences and the humanities. Emphasize and illustrate the connections between these traditions of knowledge.
- Engage with the world's complexity and messiness. This applies to the sciences as much as to the social, political and cultural dimensions of the world. This will contribute to the education of concerned citizens.
- Emphasize a broad and inclusive evolutionary mode of thinking in all areas of the curriculum.
- Familiarize students with non-linear phenomena in all areas of knowledge.
- Fuse theory and analytic rigor with practice and the application of knowledge to real-world problems.
- Rethink the implications of modern communication and information technologies for education and the architecture of the university.

Curricular changes of this magnitude and significance both require and produce changes in the structural arrangements and institutional profiles of universities. This is true for matters of governance, leadership and finance, as well as for systems of institutional rewards, assessment and incentives; it is bound to have implications for the recruitment and evaluation of both professors and students, as well as for the allocation of resources and the institutional practice of accountability. The experimental process of curriculum reform we hope to stimulate by offering these guiding principles will thus require the collaboration of scholars and educators willing to transform their scholarly and

educational practices and of administrators willing to support experimentation and to provide the necessary structural conditions for it to succeed.

These principles are the conclusion of deliberations by a working group of scholars who met at the Wissenschaftskolleg zu Berlin during the academic year 2009/10. Participants represented diverse disciplines (from the natural and social sciences and the humanities), geographical origins (Europe, North America and India) and career stages (from former university presidents to students). They invite their colleagues around the world to join in this effort of re-thinking and re-shaping teaching and learning for the university of the future.



OH ! UNE IDÉE, C'EST SI RARE !  
MARIE FARGE

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Marie Farge est physicienne et mathématicienne appliquée, et Directrice de Recherche au CNRS (Centre National de la Recherche Scientifique). Elle étudie la dynamique non linéaire des écoulements turbulents dans les fluides et les plasmas en s'appuyant sur la simulation numérique et la représentation en ondelettes. 1973–75 : chercheur au CEA dans le Département de Physique des Plasmas et de la Fusion Contrôlée. 1976–77 : Master of Science, Stanford University. 1977–80 : Doctorat de 3ème cycle en Physique, Université Paris VII. 1980–81 : Post-doctorat, Harvard University, Fulbright Fellow. 1981–87 : Doctorat d'État en Mathématiques, Université Paris VI. 1981– : Chercheur CNRS au Laboratoire de Météorologie Dynamique de l'École Normale Supérieure, Paris. 1994–95 : Professeur de Mathématiques (chaire Sofia Kovaleskaia) de l'Université de Kaiserslautern. 2005–08 : Visiting Fellow, Trinity College et Cambridge University. Elle a enseigné dans diverses universités en France et à l'étranger (Japon, Inde, Brésil, Chine, États-Unis, Allemagne, Turquie). Elle donne actuellement un cours de physique à l'Institut d'Etudes Politiques de Paris (Sciences-Po). Elle est éditrice associée de deux revues de mathématiques appliquées : *Applied and Computational Harmonic Analysis* (Elsevier) et *Journal of Multiscale Modeling and Simulation*. Elle est membre du comité d'éthique du CNRS et vice-présidente de la section « Physics and Engineering » de l'Academia Europaea. – Adresse : LMD-CNRS, École Normale Supérieure, 24 rue Lhomond, 75231 Paris Cedex 5, France. Courriel : farge@lmd.ens.fr. Site Web : //wavelets.ens.fr

En Mars 1922, Albert Einstein est invité au Collège de France par son ami Paul Langevin pour donner, en français, une série de cours sur la relativité. Un soir, lors d'un dîner mondain, il a pour voisin de table Paul Valéry. Ce dernier aimerait profiter de l'aubaine de cette rencontre pour lui soutirer quelque « truc » intellectuel, quelque secret de métier : « Mais comment faites-vous, Cher Maître ? Avez-vous un petit carnet où vous notez vos idées ? » Einstein, avec son espièglerie habituelle mâtinée d'une profonde sagesse, lui répondit qu'il n'a pas besoin de carnet, car « Oh ! Vous savez, une idée, c'est si rare ! »

Les idées sont comme les fleurs sauvages, celles que l'on voit poindre de façon incongrue entre deux pavés au cœur de nos villes, ou celles encore non identifiées qui, à la campagne, se cachent au cœur de nos prairies, et que l'on découvrira un jour, peut-être, à quelques pas de nos portes. Bref, une idée naît, certes après une longue gestation, souvent pénible mais aussi parfois ignorée. C'est au moment où on ne l'attend pas, où on ne l'attend plus, qu'elle décide justement d'advenir. Nous avons beau supplier le ciel, tenter de susciter sa venue par maints rituels, tel un chaman essayant de faire tomber la pluie, mais la vérité est que nous n'y pouvons pas grand chose. L'idée, elle, vient si elle veut, quand elle veut, et où elle veut. À chaque fois c'est un petit miracle, mais il se produit fort peu souvent. L'homme moderne a certes le pouvoir de détruire les fleurs sauvages, mais pas celui de les inventer – ceci par définition du mot « sauvage ». De même, ni les responsables politiques, ni les gestionnaires de la recherche ne peuvent forcer les intellectuels à créer, à avoir de nouvelles idées. Ils peuvent tenter toutes les procédures qu'ils voudront, ils ne maîtriseront jamais le processus créatif, pas plus que les chercheurs eux-mêmes d'ailleurs. En effet, celui-ci n'est pas affaire de volonté, mais d'inspiration et de maturation. Les intellectuels sont de fragiles antennes, juste un peu plus sensibles à l'apparition et à la perception d'une idée que les autres hommes. La plupart d'entre-eux sont intellectuellement tout aussi capables mais moins intéressés, moins disponibles, trop occupés ailleurs que dans le monde des idées. Je me suis toujours demandée pourquoi les intellectuels n'ont-ils pas des entraîneurs, des médecins, des masseurs, des psychologues, à leurs petits soins, tout comme les sportifs de haut niveau ? Nous aussi jouons des jeux, non pas de balles, certes, mais d'idées. Nous pratiquons assidûment, nous faisons des exploits, mettons notre corps dans des situations extrêmes pour y arriver, éprouvons la fatigue des nuits blanches, voire l'épuisement physique et intellectuel, et avons besoin de moments d'arrêt pour reprendre des forces. Il nous faut tout d'abord apprendre à jouer, ce qui nécessite, comme pour un sportif, une longue formation, l'acquisition d'une bonne maîtrise technique et la soumission à une sélection cruelle qui ne retient que les meilleurs. Mais il

nous faut de plus être capable d'inventer de nouvelles règles du jeu, ce qui est, soit dit en passant, le défi le plus intéressant qu'offre la recherche. Cela requiert une immersion dans le temps long, celui des échelles historiques, pour comprendre l'évolution des idées et le processus de questionnement qui en est la source vive. En effet, si l'on veut percevoir loin devant il faut savoir observer et comprendre loin derrière. Cela nécessite une grande ouverture d'esprit et une culture vaste, qui ne s'acquièrent qu'avec l'âge et la pratique. Aussi suis-je tentée de penser que, contrairement à la plupart des sportifs, les chercheurs se bonifient avec l'âge, certes de façon variable selon les domaines, mais ce n'est cependant pas une raison pour ne pas prendre soin d'eux.

Capo : mais qu'ai-je donc fait au Wiko ?

Lors de mon arrivée au Wiko, le 1er octobre 2009, j'avais rêvé qu'en m'isolant de l'agitation parisienne, ou plus précisément de l'agitation internationale qui est le quotidien de nous autres, pauvres chercheurs, sautillant d'un continent à l'autre comme des puces sur le globe, je renouerais avec la tranquillité du monde des idées dans l'écrin protecteur du *Wissenschaftskolleg*. J'y ai cru très fort la première semaine, car je retrouvais ici, à Grunewald, le calme, la beauté et la vitalité immuable de la nature que j'avais connus dans mon enfance et qui me manquent tant à Paris. Je pensais que j'allais enfin poser mes bagages dans ce havre de paix où je pourrais en toute quiétude terminer la rédaction du livre que Kai Schneider et moi-même avons, il y a bien longtemps et en toute inconscience, promis à Cambridge University Press pour la fin de l'année 2004. Malheureusement il m'a bientôt fallu déchanter. Dès que mon ordinateur fut connecté au réseau du collège, tout ce que je fuyais en venant chercher refuge à Berlin me rattrapa. Les centaines et centaines de courriels en souffrance, les articles à référer, et ceux pour lesquels, en tant qu'éditrice de revue, il me faut convaincre trois collègues par article du fait que leur dévouement serait très apprécié s'ils me faisaient la grâce de bien vouloir accepter le rôle ingrat de *referee*. A ceci s'ajoutent les articles à finir d'urgence pour ne pas pénaliser les étudiants qui ont besoin d'avoir au moins trois articles publiés avant de pouvoir soutenir leur thèse, plus les rapports d'avancement des contrats en cours et les demandes de renouvellement de ceux-ci, qu'il faut envoyer chaque année à une date impérative si je veux éviter que l'on ne me coupe les vivres, mais aussi, bien évidemment, les rapports d'activité exigés par mon employeur, le CNRS (Centre National de Recherche Scientifique), qui doivent être remplis en ligne sur divers sites web plus mal fichus les uns que les autres



Ill. 1: Lancelot passant le Pont de l'Épée. *Lancelot du Lac*. Roman du XIIIe siècle. Manuscrit copié à Paris au début du XVe siècle. BnF, Manuscrits, Français, 119 fol. 321v.



(CRAC et DIALOG, ex-LABINTEL, pour les intimes, et qui ont le bon goût d'être bogués et de disparaître à midi le jour de la date limite). La liste n'est pas close mais je vous épargne la suite, car vous m'avez comprise. Et voilà, je me retrouvais à nouveau le cerveau englué dans le béton en train de prendre, l'esprit retombant dans la désespérance intellectuelle car sommée de produire mais non de penser. Mon corps renouait ainsi avec l'épuisement des nuits blanches passées à courir après les dates limites, comme autant d'obstacles à sauter sans même avoir le temps de reprendre haleine. « Mais enfin, je suis venue pour finir le livre, je dois y arriver coûte que coûte ! », me disais-je dans un dernier sursaut de révolte. J'ouvris alors la valise contenant le précieux manuscrit du livre en gestation. Celui-ci est organisé en sept chapitres. Ses 417 pages et les différentes séries de notes engrangées depuis tant d'années sont soigneusement rangées dans des classeurs de différentes couleurs aux teintes pastel. Je disposai le tout sur la moquette rose de ma chambre, c'était du plus bel effet visuel, et je contemplai longuement cet objet intellectuel qui occupait près du tiers de l'espace vital de la pièce, tout en méditant par où je pourrais bien commencer. Je commis alors une grave erreur de jugement : je décidai, pour me remettre dans le bain, de relire le manuscrit en partant du début. Or l'entreprise, qui devait n'être qu'une simple remise en jambes, s'avéra être un *crash test*. Je commençai à couvrir les feuillets de corrections au feutre rouge, mais bientôt ce n'était plus le texte seul qui posait problème, c'était sa structure elle-même. Là, il me fallut utiliser les ciseaux et la colle, puis bientôt je m'aperçus que ce traitement de rattrapage devenait trop complexe, car j'allais réduire le manuscrit en miettes. Je rencontrais des problèmes partout, souvent insolubles. Par exemple, quand vous écrivez des centaines de pages, la plupart couvertes d'équations exprimant les relations qui existent entre des centaines de variables différentes, comment faire en sorte que celles-ci soient notées de façon consistante, chacune devant être représentée par un signe qui lui est propre, distinct des autres, quand on ne dispose que de trois alphabets – le romain, le grec et l'hébreu ? Il faut également respecter les conventions existantes, mais celles-ci diffèrent suivant les spécialités et les communautés auxquelles on s'adresse. Or le livre en question, intitulé *Wavelets and Turbulence*, est à la croisée de plusieurs traditions mathématiques (analyse harmonique, analyse numérique, processus stochastiques ...) et aborde le problème de la turbulence selon différents points de vue, qui relèvent à la fois de la physique statistique, de l'aérodynamique, de la météorologie, et j'en passe ... L'écriture chinoise, qui est en principe capable d'engendrer une infinité d'idéogrammes, serait probablement la solution, mais *Cambridge University Press* n'apprécierait peut-être pas pareille innovation. Ainsi me suis-je retrouvée bloquée au

milieu du gué, mais sans arriver à le franchir. Un mois plus tard, alors que la poussière commençait à faire son travail de sape de façon visible, et que l'étendue des feuillets jonchant le sol empêchait l'usage de l'aspirateur, j'ai sagement remis le manuscrit sur une étagère, n'ayant, une fois encore, pas eu le courage de traverser le « Pont de l'Épée ».

Une fois le livre mis au congélateur, je repris le cours normal de l'activité du chercheur « moderne » et produisis, dix mois plus tard, un rapport d'activité assez valeureux selon les critères en vogue. Pendant les dix mois passés au Wiko, d'octobre à juillet 2010 en collaboration avec Kai Schneider à Marseille, Naoya Okamoto, Katsunori Yoshimatsu et Yukio Kaneda au Japon, Frank Jacobitz et Diego del Castillo-Negrete aux États-Unis, Margarete Domingues et Odim Mendes au Brésil, Keith Moffatt en Angleterre, Rudolf Friedrich, Michael Wilczek Martin Oberlack et George Khujadze en Allemagne, et deux étudiants en thèse, Romain Nguyen van Yen à Paris et Dmitry Kolomenskyi à Marseille, nous avons :

- publié six articles dans des revues internationales à comité de lecture (*Journal of Computational Physics*, *Applied and Computational Harmonic Analysis*, *Theoretical and Computational Fluid Dynamics*, *Physics of Fluids*, *European Series in Applied and Industrial Mathematics*, *Atti della Accademia delle Scienze di Torino*),
- soumis quatre articles à des revues internationales à comité de lecture (*Journal of Fluid Mechanics*, *Journal of Turbulence*, *Multiscale Modeling and Simulation*, *Comptes-Rendus de l'Académie des Sciences de Paris*),
- rédigé six autres articles que nous allons soumettre prochainement,
- publié dix articles dans des comptes-rendus de conférences internationales à comité de lecture (Marburg, Pékin, Lisbonne, Tokyo, Capri, Paris) et un onzième est en cours de rédaction (Stanford),
- publié trois résumés dans le Bulletin of the *American Physical Society*,
- participé à la rédaction de l'avis du Comité d'Éthique du CNRS sur les STIC (Sciences et Technologies de l'Information et de la Communication).

Tous ces articles sont téléchargeables à partir du site Web <http://wavelets.ens.fr> et on les trouve dans la rubrique Publications.

Pendant cette même période, et grâce au fait que le Wiko offre l'accès en ligne à tous les journaux intéressant mon domaine, j'ai, à ma grande surprise, découvert que je venais de publier un article dans *Nuclear Fusion*, journal de l'IAEA (*International Atomic Energy*

Agency), ceci en compagnie de 230 co-auteurs, dont je connais certains, mais pas tous ! Comme vous le savez, « nous vivons une époque moderne », faite de surprises, bonnes et mauvaises. Dans le cas de celle-ci, je ne sais si je dois m'en réjouir, puisque cela me fait un article de plus, obtenu sans aucun effort de ma part (sinon le rapport que j'avais dû rédiger pour rendre compte de notre travail dans le cadre du contrat CEA-EURATOM qui finance une partie de nos recherches et dont certains éléments avaient été repris dans cet article), ou si je dois m'en offusquer car on a utilisé mon nom sans mon accord. Dans le doute je me suis abstenue de toute réaction et me suis contentée d'ajouter cet article à ma liste de publications, en me faisant la réflexion qu'il sera certainement beaucoup cité, puisqu'avoir 230 co-auteurs démultiplie d'autant les chances de citation. L'auto-citation étant une pratique promotionnelle favorisée par le système, cela garantit pour cet article au moins une centaine de citations. Ainsi vais-je pouvoir, à peu de frais, augmenter mon « citation index » et mon « h factor » – les deux chiffres-clés grâce auxquels la technocratie qui nous dirige croit évaluer nos recherches. En fait, pareille quantification naïve provient de l'industrialisation de la production intellectuelle et relève plus de la paresse des personnes qui nous gouvernent, ou de leur impuissance devant la surproduction actuelle, que d'une évaluation sérieuse. Bientôt, conditionnés par une évaluation imbécile qui traitent les chercheurs comme du bétail, nous produirons tous les mêmes petits pains, intellectuels et spirituels, bien blancs et bien calibrés, que plus personne n'aura envie de manger car ils n'auront ni goût ni valeur nutritive, mais auxquels on devra bien se faire puisqu'il n'y en aura plus d'autres sur le marché. On évalue aujourd'hui la science « au poids » en attribuant primes et médailles aux « poids lourds », aux plus productifs, pratique courante des concours agricoles. Je commence à comprendre pourquoi nos jeunes préfèrent le « business » et le « trading » à la science, car, quitte à jouer ce jeu productiviste, il vaut mieux aller aux plus offrants ...

En relisant le paragraphe précédant j'oscille entre une ironie à la Courteline – « Ah ! Ah ! L'administration française, il faut lui donner satisfaction sans trop chercher à comprendre ses méthodes, elle veut de la science au poids ! Alors, obéissons-lui ! » – et un sentiment plus amer : l'étonnement d'avoir produit tant en quantité, la tristesse d'avoir produit si peu en nouveauté, quant à la qualité je suis mal placée pour en juger objectivement, mais j'ai mes doutes ... Si je reprends le postulat d'Einstein, « une idée, c'est si rare », le chercheur, pour jouer le jeu de la production de masse propre à notre société, doit apprendre à resservir le même plat en changeant juste un peu l'assaisonnement afin de l'adapter aux *desiderata* de ses clients, à savoir l'institution qui paie son salaire, celles

qui financent ses recherches par des contrats, celles qui l'hébergent lors de ses pérégrinations à travers le globe et les journaux qui publient ses résultats. Il y a là, je pense, un grave problème : la société nous fait confiance en nous donnant un poste de chercheur, elle nous verse donc un salaire avec la mission de penser et de produire de nouvelles idées, mais ensuite les mécanismes mis en place pour vérifier la qualité de notre travail nous empêchent malheureusement de penser, inhibent notre créativité et nous condamnent, disons-le tout franc, à trahir notre Muse, à ne plus prêter assez attention à cette fragile voix intérieure qui nous inspire, pour obéir docilement aux désirs de ceux qui ont le pouvoir. Dans un article du journal *Le Monde*, paru le 18 mars 2009 sous le titre « Le loup et le chien », Philippe d'Iribarne déplore que : « L'estime des pairs va devenir moins importante, quand il s'agit d'être jugé, que la diligence avec laquelle on se soumet à des critères (nombre de publications, nombre de fois où l'on est cité) qui favorisent celui qui bêle avec le troupeau par rapport à celui qui pense librement. »

Mais, face à cet état des lieux inquiétant, il devient patent qu'il faille réagir collectivement. C'est la raison pour laquelle j'ai signé en mars dernier la pétition « Trust Researchers: A declaration to the attention of the European Council of Ministers and the Parliament », où il est demandé que les cinq principes suivants soient respectés : « mutual trust, focused on research, consistency, reliability and risk taking ». Elle a réuni à ce jour (25 juillet 2010) 13.611 signatures, dont 1.554 de France, 1.459 d'Allemagne, 1.154 d'Espagne, 1.088 du Royaume-Uni, 1.049 d'Italie, entre autres. Vous pouvez la télécharger sur le site <http://www.trust-researchers.eu>, où vous trouverez également la liste des signataires et leurs commentaires. Grâce ce site je viens de retrouver le commentaire que j'avais déposé le 17 Mars 2010 qui disait : « The simplest the best ! Research requires concentration. People organizing and managing science should protect scientists from distraction and help them not to waste their time. The present situation is counter-productive for the quality of research. We are overwhelmed by financial and administrative tasks for wich we have no special talent. We are asked to respect strict deadlines for administrative tasks, but there are not any for doing research, writing papers, publishing books – what we are supposedly paid for ! The perverse effect is that the system imposes us to give priority to the former (administration) on the latter (research). The European taxpayers should be informed that this situation has become critical: we waste our time doing administration instead of research. »

Maintenant je vous pose une colle : quelle institution a compris tout cela depuis longtemps et l'a résolument mis en pratique avec le succès que l'on sait ? Vous devriez être en

mesure de trouver la réponse. Si, si, je vous promets, vous le savez. Réfléchissez encore un peu ... et si vous n'y arrivez pas je vous donnerai la solution quelques lignes plus loin.

Ici je dois vous avouer que j'ai un peu honte de me plaindre ainsi, car je fais partie des quelques privilégiés qui n'ont aucune obligation d'enseignement (bien que j'adore enseigner) et qui continueraient à être payés même s'ils interrompaient leurs recherches ou ne publieraient plus une seule ligne. Mais c'est justement la sécurité de mon statut qui me permet de dire tout haut ce que certains, en particulier les jeunes chercheurs, déplorent tout bas. Si j'ai donné tant de détails, c'est pour vous faire sentir l'ambiance dans laquelle un chercheur travaille aujourd'hui au niveau international. Dans mon domaine de recherche, pour avancer, il faut avoir accès à divers grands instruments (ordinateurs parallèles, satellites, souffleries, dont il n'existe que quelques exemplaires à travers le monde) et ceci dans le cadre de collaborations internationales qui se développent sur plusieurs dizaines d'années. Nous sommes entraînés dans un rythme endiablé, de voyages, de conférences et de publications avec des chercheurs résidant à l'autre bout de la planète, rythme qu'il nous faut suivre coûte que coûte si on ne veut pas rester au bord de la route à regarder passer les autres. La recherche se fait de plus en plus souvent au sein de petites équipes éclatées à travers le globe, constituées d'une poignée de collègues qui explorent ensemble une même question mais dans des pays et des institutions différents. Nous sommes en contact permanent grâce au réseau *Internet* et nous nous retrouvons plusieurs fois par an en divers endroits du globe, de préférence agréables, chauds en hiver et frais en été, à l'occasion de conférences ou d'universités dites « d'été », selon l'expression consacrée. Nous tissons ainsi des liens beaucoup plus forts, humainement et professionnellement parlant, avec nos collaborateurs vivant à des milliers de kilomètres qu'avec nos collègues de couloir, car ces derniers s'intéressent à des problèmes sensiblement différents des nôtres, ceci de par l'hyperspécialisation à laquelle l'évolution de la recherche nous a conduit. L'un des dysfonctionnements actuels au sein des laboratoires provient du fait que l'administration qui encadre notre travail ne veut voir que des équipes regroupées au même endroit, car elle a un besoin compulsif de remplir des organigrammes et de constituer des hiérarchies. Or la recherche ne fonctionne plus comme cela au niveau international. Pour mieux comprendre de quoi il retourne, il serait souhaitable que l'administration tienne un peu compte des rapports d'activité qu'elle nous demande de lui remettre chaque année. Elle ferait bien d'analyser *a posteriori* qui publie avec qui car cela lui donnerait la photographie des équipes constituées *de facto*, en dehors de toutes les boîtes préformatées où elle tente de nous enfermer et où les directeurs de laboratoire, par

un sens du devoir qui les honore, rangent consciencieusement les chercheurs dont ils ont la charge. Je ne suis malheureusement pas capable de proposer de solutions de rechange. Je peux simplement suggérer que chaque administrateur passe une semaine sur le terrain aux côtés d'un chercheur, en le suivant dans toutes ses activités, sur ses différents lieux de travail et en l'accompagnant lors de ses nuits blanches passées au laboratoire. Il comprendra aisément ce qui se passe. Mais il serait tout autant souhaitable que, réciproquement, chaque chercheur accompagne pendant quelques jours un administrateur dans ses tâches multiples afin de réaliser la quantité de travail que celui-ci fournit au quotidien, avec beaucoup de conscience professionnelle et de dévouement. Il verrait aussi que le stress engendré par les nouvelles techniques de « management » ne « ménagent » pas plus l'administrateur que le chercheur, tous deux sommés d'être efficaces et de produire du chiffre d'affaire. Cependant une inconnue demeure pour moi : pour qui les administrateurs de la recherche travaillent-ils ? Sont-ils vraiment au service des chercheurs, ou leur mission n'est-elle pas plutôt d'assister l'administration centrale, le ministère de tutelle et celui des finances, à mieux contrôler leur activité en espérant ainsi maximiser leur productivité ? Ce n'est pas clair.

Comme je viens de le suggérer, je ne crois pas que la notion d'équipe de recherche, dont les membres sont regroupés dans un même lieu, ait encore beaucoup de sens, au moins dans mon domaine, vu l'éclatement des équipes à travers le monde du fait de la globalisation. Par contre, j'aimerais voir se former des « binômes chercheur-administrateur », où l'un apporterait à l'autre ce qui lui manque, l'imagination du premier complétant le sens de l'organisation du second. En fait, en écrivant ces lignes je m'aperçois que, plus que d'administrateur – terme qui renvoie trop à l'organisation centralisée quasi-militaire dans laquelle la France s'est corsetée depuis Colbert, en passant par Napoléon, et que nous avons plus récemment eu le mauvais goût d'exporter à Bruxelles –, un chercheur aurait plutôt besoin de faire équipe avec un gestionnaire. Ce dernier prendrait en charge l'organisation des activités du premier, qui sont multiples (recherche, enseignement, édition, organisation de conférences, vulgarisation ...) et qu'il a du mal à mener de front tout en restant à l'écoute des nouvelles idées, celles de ses collègues et celles de sa Muse qu'il fait siennes. Il est remarquable que la racine latine, « gestus », du mot « gestionnaire », se retrouve dans « gestation », car c'est bien de cela dont on aimerait rêver : le gestionnaire serait là pour accompagner le chercheur dans la gestation et la mise au monde d'idées nouvelles, celles qui vont lui permettre d'aborder des problèmes jusqu'alors insolubles. En effet, une idée quand elle advient, très rarement comme vous savez (la

Muse n'est jamais prolix, cf. la citation d'Einstein que j'ai choisie pour titre), est aussi fragile qu'un embryon. Au début on ne la sent même pas, on n'y prête pas attention, mais elle risque alors de disparaître à tout moment. Un peu plus tard, elle commence à vous « travailler », vous rend malade, nerveux, irritable, écoeuré, comme une femme dans les premiers mois de grossesse. Le chercheur, quand il se métamorphose en « trouveur », devient insupportable pour son entourage, ceci d'autant plus qu'il ne comprend pas encore bien ce qui lui arrive. Quand l'idée s'est tellement développée qu'on finit par la sentir et l'identifier, qu'elle nous empêche de dormir, qu'elle nous poursuit dans le métro, au beau milieu d'une conversation, le matin au réveil, alors c'est le branle-bas de combat : elle doit passer en priorité devant toute autre activité, sinon elle va mourir faute de soins. C'est à ce stade que les obligations de toutes sortes, qui plombent la vie du chercheur, ont l'effet d'un poison, car son attention est détournée du soin qu'il devrait porter à son idée afin qu'elle prenne forme. Il se peut aussi que celle-ci ne soit pas viable, comme beaucoup de foetus. Mais là, il faut être sûr d'avoir fait le maximum pour essayer de lui donner vie, de l'avoir suffisamment testée et re-testée en la retournant dix fois dans sa tête, il faut l'avoir regardée sous tous les angles que nous permet notre imagination (au sens propre du terme car un chercheur manie des images mentales), avant de décider de l'abandonner. Si on ne prend pas le temps de faire cela, on se sentira à jamais coupable de non assistance à idée en danger. Donc, le rôle du gestionnaire est de bien comprendre le processus créatif et de l'accompagner, en déchargeant le chercheur de tout ce que quelqu'un d'autre peut faire à sa place. C'est une utopie, certes, mais quelques rares personnes l'ont comprise et mise en application dans quelques rares oasis intellectuelles qui résistent à la tempête ambiante. Je pense au Trinity College de Cambridge, à l'IHES (Institut des Hautes Etudes Scientifiques) de Bures-sur-Yvette, au CIRM (Centre International de Rencontres Mathématiques) surplombant les calanques près de Marseille, à l'École de Physique des Houches d'où l'on peut admirer le Mont Blanc et à la Fondation des Treilles cachée au cœur de la Provence, pour me limiter à ceux que je connais le mieux. Mais je pense aussi, bien évidemment, et c'est la réponse à la colle que je vous ai posée quelques lignes plus tôt : au *Wissenschaftskolleg zu Berlin* !

En relisant ce texte je m'aperçois que je vous ai parlé de la crise existentielle que je ressens face à l'évolution actuelle de la recherche et non du Wiko. Hé bien, justement, je pense que cette crise existentielle est un syndrome propre au Wiko ! Cela peut vous arriver dès le début de votre séjour : vous êtes subitement frappé par l'angoisse de la feuille blanche d'une année libre de toute obligation, sinon celle de présenter votre travail lors du

traditionnel Kolloquium du mardi et celle, fort agréable, de partager quatre déjeuners et un dîner par semaine avec les autres *fellows*. Je dois ici vous avouer en aparté que je suis contrie de recourir ainsi à pareil anglicisme, malheureusement le dictionnaire ne me propose que des traductions guère satisfaisantes : « bonhomme, co-détenu, compagnon, condisciple, confrère, lascar, luron, semblable », et j'en passe. Bien que le vocable « collègue » me semblerait plus approprié pour qualifier les membres d'un « collège », son abus contemporain l'a vidé de son sens latin et je m'en tiendrai donc au mot anglais « fellow », à défaut d'un autre qui eut été préférable. Mais revenons-en au syndrome du Wiko dont l'évolution est lente, mais inéluctable. Il s'insinue dans votre organisme à bas bruit : les premiers mois cela commence par vous ronger de l'intérieur, mais sans que vous ne le ressentiez physiquement, chouchouté que vous êtes, materné de toutes parts, bien nourri, votre moindre désir exaucé sans que vous n'ayez à prendre la peine d'émettre l'ombre d'un souhait – ceci est une règle d'or du Wiko. L'angoisse existentielle, comme vous le savez bien, est un luxe que l'on ne peut s'offrir qu'à condition avoir dépassé l'état de survie. Or, comme au Wiko toute la vie matérielle est merveilleusement prise en charge, on a alors tout loisir d'écouter enfin son angoisse existentielle. Les symptômes n'éclatent vraiment que le dernier mois, celui des bilans, quand vous recevez une lettre, fort aimable au demeurant, du recteur du collège, pudiquement datée « July 2010 », vous demandant de rédiger un rapport annuel. La lettre se fait plus précise vers la fin, où il est précisé que le rapport doit être rendu « while you are still at the Kolleg ». Comme cette condition est présentée en caractère gras, et que c'est la première fois que l'on me demande quelque chose à faire pour le collège, que de plus je repars le 30 juillet, cela déclenche en moi un mouvement de panique, et me voici frappée par l'angoisse du « Mais qu'ai-je donc fait au Wiko ? »

Da capo page 64

*« Créer, c'est résister. Résister, c'est créer. »*  
Stéphane Hessel, *Indignez vous !*





Ill. 2: Méditation numérique : Solution des équations de Saint-Venant, calculée sur le Cray-2 du C2VR (Centre de Calcul Vectoriel pour la Recherche), Palaiseau, © Marie Farge et Jean-François Colonna, 1986.



SHIFTING PERSPECTIVES ON MUSIC  
DURING WORLD WAR II  
IN THE UNITED STATES  
ANNEGRET FAUSER

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Annegret Fauser is Professor of Music and Adjunct Professor of Women's Studies at the University of North Carolina at Chapel Hill. Her research focuses on music of the nineteenth and twentieth centuries, and in particular that of France and America. Her publications include books on orchestral songs in France (1994), Wagner reception (1999), and Jules Massenet's opera *Esclarmonde* (2001). In 2005, she published the monograph, *Musical Encounters at the 1889 Paris World's Fair*. She co-edited with Tamara Levitz a special issue of *Musical Quarterly* on "Music and Identity" (published in 2008) and, with Mark Everist, *Music, Theater, and Cultural Transfer: Paris, 1830–1914* (2009). She is currently Editor-in-Chief of the *Journal of the American Musicological Society*. – Address: Department of Music, Hill Hall, CB #3320, University of North Carolina, Chapel Hill, NC 27599-3320, USA. E-mail: fauser@email.unc.edu

Writing a book about music in the United States during World War II at the Wissenschaftskolleg zu Berlin may seem counterintuitive at first glance. After all, my primary and secondary materials were located across the Atlantic, and the book's audience will probably be predominantly American. Yet my year at Wiko proved the essential significance for this project, on the one hand, of the international and interdisciplinary discussions at the Institute, and on the other, of a reflective perspective from the German capital with its intellectual depth. Indeed, these international discourse networks – both formal and informal – reshaped profoundly what was my already unique view of the topic as a German expatriate living and teaching in the US. Instead of my transatlantic (and hence binary) scrutiny of musical life in America, Wiko opened a global, multi-perspectival ap-

proach both through the generosity of its current staff and my Co-Fellows, and through the accumulation of research in its Fellows' library. Moreover, with the Institute's library service making books and articles appear like magic on my shelves, I could pursue at my leisure any intellectual detour and expansion of perspective as my vision of the project started to shift.

I had come to Berlin with a fully prepared outline for the book on my computer, and with boxes and disc drives filled with copied and scanned documents to sustain me away from the riches of the Library of Congress and the American National Archives. This was going to be a monastic year of concentrated writing, carefully planned out according to my sequence of chapters. Yet life at Wiko intervened: seminars, workshops, and concerts started (and still continue) to change my telling of the story of music in the US during the last global war. I soon joined a year-long workshop on "The Fatigue of Avantgarde Movements and the Emergence of New Paradigms in Art and Culture in the 1930s", led by Boris Gasparov and Galin Tihanov. While we focused on the decade leading up to World War II, the workshop proved vital for the book project because of its interdisciplinary and international approach to a global cultural phenomenon. Along similar lines, I organized an international three-day symposium on music during World War II, where brilliant colleagues from home and abroad shared their insights into wartime music within and across different national boundaries. The two workshops opened an international perspective on cultural development in both Axis and Allied nations, tracing similarities, exploring reciprocities, and identifying differences.

In the course of the year, my original outline evolved, and the story I had planned gained complex facets. Instead of the monastic writing discipline I had anticipated, life at Wiko offered the gift of communal learning and exchange. Lunchtime conversation about Subaltern Studies, medical politics in India, Soviet cultural policies during the Stalinist era, and dolphin communication opened new questions and offered different models of thought. Furthermore, giving lectures across academic institutions in Berlin added its own layer of questions: addressing the age-old issues of music and emotion in the context of my inquiry into World War II at the Max-Planck-Institut für Bildungsforschung, for example, moved historical inquiry into the realm of individual response to music during crisis. My work is not finished, but it has attained increased depth and breadth in a process wherein I changed my emphasis and shifted my focus to embrace both the local and the global.

What stories, then, will I tell in this book? Just as my text is work in progress, this report will have to remain fragmentary. But so far I have recounted how individual musicians faced the challenges of the war: in the armed forces, as civilian entertainers, as apparent enemy aliens denounced to and persecuted by the FBI, as philanthropists, and as bureaucrats. Celebrating Walter Levin's eighty-fifth birthday at Wiko and encountering his highly individual experience as a musician in exile during the war sharpened my awareness for each individual destiny as resisting the grand, sweeping narrative. Such musicians as Marc Blitzstein, Elliott Carter, Aaron Copland, Henry Cowell, Yehudi Menuhin, Lily Pons, and Kurt Weill each had their very own experience with the war, whether at home or abroad, whether stationed with the armed forces or working for the United Services Organization. Writing their stories meant straining to hear their individual voices out of the rich counterpoint of wartime narrations and focusing not only on the what but also on the why. Yet their stories unfold in the context of sometimes overpowering institutions within which (or even against which) these musicians worked: the Office of War Information, the State Department, and the armed forces themselves. Revealing the inner working, agendas, and programs of these juggernauts tells a story about a cultural war that was fought as passionately and as committedly on the air waves and in print as the military combat raged on the world's battlefields. Who owned music's past from Bach and Beethoven to Wagner and Brahms, and, even more importantly, who would decide on the future of music, became hotly debated issues across the globe. Just as Goebbels's propaganda machine tried to ridicule American culture, so US agents worked to prove Nazi Germany's cultural bankruptcy. Never before had classical music in particular received such concerted state funding in the US as during the war years – and when American soldiers finally “captured” the German hit song, “Lili Marleen”, it made the national news as a cultural victory.

I am now telling the story of American music itself during the war: of valiant attempts to rewrite its past, of heroic work at racial integration through music in a deeply segregated nation, and of blatant musical chauvinism that put musical Americana in competition with Allied and Axis works alike. I also talk about musicians in exile and their complex musical identities. Whereas Darius Milhaud could celebrate, in 1944, his French identity in the composition of the high-school band piece, *Suite française*, his German colleague, Kurt Weill, emphasized his American credentials by setting Walt Whitman to music. Whether Henry Cowell in his *Philippine Return* (a work based on Southeast Asian folk songs) or Aaron Copland in his overtly American ballet, *Rodeo*, American responses

to the war echo those across the world from Soviet Russia to Imperial Japan. Wiko opened a global perspective for telling in particular a story of musical composition that engages with both the intrinsic and the extrinsic interfaces between American music and the rest of the world. This story is unfolding right now under my fingers, but it has been indelibly altered and enriched by the year in the Grunewald. *Fortsetzung folgt ...*



TWICE PRIVILEGED  
DAVID FREEDBERG

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Born and brought up in Cape Town, David Freedberg took his BA in Classics at Yale and his D.Phil. in Art History in Oxford. He soon left to study with Michael Baxandall, Ernst Gombrich and Frances Yates at the Warburg Institute. After eleven years of teaching at the University of London, he moved to Columbia University in 1984. After his initial work on the censorship of books and pictures, he wrote about iconoclasm but also produced more conventional art history on Rubens and Bruegel. Always concerned with psychological responses to art and the relations between high and low images, he published *The Power of Images* in 1989. During the 1980s he discovered – first in Windsor Castle and then the Institut de France – a major cache of natural history drawings produced in the circle of Galileo and his earliest supporters. The fruits of this discovery were brought together in *The Eye of the Lynx: Galileo, his Friends, and the Beginnings of Modern Natural History* (2003). Since 1987 he has been advocating the relevance of the cognitive neurosciences for the understanding of the history of art. – Address: Director, The Italian Academy for Advanced Studies in America, Columbia University, 1161 Amsterdam Avenue, New York, NY 10027, USA. E-mail: daf5@columbia.edu

It has become conventional for writers of these reports to comment on how their stay at the Wissenschaftskolleg changed their lives. Since I had the unusual privilege of being a guest of the Wissenschaftskolleg for portions of two separate academic years (2008–09 and 2009–10), it would not be a surprise if I reported that my life changed twice. Whether or not it did is too early to tell; but the effects, perhaps because of the very brevity and intensity of each immersion, were strong. In the first case I arrived in May, towards the

end of the Fellows' stay; in the second, I arrived in August, at its very beginning. In the first, the group was in its maturity; in the second, it was in formation. For the director of another institute for advanced study, the differences could not have been more instructive. The kind of solidarity that I saw in the 2008–09 group at the end was only a distant dream in the first months of the new group in autumn 2009–10. But in both cases what was most striking was the devotion of the entire staff of the Wissenschaftskolleg to creating a happy and cohesive group. Their tolerance of individual foibles was high and their patience greater than Job's. If there is any aspect of life at the Kolleg that merits first mention, it is precisely the generosity of spirit and action that was bestowed so unstintingly – and so constructively – on all its spoiled visitors.

I arrived sceptically. How could it not be a hothouse atmosphere? Of course the remains of the past, and the abundance of *Mahnmale* – that austere word for which no equivalent in English exists – soon put paid to such fears. You only had to walk to Gleis 17 to be invested with much deeper apprehensions, about yourself as much as about others. In fact, nothing at the Wissenschaftskolleg prepared one as much for learning as getting out of it – preferably on one's bike and into the city – before returning to the comforts and friendships of Wallotstraße and Koenigsallee. The greater lessons came from observing how both self and others negotiated the frequent transactions between personal and public memory that Berlin so insistently demands.

It is perhaps not surprising that I should have been so moved by ex-Rector Dieter Grimm's lecture, a few weeks after I arrived, on the development of the post-war German constitution and the significance of *Verfassungspatriotismus* in modern German society; or that the few conversations I had with him and Wolfgang Hoffmann-Riem on freedom of speech, freedom of artistic expression and freedom of assembly should have been the most critical moral moments of both my stays at the Wiko.

I came to work on what I hoped would be the last stages of my book on the relations between art and neuroscience, or rather, on the importance of understanding the neural substrate of emotional and motoric responses to visual images. Berlin, I realized, would be a good place to do so, partly because of the ways my old friend Horst Bredekamp had developed his own projects, closely related to my own, on *Bildwissenschaft* and *Bildakt* – two typically untranslatable German words, alas for the English-speaking art-historical world. But what I could not have imagined, in my wildest dreams, was the environment I would encounter when I came to the Wissenschaftskolleg in May. The warmth extended to someone who must, at so late a stage in the year, have seemed an interloper was ex-

traordinary. So was the intensity of discussion of themes with which I had long been grappling, inexpertly. My time was so short that I never got to talk enough to all the members of the focus group attempting to unite language production, reasoning and motor control. I myself was less interested in unification than in the specificities of motor response, but here was a well-formed group that could answer almost any question I posed them on the subject of the neuroscience of movement – or, better yet, offer typically succinct critiques of where I was misguided. Srinu Narayanan and Rafael Núñez were not slow to offer corrections, while the two vision experts, Bruno Olshausen and Michael Lewicki, were even more stupefied, I think, by my temerity in worrying about high-level perception without better understanding its lower level. It took two weeks after a rough and rather general presentation of my own work for Holk Cruse to come to me with a carefully prepared proposal for how I might improve my book. He will find out that I did not, in the end, adopt all his proposals, but the methodological thoughtfulness of that conversation made clear not just the abyss that still remains between science and the humanities in our time, but also unforgettably proposed a remedy: the clear statement of a hypothesis and a presentation of its falsification. Despite my education by Karl Popper's best friend, Ernst Gombrich, I decided, perhaps foolhardily, not to adopt the approach (because I could not). This particular exchange characterized the best of the *Wissenschaftskolleg*: frank criticism, tolerance of rejection, the gradual seeping in of ideas that may seem rebarbative or even unwelcome, and the slow awareness of their benefit. Sometimes the insights from conversation were sudden, the contributions brilliantly illuminating; but just as often it was the methodological grumbles of others that slowly revised the very concepts with which I thought.

And then there were the even more startling challenges. Luca Giuliani's preparation for our one long conversation (during my second stay) was just as carefully meditated as Holk Cruse's; and yet it did not seem so at the outset. He and I had earlier spoken about the interest we shared in the *Gemma Augustea*, I because of its importance for Rubens, he because of its iconography; but one day he asked whether we might talk about the neuroscience of visuomotor responses to sculpture (and in particular of issues of the felt imitation of movement that had arisen from my work on mirror neurons). He told me of his discoveries about the exact movement of the Discobolos in hurling the discus; but in doing so, asked me whether I was able to enact that action myself. I could not (because it seemed counterintuitive); he could. The same for the Doryphoros. It was an unforgettable exchange, not simply because of the vivid illustration it offered of the instructiveness of



freeing oneself from the usual discursive parameters, but also because of the way it suggested the rehabilitative possibilities not just of seeing an effective work of art, but also of imagining it. And more: for it opened, paradoxically enough, a further avenue of exploration of just what I had been working on: the activation of the motor cortex even in the absence of actual muscular possibility.

And so it was throughout my two stays at the Wiko: new material, irritating critiques, gentle revisions and, at the best of times, a rare patience in listening.

It would be hard, in Berlin, to remain entirely in one's Anglo-American shell. No one did more to extract me from this danger than Reinhart Meyer-Kalkus. Indeed, had it not been for him, my negotiation of that interaction between family history and German history – a familiar enough negotiation after all – would have been fruitless. For it was he who constantly made me review the elements of my own thought that so feebly reflected the work of the four figures who were the constant ghosts by my side throughout my second stay at the Wissenschaftskolleg: Lessing, Kleist, Novalis and, as always, Walter Benjamin. After I found an old copy of the *Hamburgische Dramaturgie* in one of the many glorious bookshops of Berlin, it was Reinhart who helped me find in Lessing (or rather, via Lessing) a resolution of some of my own cruxes in the relations between movement and emotion. But it was in all of these writers that one could find, in addition to whatever is poetic in their work, the combination of the difficult with the productive, the succinct and unsaid, with the search to articulate the unsayable that in so many ways marked my time at the Wissenschaftskolleg.

We academics live for words and by words. Too often we forget the full possibilities of other forms of communication (even at the Wissenschaftskolleg, where by leaving before the year was out, I missed the best of the lessons to be derived from animal communication as set out by Vincent Janik, Klaus Zuberbühler and Harald Wolf). Even art historians remain slow to acknowledge the possible primacy of visual over linguistic communication. But of course there is another form too. As if to remind us of the power of music to convey some of the deepest things we feel and yet cannot say, the powers that be at the Wissenschaftskolleg invite musicians to live, play and practise amongst its fortunate Fellows. And so it was that after a reception at which words never emerged from their institutional casings that I became friends with Andrés Schiff and Yuuko Shiokawa, whose music I had only heard distantly as I crossed Wallotstraße to the library. Their friendship, renewed frequently since, has served not only to remind me of the warmth of Wiko, but also of the possibilities of human communication beyond the countries of language.



## A YEAR OF LEARNING BORIS GASPAROV

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Boris Bakhmeteff Professor of Russian and East European Studies, Columbia University, New York. Professor, Department of Slavic Languages, UC Berkeley (1982–93). Professor, Department of Russian Language, Tartu University, Estonia (1974–80). Visiting professorships at Stanford, Yale, Princeton, Konstanz, Munich, Helsinki, Stockholm, St. Petersburg, and Moscow (Humanities University). Doktor filologicheskix nauk, Russian and General Linguistics (1971), Academy of Science, Minsk. Kandidat filologicheskix nauk, Slavic Linguistics (1965), Moscow Pedagogical University. MA in Musicology (1968), Moscow Musical Academy. Honorary Doctorate, Stockholm University (2008). Recent Publications: *Old Church Slavonic* (Munich, 2001). *Five Operas and a Symphony: Word and Music in Russian Culture* (Yale University Press, 2005; Ascap Deems Taylor Award; AATSEEL award). *Speech, Memory, and Meaning: Intertextuality in Everyday Language* (Berlin, 2010). – Address: 21, Claremont Avenue #22, New York, NY 10027, USA. E-mail: bg28@columbia.edu

### 1. Personal Experience and Achievement.

Judging solely by the volume of what I have produced during this year at the Wiko, it fell somewhat short of expectations one could have for such an extended segment of free time and ideal working conditions. I have done some additional research (mostly related to German matters) and written about a third of the book that was my principal project here; the book's preliminary title: "Prophesying in Part: Romantic Culture of Fragmentation and Affinities." I have also written a large survey article on European Romanticism,

which was of principal importance for shaping my book project, as well as a few other articles and conference papers.

My progress in writing a new book was somewhat hampered by the necessity to attend to a host of editorial and technical matters concerning several earlier works: my book *Speech, Memory, and Meaning: Intertextuality in Everyday Language* appeared during my stay at the Wiko (Berlin: de Gruyter, 2010); another book, *Freedom and Mystery: Ferdinand de Saussure's Philosophy of Language and Its Early Romantic Antecedents*, has been accepted by Columbia University Press, while a shorter version was commissioned for a French edition by the Edition Seuil.

Most importantly, however, this year has been for me, first and foremost, a year of learning and strategic thinking about my work. In this sense, I feel that what I have received at the Wiko is an intellectual momentum whose impact will undoubtedly last for quite a few years ahead.

First, during this year I have made a crucial rethinking and expanding of my principal project concerning Romanticism. My original intention was to show an extensive context of European Romantic culture for the œuvre of Pushkin and, consequentially, to show the place of Russian literature of the Alexandrine epoch in European culture at large. However, during my first months at the Wiko, thanks to the ideal possibilities for research and a highly stimulating cosmopolitan cultural environment I have found here, I felt encouraged to rethink my project on a larger scale. Its emphasis has now shifted to the philosophical foundations of Romanticism and their impact on early nineteenth-century European culture.

My principal argument is that the metaphysical ideas and cognitive strategies of early Romantics, while failing to create a lasting philosophical tradition, transformed themselves into what could be called the Romantic consciousness. In this sense, the metaphysical concerns of early Romanticism maintained their presence, albeit implicitly, in a variety of new artistic forms and genres that proliferated during the first decades of the nineteenth century. Above all, the heritage of early Romanticism created a dynamic environment in which various ideas and motifs were “floating around” in the European cultural space, migrating from one national tradition or one artistic medium to another and undergoing manifold creative transformations in the process. In this sense, Romanticism became the first true all-European cultural movement, with multiple centers and multi-directional dialogues – a decentralized environment in which such national cultures as

Russian, Polish, Italian, and Finnish had an integral part alongside French, German, and English.

Second, together with Galin Tihanov, and with crucial support from Reinhart Meyer-Kalkus, I organized a workshop dedicated to the study of international cultural trends at the turn of the 1930s. Our principal thesis was that the shift toward a populist and epically oriented, nationally conscious art, which was experienced at the time by many artists in different countries, was not merely a product of political and economic pressures, but emerged as a genuine aesthetic trend, a widespread reaction to about twenty years of domination by hard-core avant-garde aesthetics. The workshop explored the phenomenon of “fatigue” with the avant-garde fragmentariness of artistic form and the depersonalization of the authorial voice, a trend that manifested itself in such diverse phenomena of the time as the evolution of the style of such composers as Prokofiev and Shostakovich, the new rise of the social and historical novel, the return of the narrative element in visual arts, etc.

The group’s monthly meetings were regularly attended by 10–14 participants and featured nine papers. Its work culminated in a two-day workshop in June, co-sponsored by the Freie Universität Berlin and Columbia University, in which scholars from Germany, Austria, America, and Russia took part. I am determined to continue this work, both in my personal writing and by organizing seminars and conferences on the subject. There are preliminary plans to continue an international exploration of this subject under the sponsorship of the Harriman Institute at Columbia.

Above all, I had a tremendous experience of contacts with the German academic and literary world, largely thanks to a rich cultural environment that coalesces at the Wiko. Among the highlights of this experience was my work as an outside evaluator for the program “Clusters of Excellence” at the Freie Universität Berlin. Here at the Kolleg, I have received much encouragement and guidance, particularly from Martin Mosebach and Reinhart Meyer-Kalkus, in my readings in twentieth-century German literature.

## 2. Academic Life at the Wiko.

I would like to make a few suggestions about the proceedings of Wiko Tuesday colloquia. To create a substantial dialogue among scholars in the sciences and the humanities is a challenging task, and I am not fully satisfied with how it has been addressed during this year’s sessions. Particularly the scientists found themselves at a disadvantage because of

the need to simplify and popularize for a diverse audience; however, the problem affected presentations in the social sciences and the humanities as well, perhaps in a less demonstrable way because the natural scientists could not use their professional language, while presentations by social scientists and humanists needed only a slight explanatory adjustment of their presentations. As a humanist, I sensed a contradiction between my inability to communicate with scientists in their professional language, on the one hand, and the feeling of being intellectually shortchanged by popularized presentations of their research, on the other. I must confess that richly illustrated, at times stunningly anthropomorphic narratives about the habits of social insects left me with an aftertaste of a fairy tale.

To remedy this situation, I want to suggest some general re-orientation of the colloquia. In my opinion, emphasis should be put on general methodological problems more than on the substantial content of the presented projects. I envision people talking about how they formulate the intellectual goals of their study, what the methodological limitations and pitfalls of the taken approach are, what the current trends and controversies concerning their subject are, and where their own approach stands in this context. Moreover, there is a better chance that such presentations could elicit coherent general discussion, rather than the arbitrary “question-and-answer” sessions that prevailed at this year’s meetings. The paper-giver and the chair could help to shape the coming discussion by posing beforehand some questions of principal importance as its guidelines. Certainly, I do not offer any universal recipes. But it would be beneficial, I believe, if each group of Fellows could discuss such problems at the beginning of their term, to work out proceedings that would suit them best.

Another suggestion: I strongly believe that there should be more colloquium papers in German, followed by a bilingual discussion. My own intention in the beginning was to prepare and deliver my talk in German; I felt that such an experience could be of invaluable value for my further contacts with the German academic environment. However, after I had seen virtually all of my German colleagues delivering their papers in English, I felt that it would be presumptuous on my part to do otherwise.

In conclusion, I wish to thank the staff of the Kolleg not only for being tremendously helpful and supportive, but above all for creating a rich and dynamic intellectual environment for all of us. It has made this year at the Wiko unforgettable and highly consequential for my scholarly work and academic life in the future.



THE MAGIC INSTITUTE  
DANIEL HALBERSTAM

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Daniel Halberstam is the Eric Stein Collegiate Professor of Law and Director of the European Legal Studies Program at the University of Michigan. He also holds a position as Professor of Law in the European Legal Studies Department at the College of Europe, Bruges. A graduate of the Gutenberg-Gymnasium (Wiesbaden), Columbia College (in Mathematics and Psychology), and Yale Law School, he worked as clerk to Supreme Court Justice David H. Souter and as judicial fellow for Judge Peter Jann, European Court of Justice. He also served as attorney advisor to the Chairman, US Federal Trade Commission and as attorney advisor in the Office of Legal Counsel, US Department of Justice. Halberstam serves on the editorial advisory board of *Cambridge Studies in European Law and Policy* and the *Common Market Law Review*, among other publications. His teaching and scholarship focus on constitutionalism in comparative and international public law and legal theory. – Address: European Law Program, The University of Michigan Law School, 623 South State Street, Ann Arbor, MI 48109, USA.  
E-mail: [Daniel.Halberstam@umich.edu](mailto:Daniel.Halberstam@umich.edu)

My having lived in Germany for nearly two decades prior to coming to the United States for college made moving to Berlin a homecoming of sorts for me. On a professional as well as personal level, the Institute and its entire staff from relocation to farewell could not have been more hospitable. The degree to which the Wissenschaftskolleg provides for the Fellows' wants and needs, coupled with the breadth of intellectual stimulation it offers throughout the year, makes this an almost magical place for scholarly exploration.

Spending a year in Grunewald thinking, reading, writing, and discussing was a rare privilege indeed.

My own scholarly projects at the Wiko centered on comparative constitutional law. The projects ranged from the more traditional realm of comparative federalism and the emerging field of comparative administrative law to the boundaries of constitutionalism and pluralism. With regard to the first, I finished a co-authored report on an empirical study of federalism and legal uniformity. This study examines the questions how and to what degree federations produce uniform law within their system. The comparative empirical study addresses this question comprehensively for the first time by examining legal unification in twenty federal systems around the world. With the help of national reporters from each of these systems, we had gathered information in the form of broad-ranging qualitative descriptions of national systems, as well as highly specific quantitative assessments of the degree of legal unification in each system. Our general report presents the means and methods of legal unification, the degree of legal unification of each system (and of particular areas of the law within each system), and a first attempt to explain the driving forces of legal unity and diversity in federations more generally. Over the course of the year we brought our general report to preliminary publication under the auspices of the International Academy of Comparative Law (which I was honored to join by election at their membership meeting this past July).

Second, my stay at the Wiko gave me the time and resources to expand a small piece written originally for a German/French symposium into a self-contained chapter on the constitutional role of independent agencies in the United States, Germany, and France. In this brief essay, “The Promise of Comparative Administrative Law: A Constitutional Perspective on Independent Agencies”, I pursue the idea that independent agencies play rather different roles in these three systems and that each of these roles are connected with distinct histories, inter-institutional political dynamics, and (perceived) constitutional pathologies. I thereby push back against the dominant trend in the still-emerging field of comparative administrative law that examines the creation of administrative agencies as a rather generic phenomenon with universally shared purposes, values, and goals. By viewing these agencies through the lens of constitutionalism, I hope to bring into focus hitherto neglected differences in the significance of such agencies for each system – differences with which we must wrestle especially as we confront supranational (and international) demands for the creation of often novel independent administrative structures.

Finally, I made progress on my overarching project of constitutional pluralism. The basic idea, on which I gave my colloquium presentation, is to explore the interconnectedness among systems and institutions of constitutional law and to investigate the regularities of discourse in the clashes of authority that ensue. In these contests, claims of legality and legitimacy are blended together, yielding a practice of conflict and spontaneous mutual accommodation instead of universal hierarchy and settlement. The hope is that considering this interconnectedness will yield not only an understanding of certain fringe aspects of constitutionalism, but also a potential reconceptualization of the core practice of constitutional law itself. My stay at the Wiko has allowed me to broaden my exploration of these ideas and also to finish two chapter-length manuscripts – one on “Local, Global, and Plural Constitutionalism” and another on “Systems Pluralism and Institutional Pluralism in Constitutional Law.”

The rewards of this year, however, were not only to be found at my own computer and in my own collection of books or even in the many books borrowed from throughout Europe with stunning ease by our heroic librarians. They were found beyond the office as well. The weekly seminar series was a *tour de force* ranging from the emergence of the symphonic form to the puzzles of quantum mechanics; from the saga of the gold rush to the wonders of ant battles; from the sociology of morals to animal communication; and from ancient Greek philosophers, gods, sculptors, and craftsmen to modern interiors and plays. Our regular lunch and (weekly) dinner conversations with (current, former, and permanent) Fellows, members and staff of the institute, guests, and many Fellow spouses (or honorary Fellows, as they really were) refreshed our minds and provided food for thought beyond the standard fare of our respective projects or disciplines. Indeed, these conversations – whether in colloquia, at lunch or dinner, in hallways, at special sessions, or simply at table-tennis matches – led to some fascinating and often rather systematic exchanges on discipline and method from which I – and probably many of us – benefited immeasurably.

Then there were the concerts. We were blessed this year by a host of wonderful composers and musicians, some of whom gave us a very special present. András Schiff gave an unforgettable in-house performance of Bach, Schumann, and (a highly personal piece of) Kurtág, only to be joined by Yuuko Shiokawa for a captivating Mozart finale. Alfred Brendel gave a sonorous rendition of his delightful essay on humor in music while providing his own accompaniment and acoustic illustrations. These evenings will remain with me – and almost surely with us all – forever. Several of us were quick to jump at



another marvelous opportunity in that regard: hearing András Schiff perform and direct Haydn at the Berlin Philharmonic.

The world beyond the Wiko was filled with attraction, and with more to offer than a family with three school-age children could ever hope to exploit. After numerous trips to museums, galleries, performance halls, and lakes we still had explored only a fraction of what Berlin had on tap. Our children became fluent not only in German but also in a public transportation system that (to Americans) is simply a marvel. The John F. Kennedy public school our children attended was a model of intercultural dialogue and hospitality while giving our children a sense of maturity that went beyond their experiences back home. Quite apart from the few stints to capitals across Europe during their school vacations, the year was a wonderful growth experience for them as well.

The family dinners at the Wiko were always a highlight. For us, these were especially significant occasions, as we did not wind up living in the famed Villa Walther. As it turned out, we took up residence in an idyllic part of town and just around the corner from where Eric and Virginia Stein (my chair's namesake and his spouse) lived during their visit to the Wiko over 25 years ago. The monthly dinners were thus a special opportunity for our family to connect with those of the other Fellows. These dinners were also yet another display of the Institute's hospitality and generosity at its best. From the kitchen staff to the director, the Wiko here as elsewhere demonstrated a commitment to the well-being of spouses and children unsurpassed by anything I have experienced elsewhere.

I have one and only one great regret about all this. Writing this report as I am back home and into my routine again, I am more aware than I might like to be of having left behind the magic of that institute in Grunewald. For now.



AN ENCOUNTER WITH THE  
NATURAL SCIENCES  
ORNA HARARI

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Lecturer, the Departments of Classics and Philosophy, Tel Aviv University, 2004–present; Member of the Young Scholars Forum of the Israel Academy of the Sciences and Humanities 2008–09; Visiting Professor, EHESS, 2001; Post-Doctoral Fellow, The Dibner Institute for the History of Science and Technology, MIT 2000–02; Ph.D. Ancient Philosophy, Tel Aviv University 2001; MA and BA, Philosophy, The University of Haifa 1996. Recent publications: “*Methexis* and Geometrical Reasoning in Proclus’ Commentary on Euclid’s Elements.” *Oxford Studies in Ancient Philosophy* 30 (2006); “Proclus’ Account of Explanatory Demonstrations in Mathematics and its Context.” *Archiv für Geschichte der Philosophie* 90/2 (2008); “Simplicius on the Reality of Relations and Relational Change.” *Oxford Studies in Ancient Philosophy* 37 (2009); “Les preuves démonstratives dans le commentaire de Proclus au premier livre des *Éléments* d’Euclid.” In *Études sur le commentaire de Proclus au premier livre des Éléments d’Euclid*, edited by A. Lernould. Presses universitaires du Septentrion, 2010; “The Unity of Aristotle’s Category of Relatives.” *The Classical Quarterly* (forthcoming); “Philosophy or History? The Modern Historiography of Ancient Philosophy” (in Hebrew). *Proceedings of the Israel National Academy of the Sciences* (forthcoming). – Address: The Department of Classics, Tel Aviv University, Ramat Aviv, Tel Aviv 69978 Israel. E-mail: oharari@post.tau.ac.il

I came to the Wiko with the intention of completing the study of one part of a larger project that deals with the reception and transformation of Aristotle’s theory of demonstration in Late Antiquity – the late ancient commentators’ conception of knowledge and proof in the natural sciences. In so doing, I focused on one of the more innovative contri-

butions of the late ancient commentators to the methodology of science in the Aristotelian tradition – the notion of sign-based proofs (*teikmēriōdēs apodeixeis*). By introducing this notion, the late ancient commentators go beyond Aristotle in (1) viewing non-explanatory proofs as an acceptable type of proof in the Aristotelian framework and (2) searching for a means for proving the principles (i.e. the first premises) of demonstration, which are in Aristotle's view indemonstrable. In my study of this notion, I tried to understand, among other things, the philosophical motivation for considering non-explanatory proofs demonstrative, the modifications of Aristotle's notion of proof that facilitated this expansion of the theory of demonstration, and the reasons why this type of proof befits the natural sciences rather than any other branch of knowledge. I started this study before my arrival at the Wiko, and already on my way to Berlin I seriously considered calling it off. After almost a year of analysing the relevant sources, I had merely a fragmentary picture in my mind. Particularly, the two main sources, which according to the received view present one and the same account of sign-based proofs, not only seemed to propound two accounts, but these accounts also seemed to me absolutely unrelated to one another.

Despite my desperation, I presented this subject in my Tuesday Colloquium talk. The need to present my subject to an heterogenic audience forced me to focus on the basic question that motivated my research, i.e. why do the ancient commentators admit non-explanatory proofs into the Aristotelian model? This effort was proved fruitful in the case of one of the accounts found in the late ancient sources – Simplicius. While preparing this talk, I managed to trace the origins of Simplicius' account of sign-based proofs to Alexander of Aphrodisias, and this in turn enabled me to understand the conceptual change that gave rise to the introduction of these proofs. I realized that considerations regarding the argumentative force of proofs led thinkers in later Antiquity to claim that, in addition to the requirements that Aristotle lists in his *Posterior Analytics*, the principles of proofs should be easily accessible to the human mind or in Aristotelian terms better known to us. A major implication of this view is that it is epistemologically and methodologically preferable to base proofs on things that are better known to us when these do not coincide with things that are better known by nature. This implication leads in turn to a distinction between two types of proofs: (1) explanatory proofs that proceed from premises that are both better known by nature and to us and (2) non-explanatory proofs that proceed from premises that are better known to us but not by nature, or in other words, sign-based proofs.

While these results facilitate a general understanding of Simplicius' notion of sign-based proofs, it does not suffice to explain its details. Therefore, I concluded my Wiko talk with a list of questions regarding the differences between Simplicius' and Alexander's conceptions of causality and explanation of natural phenomena. Particularly, why does Simplicius think that Alexander's view fails to account for the regularity of natural processes? To answer this question, I started to examine the explanatory role of substantial forms, definitions, the rotation of the heavenly bodies, and ultimately the prime mover in Alexander's philosophy. However, I did not pursue this examination systematically. Why? I guess that I am not the first Wiko Fellow who has asked himself or herself this question and I am not the first to find the answer in the lively and stimulating social and intellectual interaction that the Wiko offers. Yet, instead of carrying me away from my subject, this interaction led me back to the issue which was the source of my desperation when I arrived in Berlin, i.e. the relationship between the two accounts of sign-based proofs found in our late ancient sources. As I began to see more correlations between modern and ancient debates on the explanation of natural phenomena, I also found the point of contention that led the two late ancient commentators – the aforementioned Simplicius and Philoponus – to develop two different and incompatible accounts of sign-based proofs: that is, the question whether nature operates mechanistically or teleologically. Having understood this, I began to see how specific arguments in one of these commentator's works were devised to avoid the criticism found in the other and vice versa. This result summarizes my Wiko experience and not only from a professional point of view. Both in my research and in my personal interaction with the other Fellows I learned to see connections and links in places where I could not see them before.



COMPOSING *WELTETHOS*:  
*EINE VISION IN MUSIK*  
JONATHAN HARVEY

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Harvey has a truly global reputation, particularly for his work in the field of electro-acoustic music (he has been commissioned by IRCAM on eight separate occasions), and is considered one of the most skilled and imaginative composers using the electronic medium today (receiving the Giga-Hertz Award for life's work from a jury including Boulez and Rihm). He has also composed for most other genres, including large orchestra, ensemble and solo instrumental. He is particularly renowned for his choral music, much of which is suited for church performance, most notably his church opera "Passion and Resurrection". He is frequently featured at all the major European music festivals. Harvey was Composer-in-Association with the BBC Scottish Symphony Orchestra from 2005 to 2008, for which he produced an orchestral triptych: "Body Mandala" (2006), "Speakings" (2008) and "... Towards a Pure Land" (2005), and he celebrated his 70th year between May 2009 and May 2010 with many dedicated concerts, new recordings, festival focuses and composer portraits. Recent commissions include two works for chorus and orchestra: "Messages" (2008) (Rundfunkchor Berlin with Berliner Philharmoniker, and Fundación Patronata Semana de Música Religiosa de Cuenca), and a full-evening commission from Hans Küng's Global Ethic Foundation for narrator, chorus, children's chorus and orchestra (also Berliner Philharmoniker). – Address: 35 Houndean Rise, Lewes, Sussex, BN7 1EQ, Great Britain. E-mail: jharvey@cumulusine.net

My stay at the Wissenschaftskolleg was brief, less than 3 months. This was because of an accident I had had – truly a composer's accident – falling off a stage at a rehearsal of my latest opera. My nerve damage became steadily worse during the stay and has only re-

cently, in July 2010, begun to show signs of recovery. This did not, however affect the intense pleasure and stimulation my wife and I experienced, far from it; Wiko was a wonderful distraction. We made lasting friends and stored in our minds influential memories of people, atmospheres, ideas. The aura of kindness and encouragement was palpable.

My work went well. I was (and still am) engaged on a huge “oratorio”, one of the most important projects of my life. This is how it came about.

One day in 2006 I got a call from the manager of the Berlin Philharmonic Orchestra, Pamela Rosenberg. Would I write a 90-minute whole-evening work with choir for them? Yes, I said quickly, in case she suddenly changed her mind or had made a mistake. It was an idea of the most famous theologian in the world, she went on. He had approached them with a project that Simon Rattle and the orchestra liked, and he had asked them to find a suitable composer. That’s how they came to ask me.

I had worked with the orchestra the year before – Rattle conducted my “Madonna of Winter and Spring” – so I was full of memories and visions of that imaginative, creative, expressive playing so characteristic of this extraordinary orchestra. I already had a commission from the Rundfunkchor Berlin (using also the Berlin Philharmonic) for what turned out to be “Messages”, a twenty-minute cantata.

That was written and performed in 2007.

The theologian whose idea it was is Hans Küng. He has devoted his late years to international peace, arguing that at this point in time – so critical politically, with the unprecedented power of mass destruction, and ecologically, with the spectre of the elimination of the human species, no less – it is imperative to arrive at a global ethical consensus. There is no need to invent a new declaration, he argues; the major cultures of the world have proposed an ethical guide, on which they all broadly agree, thousands of years ago. The ever-nagging notion of “moral relativism” (all cultures have different and often contradictory customs and mores) is, on careful study, subsumed into an overlapping consensus without violation of cultural integrity. This is an important point, since all too easily the allegation can be made that the West, as usual in its history, is assuming global moral superiority. Hans Küng is very keen to emphasise that the message is not just for religious people but for all people and great care has been taken not to impose exclusively a Western morality.

The German text he gave me consists of a key summary of the teaching and context of Confucius, Moses, Hindu scriptures, Mohammed, Buddha and Jesus. Each of these six is

then quoted and commented on by traditional writings. Finally each of the resulting six movements has a refrain sung by a childrens' choir.

Wir haben Zukunft:

Wir Kinder haben Zukunft, wenn wir immer Menschen bleiben.

Menschen mit Vernunft und Herz. Etc.

It seemed to me important for the refrain to be sung by children, to avoid any hint of preaching in a text about ethics, and to dramatise the universal urgency. They want a future, like Strauss' unborn children in "Die Frau ohne Schatten", but in a more immediate and present way.

At the time of writing these words I have completed the first five movements; the whole work will have taken about two years when finished. Living for three months at the Wissenschaftskolleg zu Berlin, I was able to listen to the orchestra and occasionally ask Simon Rattle about questions of balance.

The difficulties of writing for choir and any other forces are always great. Even if the composer knows how many are in the commissioning choir, he has no idea how strong their voices are, whether their forte drowns the woodwinds' forte, or vice-versa. All choirs are different.

The demanding nature of the text forced me to be direct. I felt little need for the ludic element, for ingenious pattern manipulations or clever timbral or thematic puns. Not to have this policy this would have been like the world leaders at the Copenhagen climate change summit scoring vote-catching points off each other while the children of the world sense their lives being thrown away. In this same way, my *Messages*, which set only the names of angels as text, was a good focuser. If one believes in the strength of angels to some considerable degree, any purely musical ambitions are impertinent. The responsibility this project of Hans K ung's demands is likewise almost awe-inspiring.

The only musical idea suggesting a specifically musical discourse of creativity that came right at the beginning was that of using two conductors. The play of simultaneously different tempo-worlds seemed a natural extension of the huge forces arrayed on stage.

The Confucianism movement, the first, uses complex time relationships in a manner inspired by contemporaneous music theory. Confucius also maintained that the moral effect of music is its value. The harmony, or should it be Harmony, between Heaven and Earth is what music makes clear. It is not about personal emotion but rather about how

earthly music reflects heaven. There are plenty of rhythmic “reflections” and imitations and very few “subjective” thirds and sixths in my music here, more fourths and fifths, and plenty of wooden percussion sounds. Wood is more suitable than skin, which invokes slaughter, and metal, which invokes industrialisation; wood is the most harmonious percussion element.

I always start out with sketches in words and notation stretching out months or years before the serious composition starts. Then I ponder the nature of the work, what I want to *express*. This is not necessarily manifested in images or energies that refer outside music, but very often, in a work such as this, it is. For the second movement, the image of Moses on Mount Sinai, communing with God and receiving the ethical precepts that were to change the course of Judaism and much of the world, was of striking drama. There were “thunders and lightnings and a thick cloud upon the mount, and the voice of the trumpet exceeding loud; so that all the people that was in the camp trembled.”

The ram’s horn, or shofar, is the most characteristic of the ancient Hebrew instruments still to be ritually used, and the idea of the trumpet/shofar announcing the ethical revolution haunted my mind and my scoring. The strong emotions of the Hebrew bible are at the opposite end to the objective philosophy of Confucius. So the music changes. There is also the passionate ghost of Jewish music, in the glissandi of the woodwind instruments, for instance. The echo of an otherness to the Western ear.

Once I have a musical idea, it imposes its own exigencies. I try to transform it and bring out its full range of ambiguities, without switching to new material. My instinct is that too many contrasts become tedious, but invention within narrow boundaries leads to structural depth, the goal of all music. If the “spirit has seized one” as Beethoven would have put it, then the invention will be wild, even if confined.

This Middle Eastern otherness is further developed in the Islamic movement, where the ancient technique of building modes from two tetrachords becomes a compositional strategy. There is a system of modulation from maqam to maqam, changing one tetrachord at a time. The tetrachords include microtones. So the modulations are very clear.

The dangers of a Westerner meddling in cultures he does not deeply understand become especially strong when setting the Qur’an. There is one passage where this is done, and I read and consulted widely on the long controversy concerning music and sacred Islamic practice. The Qur’an is inseparable from its recitation. And the recitation, being the voice of God as revealed to his Prophet via the angel Gabriel, must not be fixed, rather



it is the inspiration of the moment expressed by highly trained and devout people, following certain guidelines as to pauses and how to pronounce the vowels, etc.

As I am setting it in German translation, like the rest of the work, these restrictions do not really apply, and I followed my precept to be absolutely direct, setting the words for homophonic a capella choir, very soft and slow, with no “musical devices”. The text is beautiful, and I try to allow it to speak, without getting in the way. I had much help at Wiko both from expert Islam scholars and from the extraordinary efforts of the library.

The first image I had for Hinduism, the third movement, between Judaism and Islam, was of Nataraja, the dancing cosmic creator god, an aspect of Shiva. So this movement dances, and a high degree of colour arising from intense energy is here germane to the underlying meaning. The full organ (a powerful one in Berlin’s Philharmonic Hall) is deployed in tango with the full orchestra, negotiating complex rhythms.

But the other essence of Hinduism is inner control and the realms of meditation. So here is also meditative, inward, tranquil music, “chanted” by the massive chorus with closed mouths and slow yogic breathing rhythms.

And so for at least six more months my work will go on, finding image and lighting up an expansion, with these extraordinary texts that are so different from anything I have set before. Rather than being poetic or mystical, they are pragmatic, noble and ethical. The purpose has become social rather than aesthetic.

Without Wiko, such concentration would have been hard to achieve indeed.



OCTOPUS EMBODIMENT AND  
COGNITIVE BRAIN FUNCTION  
BINYAMIN HOCHNER

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Binyamin Hochner was born in 1946 in Kvutzat Shiller near Rehovot, Israel (then Palestine). He studied Neurobiology at the Hebrew University of Jerusalem and completed his postdoctoral training with Prof. Eric Kandel (Nobel Laureate for Medicine, 2000) at Columbia University. He returned to the Hebrew University as a Research Fellow at the Otto Loewi Center in the Institute of Life Sciences and later became an Independent Researcher at the Department of Neurobiology. He has continued his collaboration with Prof. Kandel with short research visits and a sabbatical. Currently he is an Associate Professor of Neurobiology at the Department of Neurobiology, Institute of Life Sciences and a Faculty Member of the Interdisciplinary Center for Neural Computation of the Hebrew University of Jerusalem. – Address: Department of Neurobiology, Institute of Life Sciences, Edmond J. Safra Campus, Givat Ram, Hebrew University of Jerusalem, Jerusalem, 91904, Israel. E-mail: bennyh@lobster.ls.huji.ac.il

Being a Fellow of the Wissenschaftskolleg was a very special, interesting, and unusual experience for me, detaching me from the highly interactive way of life in laboratory and classroom for ten months. I feel that this period has brought important additional intellectual insights to my scientific goals. In this report I would like to sketch some of the ideas emerging from my stay. I should warn the reader that many of these ideas are preliminary and some are based on a first approach to areas beyond my immediate field of knowledge and profession.

I was trained as neurophysiologist at the Hebrew University and in the laboratory of Eric Kandel at Columbia University. At that time (late '70s and '80s) neurophysiology was

still a developing field. My fellow students and I had the privilege of following several leading figures like Sir Bernard Katz, Steven Kuffler, Eric Kandel, John Nicholls, Josef Dudel, Itzchak Parnas, and Rami Rahamimof, who advocated the bottom-up approach, i.e., using simple preparations for researching basic neuronal mechanisms. The rationale was that this approach could reveal universal properties of the nervous system that would then help us understand how complex nervous systems function.

Since then the situation has changed. We have now accumulated such a huge amount of information on the various processes in nerve cells that I doubt whether this bottom-up approach is practically feasible. And, despite this abundance of details, we still know little about how a brain achieves complex cognitive functions.

Over the years I found myself becoming more and more interested in how simple cellular processes may be involved in complex neural functions. Analyzing simple motor systems may help explain how animals efficiently control multiple degrees of freedom, as well as aiding the design of better robots. Moreover, such analysis may even suggest possible intelligent properties that may emerge from this simple organization. We followed this approach in my focus group in the Wiko (Functional and Structural Constraints in the Evolution of Sensorimotor Networks) that concentrated on a “simple system”. However, I still feel that different approaches are needed to advance our understanding of how complex brains carry out cognitive functions.

Cognitive functions are usually thought to include processes such as learning and memory, association, language, problem solving, decision making, mental imagery, and more. I have developed a mechanistic approach that may help conceptualize these terms within a neurophysiological framework. I view cognitive processes as emerging through integrative processing of sensory and motor information with stored memory representations. In this mechanistic scenario, in contrast to the prevailing dogma, memory itself is not considered a cognitive function. It is worth noting both that certain animals without obvious high cognitive abilities show excellent memories and that humans with cognitive disorders may still possess an excellent memory.

Over the last fifteen years, my collaborators and I have studied the nervous system of the octopus (*Octopus vulgaris*, class Cephalopoda, phylum Mollusca). Based on its behavior, the octopus is considered the most advanced invertebrate. Its nervous system has the largest number of nerve cells of any invertebrate – around 500 million neurons, similar to the nervous system of a dog. I am fascinated by two special features of the octopus, its highly maneuverable eight flexible arms and its highly advanced and complex behavioral

repertoire. These are, I believe, especially suitable models for furthering my scientific aim of better understanding how the brain is involved in complex behaviors.

During my sabbatical year at the Wiko, the Colloquia given by other Fellows, the informal discussions, and the ideas raised in my Focus Group have all served to strengthen my belief that octopuses and other cephalopods are ideal animals for researching complex brain functions, including those vaguely defined as cognitive. One reason for the strengthening of this belief was my becoming more familiar with the term “cognitive embodiment”. Although the concept is a little vague, its main point lies in viewing the behavioral complexity of robots, animals or human beings with reference to their being embodied entities. That is, complex behaviors of an agent (animal or human), including cognitive functions, stem from the highly dynamic interactions between the agent and the environment through the physical interaction of the body with the environment and the resulting sensory and motor information. In this view the controller (i.e., the nervous system) is an integral component but yet only one part of this embodied whole. This is well explained by Pfeifer et al. (2007): “Clearly, the embodied view suggests that the actual behavior emerges from the interaction dynamics of agent and through a continuous and dynamic interplay of physical and information processes.”

This view is also interesting because it implies “self-organization” in the establishment of embodiment. Self-organization is a very attractive idea for explaining the highly adaptive properties of especially complex nervous systems. Indeed, self-organization may be a biological characteristic of “complex brains”. Some dramatic differences that we find in the organization of a learning and memory area in octopus and cuttlefish brains may suggest that self-organization is a basic neural property from which high adaptability arises.

If this embodied view is correct, then it becomes very clear that the controller (the brain in the case of animal behavior) must be the most adaptive component. Thus, it is no surprise that all nervous systems are endowed with short- and long-term plasticity, which we usually implicate in learning and memory. There is every reason to assume that such plasticity processes are directly involved in the self-organizational processes. This idea is supported by the recent discovery of how relatively easy it is to “train brains” to generate a meaningful output (e. g. in brain-machine interface).

Within the framework of “embodied intelligence”, embodied agents are seen as being comprised of four dynamically interconnected elements: the controller, the mechanical and the sensory system, and the environment (Pfeifer et al., 2007). It is clear, however, that

some animals have relatively simple embodiment, while in others it is very complex, that is, all four parts are complex. The octopus is one example of a very complex embodiment with its amazingly large sensory system comprising hundreds of millions of sensory cells (visual, tactile, chemical) and large eyes, and its two highly complex motor systems (one for the highly maneuverable arms and soft body and one for the complex image-generating chromatophore system). In addition, the very large nervous system with 500 million neurons provides the substrate for an appropriately complex controller that must be dynamically integrated into the embodiment. Yet, in spite of the complex embodiment and large central nervous system, the octopus brain is rather simply organized. In other words, this somewhat philosophical concept of “embodied intelligence” has helped me perceive cephalopods as a special group of invertebrates, whose relatively simply organized nervous system makes them extremely useful for unraveling concepts and principles underlying complex behaviors.

Continuing this line of thought, I argue that we have a better chance of understanding complex nervous systems by examining those that have evolved from simpler elements with a simpler connectivity. Our electrophysiological studies have shown that the biophysical properties of the neurons in the octopus brain still maintain typical simpler invertebrate characteristics. That is, the cephalopods present the most complex brains that are still constructed from simpler nerve cells. In addition, cephalopod brains are also more simply organized, more like typical invertebrate ganglia than the multi-layered highly interconnected vertebrate brain tissue.

It has been proposed that the main difference between vertebrate and invertebrate nervous systems lies in the level of complexity of the nerve cells (Emes et al. 2008). If this is so, then I believe that, appropriate to their simpler cellular mechanisms, the cephalopod neural networks must also be more simply organized than vertebrate networks. The vertebrate networks can achieve great complexity with a smaller number of neurons due to their more versatile properties. In contrast, invertebrates, with their simpler neurons, would need to develop larger networks, but with simpler connectivity, to achieve a similar level of complexity. Possible support for this suggestion comes from comparing the number of cells in the vertical lobe of the octopus and the vertebrate hippocampus, brain structures important for learning and memory. The octopus vertical lobe contains about 25 million neurons, only half the number of neurons in the human hippocampus (about 50 million) and almost seven times more than in the rat hippocampus (about 3.6 million

neurons). I believe such a basic difference in complexity of organization makes the cephalopod brain much easier to explore.

I am grateful to the Wissenschaftskolleg for providing me with the opportunity to enrich my perspectives in relating behavioral complexity to brain mechanisms and organization. I have returned to Jerusalem with greatly strengthened enthusiasm to continue my research on octopus and other cephalopods. Not only do I aim to contribute to the better understanding of complex brain functions, I hope also to succeed in persuading more neuroscientists of the advantages of researching cephalopods.

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GIVE AND TAKE  
BERT HÖLLDOBLER

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Bert Hölldobler (born 25 June 1936) is a German behavioral biologist and sociobiologist whose primary study subjects are social insects and in particular ants. He is a co-winner of the Pulitzer Prize for his work on *The Ants* (1991) with Edward O. Wilson. In 1990, he received the Gottfried Wilhelm Leibniz Prize of the Deutsche Forschungsgemeinschaft. He also collaborated with Wilson to write *Journey to the Ants* (1994). In 2008 he and Wilson co-authored their third book *The Superorganism*. He holds positions at the University of Würzburg as Professor emeritus and Arizona State University, where he is a Foundation Professor in the School of Life Sciences. – Address: Zoologie II, Biozentrum, Am Hubland, 97074 Würzburg. E-mail: bertholl@asu.edu

The six weeks I was privileged to spend at the Wissenschaftskolleg (Wiko) zu Berlin were wonderful and most stimulating. My only regret is that my time schedule did not allow me to accept an invitation for a more extended visit. At the Wiko I experienced several highlights. One was the workshop on “Developmental Evolution of Eusocial Systems” organized by Manfred Laubichler and Robert Page. There was no pressure to produce a paper, and this, I think, was one of the reasons for the lively “give and take” discussion, the genuine probing of different views concerning the evolutionary origin of eusociality, and the extensive analysis of levels of selection that shape eusocial adaptations. I also enjoyed the many conversations with Wiko Fellows, the scientific fields of some of them quite different from my own field of expertise, which was especially enlightening for me. Equally exciting were the Tuesday seminars; I mention exemplarily the most informative presentation by Yogendra Yadav on “Elections and Representation in Contem-

porary India". The relaxed atmosphere during the Thursday dinners marvelously fostered new encounters with scholars and their spouses. Finally, the quiet and comfortable private office enabled me to finish the last touches of my new book, "The Leafcutter Ants: Civilization by Instinct". All in all, these were wonderful weeks in Berlin!

My heartfelt thanks go to the Rector, Luca Guiliani, the Secretary, Joachim Nettelbeck, the Academic Coordinator, Reinhart Meyer-Kalkus, and to the most helpful, competent and very cordial staff of Wiko. All of them made me feel at home at Wiko.





DIE KRAKE PAUL – ODER: WISSENSCHAFT  
ALS NICHTWISSEN-SCHAFT  
WOLFGANG HOFFMANN-RIEM

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Geboren am 4. März 1940 in Hannover. 1959–64 Studium der Rechtswissenschaft, Wirtschaftswissenschaft und Soziologie an den Universitäten Hamburg, Freiburg i. Br., München und Berkeley. 1970–74 Rechtsanwalt. 1974–2008 o. Professor für Öffentliches Recht und Verwaltungswissenschaft der Universität Hamburg; 1979–99 Direktor des Hans-Bredow-Instituts für Rundfunk und Fernsehen; seit 1998 Mitglied der Forschungsstelle Umweltrecht und seit 1995 Leiter der Forschungsstelle Recht und Innovation, jeweils an der Universität Hamburg. Forschungs- und Lehraufenthalte in Stanford, Harvard, Berkeley, Tulane, Hastings und Sidney. 1989–92 Vorsitzender der Deutschen Gesellschaft für Publizistik- und Kommunikationswissenschaft (DGPuK); 1981–83 Vorsitzender der Vereinigung für Rechtssoziologie. 1995–97 Justizsenator der Freien und Hansestadt Hamburg, in dieser Zeit Vorsitzender des Rechtsausschusses des Deutschen Bundesrats. 1999–2008 Richter des deutschen Bundesverfassungsgerichts. Seit 2007 deutsches Mitglied der Venedigkommission des Europarats (European Commission for Democracy Through Law). Forschungsschwerpunkte: Verfassungsrecht; Reform des Verwaltungsrechts; Methoden der Rechtswissenschaft; Innovationsforschung; Medienrecht und Medienwissenschaft; Polizei- und Umweltrecht, Justizreform. – Adresse: Universität Hamburg, Fakultät für Rechtswissenschaft, Rothenbaumchaussee 33, 20148 Hamburg. E-mail: whoffmann-riem@gmx.de

Die Technik der Prognose feierte 2010 einen neuen Helden: die Krake Paul aus Oberhausen. Es gelang dem Tintenfisch Paul, was bisher kaum jemandem, jedenfalls nicht am Institute for Advanced Study (Kosename: Wiko), gelungen ist: die Zukunft verlässlich

vorherzusagen, und das sogar für das gesellschaftlich so wichtige Spielfeld des Fußballrasens der Weltmeisterschaft. Alle Siege, aber leider auch Niederlagen, der deutschen Mannschaft hat Paul treffend angekündigt.

Wie kümmerlich muss Paul der Herr Sokrates erscheinen, wenn dieser formuliert: „Ich weiß, dass ich nichts weiß.“ Paul mag es – wenn es ihn überhaupt interessiert – für einen Trick halten, wenn Sokrates das Wissen über Nichtwissen als Wissen bezeichnet. Und sich darin weiser als andere dünkt, dass er, was er nicht wisse, auch nicht zu glauben wisse. Vermutlich werden solche Gedanken für Paul zu kompliziert sein, als dass er die Steuerung seiner Krakenarme damit belasten müsste.

So einfach können die Bewohner des Wiko sich dem Problem von Wissen und Nichtwissen nicht entziehen. Sie kennen zwar die Sprüche des Philosophen, sind aber grundsätzlich fortschrittsgläubig und sie nutzen Nichtwissen als Treibstoff bei der Suche nach neuem Wissen, nämlich dem, was zum anerkannten und bewährten Bestand von Erkenntnissen werden kann. Bei diesem Bemühen werden sie allerdings häufig abgestraft. Denn neues Wissen öffnet meist den Blick auf noch mehr Nichtwissen. Je erfolgreicher Wissenschaft ist, desto mehr Nichtwissen häuft sie an. Da häufig aber auch einzelne neue Wissenspartikel aufgefunden werden, werden diese gefeiert (zumal dieser Erfolg als Grundlage von Anträgen für weitere Forschungsprojekte taugt) und Blicke in den Abgrund des Nichtwissens werden möglichst unterbunden (oder auf den für einen Forschungsantrag nützlichen Horizont reduziert).

Es bleiben Fragen. Gewinnen wir überhaupt Wissen, das zu wissen sich am stärksten lohnt? Vorfrage: Wie und wozu gewinnen die Vertreter aller der seltsamen Disziplinen, die das Wiko bevölkern, Wissen? Da im Wiko-Jahr 2009/10 die Naturwissenschaftler, ganz voran die Biologen, dominierten, müssen sie für Beispiele herhalten.

Der erste Biologen-Vortrag galt dem Navigationsverhalten der Wüstenameise. Wie orientiert sie sich in der baum- und strauchlosen Wüste, also einem Gebiet ohne deutliche Markierungen? Um zu testen, ob oder wie diese seltsamen und wunderschönen Tiere Orte und Entfernungen speichern und das Gespeicherte umsetzen können, wurden einer Ameise die Beine verkürzt (schmerzfrei, wurde versichert), nachdem sie auf Futtersuche das Nest verlassen hatte. Sie wählte die richtige Richtung zurück zum Nest, aber der zurückgelegte Weg war zu kurz. Einer anderen Ameise wurden die Beine in handwerklich meisterhafter Weise durch Ankleben von Stelzen verlängert. Sie fand die Richtung, aber schoss mit ihren zu langen Schritten übers Ziel hinaus. Eine Programmierung über

Richtung und Entfernung war belegt. Die theoretische Einordnung folgte in einem spannenden Referat.

In einem anderen Vortrag habe ich etwas über die Bedeutung von Pollen, Honig und Wasser bei der biologischen Fundierung der Arbeitsteilung in Bienenstöcken gelernt. Ein weiterer Vortrag richtete den Blick auf die Superorganismen der Blattschneiderameise und zeigte, wie arbeitsteilig Gemeinschaften von sozialen Insekten organisiert sind. Unter der Überschrift „Vom Ursprung der Sprache“ habe ich ferner gelernt, dass Delfine und Affen sich über Laute zielgerichtet verständigen, aber auch, dass ein Affe aus Asien einen aus Afrika nicht versteht. Aber was leistet Sprache? Selbst bei Menschenaffen, so eine weitere Einsicht, vermittelt Kommunikation keine gemeinsame soziale Erfahrung. Warum aber sind Menschen über Kommunikation kooperativ geworden? Eine solche Frage führte in den Bereich des Nichtwissens oder der Hypothesen, hier der, dass es mit der Evolution von kooperativer Motivation zu tun habe. Und weiter?

Als Zuhörer der Kolloquien war ich ungeachtet vieler imponierender Rückblicke auf die Forschungsgeschichte und der Einblicke in Theoriegebäude häufig überrascht, wie kleinteilig die berichteten Befunde oft waren, gemessen an all dem, was offenbar noch nicht gewusst wird. Zugleich aber überfiel mich vielfach Neid: Als Jurist kann ich meinen Blick nicht derart reduzieren. Meine Tätigkeit zielt auf die Mithilfe bei der Bewältigung von häufig sehr komplexen sozialen Konflikten und auf die Gestaltung von Zukunft mit den Mitteln des Rechts. Soweit in der menschlichen Gesellschaft beispielsweise Konflikte über Sprache ausgetragen werden – also mit dem wünschenswerten Verzicht auf die Eskalation zum Gewalteininsatz –, gehört dazu sehr viel mehr als der bei Delfinen beobachtete Austausch zielgerichteter Laute. Die Lösung sozialer Probleme unter Menschen führt in ein komplexes, hoch dynamisches Feld von Verkettungen und Verschleifungen unterschiedlicher Faktoren, deren Isolierung – selbst wenn sie gelingt – häufig kaum Einsichten gibt, die der Problembewältigung gerecht werden.

Auch wenn ich bewundere, wie meine biologischen Kollegen ihre Experimente mit Ameisen, Bienen und Schimpansen anlegen, wundere ich mich doch auch, wie einfach viele der gestellten Fragen sind – gemessen an der Komplexität, die doch auch die Tierwelt auszeichnet – und zugleich, wie schwierig schon deren Beantwortung ist. Viele Wissenschaftler können es sich sogar leisten, Erkenntnisse allein um der Erkenntnis willen zu erwerben – gewissermaßen in Instituten für sinnfreie Forschung. Dann wird mir bewusst, dass Derartiges für meine Arbeit (die ich auch als wissenschaftliche verstehe) zwar auch vorstellbar ist, aber nicht ausreichen kann. Wie vielschichtig ist schon ein scheinbar

einfacher Ehekonflikt und wie schwierig der Umgang mit seinen Folgen auf verschiedenen Ebenen? Wie können wir (ja: wollen wir überhaupt) erkennen, ob der Besucher einer Moschee gerade die Flugroute zum Empire State Building rekapituliert? Wie können in Turbulenzen geratene Finanzmärkte stabilisiert werden, obwohl offenbar niemand wirklich durchschaut, wie Finanzmärkte funktionieren? Unter welchen Bedingungen darf eine neue Technologie trotz fehlenden Risikowissens genutzt werden, wie etwa die Nanotechnologie, die viele Vorteile in der Medizin, in der Kosmetik, in der Bekleidung bringt, aber auch schon erkennbare, vermutlich ebenso viele nicht erkennbare Risiken für Gesundheit oder Umwelt?

Wer dazu als Wissenschaftler Stellung nehmen will oder wer – etwa als Verwaltungsbeamter, als Politiker oder als Richter – mit solchen Problemen praktisch umgehen muss, der weiß, dass er sich nur begrenzt im Reich des Wissens, sondern weitgehend in dem des Nichtwissens bewegt. Die Wissenschaftler, an die der Praktiker sich in seiner Not wenden wollte, werden ihm vielfach keine Befunde vermitteln, die Sicherheiten geben, sondern bestenfalls Wahrscheinlichkeitsaussagen machen, wenn sie denn überhaupt etwas für die Aufgabe Relevantes verfügbar haben. Der erwähnte Praktiker hat auch kaum Chancen, die Löcher in seinem Nichtwissen durch Experimente größer werden zu lassen.

Die zitierten Biologen und viele andere Naturwissenschaftler können die Gegenstände ihrer Erkenntnisbemühungen begrenzen; sie können Experimente unter definierten, also einengenden Bedingungen machen; ihre theoretischen Entwürfe dürfen auf bestimmten, häufig selektiven Prämissen beruhen. Wollen sie Experimente auf Wiederholbarkeit – ein klassisches Seriositätsindiz – ausrichten, müssen sie als maßgebend geltende Faktoren identifizieren und meist sogar kontra-faktisch reduzieren, um Vergleichbarkeiten zu sichern, also etwa situative Einflüsse auszuschließen. Sie können solche Experimente auch auf Fragen des Sozialverhaltens von Tieren, etwa der Bewältigung alltäglicher oder exzeptioneller Probleme in Bienenstöcken, erstrecken. Nach einem der eindrucksvollen Vorträge über Bienen blieb aber die Frage unbeantwortet – sie wurde nur formuliert: „How does complex social behaviour evolve?“ Wie viel schwerer fällt die Antwort für menschliche Gemeinschaften, erst recht, wenn nicht nur die Entstehung, sondern auch die Bewältigung gesellschaftlicher Konflikte zum Thema und zur Aufgabe werden. Noch schwieriger wird es, wenn Gesellschaften Vorkehrungen suchen, um ihre eigene Zukunftsfähigkeit zu sichern. Hier wird Menschheit selbst zum Experiment, al-

lerdings zu einem weitgehend unkontrollierten und meist nur im Nachhinein beobachtbaren Experiment.

Bei unserem Bestreben, mehr wissen zu wollen, hilft vielfach nicht einmal der aufklärerische Glaube an die Vernunft. Denn das Vertrauen in die Verstehbarkeit und Beherrschbarkeit der unterschiedlichen Dimensionen von Welt allein mit den Mitteln des Verstandes ist erschüttert. Dafür stehen auch Namen von Alt-Fellows wie Lepenies, Nowotny oder Elkana. Jedenfalls hat sich das Rationalitätsideal neu gekleidet. Die wohl vorherrschende Sichtweise des (nicht radikalen) Konstruktivismus zweifelt jedenfalls an der Möglichkeit zeit- und situationsunabhängig gültiger und von allen gleichermaßen einsehbarer Aussagen über die – oder besser zur Beschreibung von – Realität. Betont wird die soziale Determiniertheit wissenschaftlicher Erkenntnis. Als unhintergebar gelten die Grenzen intersubjektiver Verständigung und intersubjektiv einleuchtender Beweise. Beobachtungen stehen im Kontext theoretischer, kultureller und sozialer Prämissen. Anerkannt wird die Relevanz von spezifischen Denkgebäuden, sei es der Denkstile im Sinne Ludwik Flecks oder der Kuhn'schen Paradigmen. Die Bedeutung situativer Rahmenbedingungen für das Erkennen wird ebenso gesehen wie die Erheblichkeit subjektiven Erlebens und Interpretierens, die Beachtlichkeit von Vorurteilen, Wünschen und Ideologien, von Konventionen, Riten und Tabus. Unterschiedliche Scientific Communities können unterschiedlichen Paradigmen anhängen und im sozialen Konstruktionsprozess unterschiedliche Verbündete aktivieren. Selbst die gleichen Daten können unterschiedlich interpretiert und in unterschiedlicher Gestalt in jeweils unterschiedliche Verwendungszusammenhänge transferiert werden – ohne dass die Vorgehensweise stets eindeutig als fehlerhaft belegbar wäre.

Allerdings will ich nicht ausschließen, dass die Spielräume für unterschiedliche Wahrnehmungen in den Gegenstandsbereichen unterschiedlicher Disziplinen jeweils unterschiedliche sind – so in der Physik vermutlich engere als in den Sozialwissenschaften. Aber auch in den Naturwissenschaften dürfte unbestritten sein, dass Fragen je nach den Relevanzbedingungen der jeweiligen Akteure gestellt und Ergebnisse nach ihnen ausgewählt und interpretiert werden. Auch wissen selbstverständlich auch Naturwissenschaftler um die Komplexität von Welt und manche nutzen auch Möglichkeiten zur ganzheitlichen Analyse komplexer Phänomene – mit dem Risiko, andere mit dieser Vorgehensweise zu irritieren oder gar zu überfordern. Auch wird dies im gegenwärtigen segmentierten und fragmentierten Wissenschaftssystem nur selten honoriert, insbesondere nicht im Bereich der Forschungsförderung.

Francis Bacons berühmte Formulierung „Wissen ist Macht“ stammt von einem Forscher, der Wissenschaft als Mittel zur Beherrschung der Natur konsequent in den Dienst der Gesellschaft stellen, also Probleme lösen, wollte. Wissensstreben als Fortschrittsstreben und dabei auch als Streben nach Macht über die Natur, als Macht zur Veränderung und letztlich als Macht auch über Menschen. Erfolgreiche Herrschaft braucht Macht. Aber Macht ist ambivalent: Wissen über den Bau einer Atombombe kann als Drohung wirken; die Enträtselung des genetischen Codes kann Mittel zu gentechnischen Eingriffen in die Natur sein, ja auch zu Veränderungen der genetischen Bausteine des Menschen. Hier müssen wir Bacons These noch ergänzen um den Satz: „Auch Nichtwissen ist Macht.“ Nur solange die immensen Breiten- und Langzeitfolgen des Einsatzes von Atombomben nicht wirklich bekannt waren, war diese Waffe als Machtmittel relativ leicht einsetzbar. Solange die sozialen, ökologischen oder auch nur die biologischen Folgen gentechnischer Veränderungen nicht in ihren Facetten und Details bekannt sind – und das wird lange so bleiben –, ist das Nichtwissen ein Machtmittel, sowohl für diejenigen, die Gentechnik bekämpfen, als auch für diejenigen, die sie stimulieren. Hier hilft es nicht, das Sprichwort zu zitieren: „Was ich nicht weiß, macht mich nicht heiß“. Unwissen kann auch beunruhigen. Die Antwort muss nicht heißen: Also muss ich mehr wissen. Sie kann auch heißen: Also muss ich anderes wissen, etwa: Wie kann ich besser mit Unwissen umgehen?

Warum ich das alles beschreibe oder gar betone? Weil mich überrascht hat, wie wenig solche Grundsatzfragen im abgelaufenen Jahr im Wiko diskutiert wurden und dass sie selbst dort nicht zum Thema wurden, wo sie angesprochen wurden oder sich implizit aufdrängten. Es wurde nicht näher gefragt, ob solche Grundsatzfragen gemeinsame Fragen sind, die Disziplinen übergreifend verbinden. Lag das nur an dem Wunsch, die Kollegen in den Dienstagskolloquien nicht zu überfordern, oder auch daran, solchen schwierigen Fragen lieber auszuweichen und zur Vermeidung von Reputationsverlusten auf sicherem Terrain zu bleiben? Oder lag es auch daran, dass es vielleicht gar nicht von allen für wissenschaftlich gehalten wird, wenn Fellows komplexe Vorgehensweisen wählen, ohne reduktionistische Schnellstraßen zu befahren? Versinnbildlicht die wechselseitige Sprachlosigkeit in Grundsatzfragen vielleicht auch, wie trennend die weiterhin üblichen Deutungshoheiten über Wissenschaft und über die Wissenschaftlichkeit von Methoden sind? Gibt es hier immer noch Ausschließlichkeitsansprüche?

Dringender stellt sich mir auch eine andere Frage: Ist das Wissen (oder sind die Bruchteile von Wissen), auf das sich die üblichen wissenschaftlichen Expertisen beziehen,

vergleichsweise weniger relevant als das Wissen darüber, wie eine Gesellschaft mit Nichtwissen – insbesondere mit dem unspezifischen Nichtwissen, nämlich dem, von dem wir nicht einmal wissen, dass wir es nicht wissen – umgeht und sinnvoll umgehen kann? Muss die Wissenschaft sich stärker um die Entwicklung von Vorgehensweisen und Regeln kümmern, wie die Gesellschaft angesichts von weitreichendem Nichtwissen ihre Zukunftsfähigkeit sichern kann? Wäre auch das eine Aufgabe von Wissenschaft, vielleicht einer, die zur Nichtwissen-Schaft gereift ist?

Um all das brauchte Paul sich nicht zu kümmern. Er produzierte kein Wissen, sondern eine schlichte Information, nämlich die, welche Muschel er aus einem von zwei mit für Wassertiere merkwürdigen Farben – stets war Schwarz-Rot-Gold dabei – geschmückten Behältern fischte, um sie zu verzehren. Die Deutungshoheit, mehr darin zu erkennen, lag nicht bei Paul. Sie lag vielmehr bei denen, die diese Information in einen Verwendungszusammenhang ordneten, der Paul verschlossen bleiben musste und der für die Stillung seiner tierischen Bedürfnisse irrelevant war. An den Forschern in Oberhausen (ja, Oberhausen) konnte aber gelernt werden, was Marketing bedeutet, vermutlich auch für das, was im Wiko als Wissenschaft behandelt wird.



RE-DISCOVERING BERLIN  
VINCENT M. JANIK

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Vincent M. Janik is an Associate Professor or Reader in the School of Biology at the University of St. Andrews, UK. His research focus lies in the evolution of complexity in mammalian communication and cognitive systems. In his empirical work he concentrates on the communication and cognition of marine mammals. Born in Berlin in 1966, he received his German diploma in Biology from the Freie Universität Berlin in 1992 and his Ph.D. from the University of St. Andrews in Scotland in 1998. After two postdoctoral fellowships at the Woods Hole Oceanographic Institution, USA, he returned to St. Andrews where he was a Marie-Curie postdoctoral Fellow and later a Royal Society University Research Fellow before receiving his faculty appointment. – Address: School of Biology, University of St. Andrews, Fife KY16 8LB, Great Britain. E-mail: [vj@st-andrews.ac.uk](mailto:vj@st-andrews.ac.uk)

Having been born in Berlin, I was looking forward to coming back and spending more time in a city that I left only with hesitation. Unlike in many other places, natives tend to stay in Berlin. It is a city that has much to offer and even before the Wall fell West Berlin was an interesting place to live. Yet, it did not cater for everyone and I left in 1994 to pursue my interests in animal behaviour and marine biology. I have only been back for short visits ever since. These visits allowed me to see changes, but there are many hidden aspects to any place that will only reveal themselves during a prolonged stay. The year at the Wiko was going to give me an opportunity to experience Berlin after a 15-year break and re-acquaint myself with it.

Koenigsallee provided an excellent base since it is one of the parts that had seen the fewest changes since the Wall came down and felt very familiar. Nevertheless, the stay at



the Wiko was my first time in Berlin that I did not recognize the city as my hometown. Part of living in West Berlin had been the feeling of living in a province that was cut off from the dominant hubbub of the world. It came with a certain self-centeredness that was perhaps not a good thing. This fairly central aspect of Berlin life to those who lived there seemed to be gone and has been replaced by a more cosmopolitan air and open attitude of most inhabitants. I enjoyed seeing these contrasts and am amazed at how quickly this major city had changed its face.

Being at the Wiko was, of course, a real treat and brought a life that was somewhat artificial in its academic richness. Few places allow, much less foster the degree of interdisciplinary exchange that is part of everyday life at the Wiko. I enjoyed the Tuesday colloquia and other seminars and conversations on subjects that I am usually not exposed to. One of the highlights was a discussion group on the topic of human uniqueness, a relatively informal gathering that was initiated by Steven Lukes to explore differences between animals and humans. It was open to all Fellows, but had a core group of around six people that attended it regularly. We discussed obvious topics such as teaching, theory of mind, language and culture, but also some less commonly found in human-animal comparisons, such as emotions, play, music, norms, social alliances and hierarchies. The multi-disciplinary composition of our group ensured a lively debate and novel insights for all of us. Outside of this group there were also many new inspirations to be found. I was able to discuss the origins of music and the relation between animal signals and music with Jonathan Harvey, Maria Majno and Reinhart Meyer-Kalkus at the Wiko and with staff of the Max Planck Institute for Human Cognitive and Brain Sciences in Leipzig. These interactions motivated me to explore the basic physiological changes caused by sounds in animals in relation to music.

My own plan for the year at the Wiko was to write on the evolution of complexity in mammalian communication. This was a project I had planned together with my colleague Klaus Zuberbühler. I used a large chunk of my time delving into the philosophical literature on the subject. Not surprisingly, this brought a fair amount of confusion to our well-laid plan. Fortunately, we were lucky in that there were a number of Fellows who shared at least some of our interests, which gave us the opportunity to engage in many discussions that were directly relevant to our project. Bert Hölldobler, Robert Page, Raghavendra Gadagkar and Olof Leimar brought me up to speed on communication in insects, Penny Brown introduced me to the intricacies of people reference and interaction in human language, Frank Pasemann explained the power of distributed representation in

neural networks and Vasilis Politis was at hand to answer my questions about the philosophical views on our subject. Furthermore, to enable and stimulate discussions with relevant people in our field, we organised two short meetings during our time at the Wiko. The first one, on complexity in animal communication, was generously supported by the Otto und Martha Fischbeck-Stiftung. Sadly, it was somewhat hampered by the eruption of an Icelandic volcano that stopped most air traffic in and around Europe, but undaunted we still had an interesting day of exchange with colleagues from Germany, Austria, Sweden and the UK. The second and somewhat larger meeting was on reference in animal communication and funded by an EU grant. This meeting focussed on the definition of reference in animal communication and the requirements to demonstrate its presence in communication systems. We invited colleagues from the fields of biology, psychology and philosophy to review data on reference in animal communication and to discuss the usefulness of the functional reference concept in animal communication studies. These meetings have been at the centre of our project. While it is usually a great undertaking to organise meetings, the professional help that the Wiko staff offered made it a painless experience. All in all, the Wiko has been invaluable in the progress of our project and instilled it with a unique level of input from outside our own discipline.

I am now back in St. Andrews in preparation for a new semester. Administration and teaching demands are back in full swing and the time at the Wiko seems like a distant memory of a now lost paradise. But while it was a real treat to be able to concentrate on one's work with no distractions, a perhaps even more enjoyable part of the stay was the new friendships that often formed outside of discipline boundaries. I enjoyed watching the World Cup and discussing the differences (or lack thereof) in research methods between the humanities and the natural sciences with Martin Puchner and Amanda Claybaugh, the interesting insights into all aspects of life in India provided by Yogendra Yadav and Madhulika Banerjee and discussions about the German and other academic systems with Harald Wolf and Galin Tihanov. These and other new friends found among the Fellows are a true gift that Wiko has bestowed upon us. Last but not least, a big advantage was the opportunity for our children to experience German culture and learn my native language as one of theirs. They have done remarkably well and are now truly living in two cultures. I thank the Wissenschaftskolleg and all of its staff for making this time for our whole family so enjoyable.



INTERIORS AND INTERIORITIES,  
OR, VOYAGE AROUND MY ROOM  
EWA LAJER-BURCHARTH

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Ewa Lajer-Burcharth is William Dorr Boardman Professor of Fine Arts at Harvard University and a senior advisor for Arts and Humanities at the Radcliffe Institute for Advanced Study at Harvard. Lajer-Burcharth earned her Ph.D. in Art History from the City University of New York and a Masters Degree from the Institute of Art History at the University of Warsaw in Poland. She was formerly a curator at the Contemporary Art Center Studio in Poland and has received fellowships from the Guggenheim Foundation and the Institute for Advanced Study in Princeton, among others. Her teaching focuses on eighteenth- and nineteenth-century European art, as well as contemporary art and critical theory. She is the author of *Necklines: The Art of Jacques-Louis David After the Terror* (Yale, 1999) and *Chardin Material* (Sternberg Press, 2011). During her fellowship year at the Wissenschaftskolleg zu Berlin, she worked on her current book project titled *Interiority at Risks: Precarious Spaces in Contemporary Art*. Her essay titled “Interior and Interiority: Chantal Akerman’s *Là-bas*”, based on the research conducted during her tenure at Wiko, has been published in the special issue of *31*, a Zurich-based magazine for critical theory. – Address: Department of History of Art and Architecture, Harvard University, 485 Broadway, Cambridge, MA 02138, USA. E-mail: burchart@fas.harvard.edu

Often while working ensconced in my lovely office in Wiko’s *Neubau*, I was reminded of Xavier de Maistre’s little book titled *Voyage autour de ma chambre*. De Maistre, a young Savoyard officer, wrote this idiosyncratic essay – part autobiography, part philosophical investigation – in 1790, during his involuntary interiorization in Turin. Having fought a

duel, he was sentenced to 42 days of house arrest, and he decided to make the best of it. Written in a spirit of defiance and resistance to confinement, *Voyage Around My Room* is an inversion of a travel book that takes the reader on a tour around the author's dwelling and his mind. An account of an interior that metamorphoses into an essay on interiority, de Maistre's book was important to my own research project, which deals with the problem of the relation between interior space and the sense of self in contemporary art. But it was also a kind of model for me for how to use my *voluntary* confinement to produce new work.

What I liked about my year-long stay at Wiko was precisely the sweet interiority of my enclosure, the space and time it provided me to think and write about the question of the relation between interior and interiority as it manifests itself in contemporary art. I cherished those hours of enabling seclusion. But what I also cherished was the prospect of daily release from it occasioned by the daily lunches with my colleagues and fellow travelers around *their* rooms. These lunches, and the forum for daily discussions they provided, proved to be inspiring in many, often unsuspected and indirect ways, and I look back at them with fondness. Though I would have welcomed more Fellows working in the humanities, it proved more stimulating than I expected to have such a large number of scientists at hand. The conversations conducted on the occasion of these daily lunches, but especially the discussions following the seminar presentations, the *Dienstagskolloquia* in which I was very happy to participate, were in a deep and lasting way inspiring to me. I have learned a lot and established many rewarding rapports not only with the literary scholars and the philosophers, with whom I expected to interact, but also with the biologists and the lawyers, the writers and the musicians, some of whom became very dear friends.

Berlin as a city proved to be, of course, a special pleasure: a vast room in which to wander, full of art. With its stupendous museums, but especially its contemporary art scene – certainly the most lively in Europe – the city was the most stimulating and rewarding place to be in, for me, as well as my family. I have devoted (almost) every Thursday afternoon to explorations of the museums and the city's art scene, and my husband, Martin, a journalist, who accompanied me on these occasions, enjoyed them as much as I did. Our daughter, Zofia, too, thrived in Berlin, wherein she was able to conduct a life far more autonomous than in Cambridge. She came to speak German fluently and made lots of new and dear friends. Above all, she became immersed in a new culture and was exposed to new ways of doing things, which proved at once challenging and enjoyable to

her. This aspect of the life at Wiko – the possibility for the Fellows to bring their families along, *and* the extraordinary care given them by the staff – is truly unique and most appreciated. I am most grateful for this experience, as is my family – “Thank you Wiko!” as my daughter says.



ROBERT LEPAGE'S VISION  
MANFRED D. LAUBICHLER

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Manfred Laubichler, born 1969 in Salzburg, Austria, is Professor of Theoretical Biology and History of Biology in the School of Life Sciences and Director of the Center for Social Dynamics and Complexity at Arizona State University. His undergraduate training was in Zoology, Philosophy and Mathematics at the University of Vienna and his graduate training was in Biology at Yale and in History/History of Science at Princeton. He is associate editor of two journals, *Biological Theory* and the *Journal of Experimental Zoology, Part B: Molecular and Developmental Evolution* and is a visiting scholar at the Max Planck Institute for the History of Science in Berlin, an adjunct scientist at the Marine Biological Laboratory in Woods Hole, Mass. and an external faculty member at the Konrad Lorenz Institute for Evolution and Cognition Research in Altenberg, Austria. – Address: School of Life Sciences, Arizona State University, P.O. Box 874501, Tempe, AZ 85287-4501, USA. E-mail: manfred.laubichler@asu.edu.

French-Canadian director Robert Lepage's vision of modern life is full of chance encounters that later unfold in complex stories. In such recent theater classics as the *Seven Streams of River Ota* and *Lipsynch*, these complex narratives span the globe and bring together historical episodes, large and small, as well as different languages, cultures and biographies. They combine the everyday with the extraordinary in an increasingly globalized world that is still made up of specific local events and circumstances.

The buildings in Grunewald's Wallotstraße are a place that embodies Lepage's vision. The ten months that Fellows, spouses, children and guests spend together with the staff and the Berlin and international networks that make up the Wiko are a time of many

chance encounters, of beginning and continuing stories that transform all of us in the process.

The Wiko is also a place where the world slows down, at least a bit. Here the focus is on looking inward, reflecting and gaining new perspectives – something that is possible only if there is time to let ideas emerge slowly, gradually and without the rush of deadlines. To be sure, the Wiko in 2010 is certainly a different place from in the 1980s or even 1990s. E-mail, Skype and the much easier means of travel in and out of Berlin have turned the Wiko more into a hub than a monastery. And this is what we all experienced during our stay: a constant in and out of Fellows and guests that brought the world at large back to the Grunewald.

How then, did I experience the year at the Wiko? Was it productive? And, if so, by what metric? My own Wiko experience falls squarely within the “Lepenies paradigm”. Early in our stay, when most Fellows were busy to unpack, get organized and tackle the plans we all came with – catching up with overdue papers and getting ready to finally write the planned book – we heard about former Rector Wolf Lepenies’ criteria for a successful Wiko experience. “If, after 10 months, you have written exactly the book you wanted to write when you came here, this is a failure. If, on the other hand, you leave with a completely new book in mind, this is a success.” Or any variation thereof – I think I have heard about six variations of this theme during our year. By this metric, my year was a smashing success that was only possible because of the genuine culture of the Wiko.

Rob Page and I came with a clear project in mind. We had mapped out a book that was the focus of our working group on the *Social Insects as a Model System for Evolutionary Developmental Biology*, a group that also included Olof Leimar, Adam Wilkins and several short-term Fellows and guests, most notably Bert Hölldobler. When we left, our understanding of the topic had been transformed. Thankfully we did not write the original book as planned. Rather, Rob wrote a manuscript that synthesized three decades of experimental work, we began a mathematical modeling project with Olof and we completely rethought the original project. And that is only what happened within our working group.

Very much in the spirit of Lepage’s vision, during my year at the Wiko I crossed paths with Yehuda Elkana again. We are both travelers between worlds, geographic as well as intellectual, and share a wide range of interests – from the history of science to the university curriculum, and many friends. Yehuda has been connected with the Wiko “for-

ever”; so much so that he considers himself to be part of the furniture. This year, after his retirement as Rector of the Central European University, he was there as a Fellow and organized a working group on curriculum reform. Many Fellows joined and we had stimulating discussions that resulted in a manifesto and several initiatives related to curriculum reform. Among those, the collaboration between Leuphana University in Lüneburg and Arizona State University stands out and continues the series of unexpected events made possible by the Wiko experience. Both are reform universities in that they go beyond the traditional model and explore what the university of the 21st century could look like. And now we are working towards joint curricula and a global classroom that will enable students from both places to meet, discuss, collaborate and, in the process, expand their horizon – the Wiko model transplanted into university education.

It is difficult to list the many ways the Wiko provides intellectual stimulation. In my case, I came with ideas for two books and left with four clearly mapped-out manuscripts, bridging disciplines and languages. And even though I had been deeply connected to Berlin already, I formed many new collaborations in the city, most notably with the group of Horst Bredekamp at the Humboldt University. The friendships formed during this year continue to enrich our lives, and encounters with people around the globe connect individual biographies back to the Grunewald. (This fall alone, at two of the talks I gave, a former Wiko Fellow was in the audience, thus adding a different dimension to the traditional “after seminar” dinner conversation.) In our era of globalization, the few buildings in the Grunewald connect the world by less than six degrees.





BERLIN INTERSECTIONS –  
BERLINER KREUZUNGEN  
OLOF LEIMAR

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Olof Leimar was born in Sweden in 1949. He is a Professor of Zoology at Stockholm University. He studied Physics and Mathematics at the Royal Institute of Technology in Stockholm and then switched to Population Genetics and Biology. He received a Ph.D. in Zoology at Stockholm University in 1988. His current field of research is theoretical evolutionary biology, with a special interest in phenotypic variability, including animal personality variation, and in the study of cooperation and conflict. – Address: Department of Zoology, Stockholm University, SE-10691 Stockholm, Sweden.

E-mail: [olof.leimar@zoologi.su.se](mailto:olof.leimar@zoologi.su.se)

On one of my first days in Berlin I drove my car from the Wissenschaftskolleg to the Humboldt University on Invalidenstraße. My plan was to visit my good friend and collaborator Peter Hammerstein. My guide – Arnulf Köhncke – instructed me which turns to make. At one point we ran into the big intersection in front of the Hauptbahnhof. This was my first attempt at navigating that kind of Berliner Kreuzung. Worrying about the traffic coming from all directions, I gazed at the patterns of white dashed lines on the ground. Perhaps they indicated how to make a left, but they did not make sense to me. I tried to improvise, got into trouble and stopped at some poorly chosen spot in the middle of the traffic. – Oh, that's not the way to go, Arnulf said, but don't worry, just wait here until the lights turn the next time and the other drivers will let you pass through safely. I had committed my first *Abbiegefehler*.

Errors while turning – *Abbiegefehler* – cause aggravation and even serious accidents in Berlin. As I later read in the *Tagesspiegel*, the Berlin Senate has compiled a list of the

city's most dangerous intersections, which perhaps luckily for me did not include the one in front of the Hauptbahnhof. The Senate also listed causes of accidents, and *Abbiegefehler* are prominent.

It seems to me that Berlin drivers have a heightened sensitivity to imminent *Abbiegefehler*. Sometimes when I have been about to make a left in an intersection, a driver coming in the opposite direction has honked at me, as if to warn me that I was violating some rule. Pondering on it, I came to the conclusion that without thinking I had been planning to perform an *altdeutsches Linkssabbiegen* – an old German left turn – in which turning drivers keep right and pass around each other. The nowadays accepted method is instead the so-called *amerikanisches Linkssabbiegen*, where turning drivers pass directly in front of each other. The name – American left turn – tells the story of the procedure: after World War II, the military vehicles of the American occupying power introduced it to the Germans. Over time it caught on and soon after the 1989/90 reunification it was officially sanctioned in all of Germany. Perhaps the Berliners went through a period of insecurity about left-turn navigation, just as I did.

A stay at the Wissenschaftskolleg changes the Fellows in many ways. There is the experience of being treated with the polite kindness that is a hallmark of the Wiko staff. I never felt I deserved the treatment but it had the effect on me – which I suppose was intended – that I made an effort to deserve it. In a similar way, walking into the main Wiko building and seeing the fresh and striking flower arrangement at the top of the stairs, or the tasteful seasonal decorations in the restaurant, exerted a civilizing influence, setting the expectation of respectful interaction. The Wiko emits many subtle signals to the Fellows, who have a justifiable confidence in the value of their own fields of study and, at least potentially, some skepticism or arrogance towards those of others. The signals guide the Fellows in their interchanges and make them more open to be influenced.

So how was I changed by the many encounters with people and ideas during my stay? This is not easy to say. On first inspection, the answer might be: not very much at all; I am still mostly the same as before. Of course I learned many things, about developmental evolution and the biology of social insects from Robert Page, Manfred Laubichler and the other Fellows in my focus group, or about diverse views on human and animal characteristics in the wonderful discussion group on human uniqueness set up by Steven Lukes. Having studied theoretical physics in the 1970's, I also enjoyed hearing about current ideas in quantum mechanics from Jens Eisert, Tobias Osborne and Ulrich Schollwöck. It

was like meeting an old friend one has not seen in many years: familiarity and strangeness mixed together.

I believe I am sensitive to the attitudes, typical moves and thinking habits of other intellectuals. Perhaps I am not so special in comparison with scholars in the humanities and arts, but at least among natural scientists I feel gifted in this direction. For me, meeting and discussing with people adds a layer of understanding of their thinking that is less easily accessible from just reading their works. As a Fellow I received much stronger doses of this experience, spanning a larger range of disciplines, than I do in my normal academic life. For me it was interesting to discover that there is more overlap between the humanities and the natural sciences in basic epistemological attitudes than I had previously thought to be the case. For instance, I was intrigued to find that David Freedberg, Martin Puchner and Galin Tihanov – all active in fields placed centrally within the humanities – to a large extent shared my views on how knowledge and understanding are acquired. This is not to say that there was complete agreement among the Fellows about how scholarly activities best should be pursued, but such differences tended to be submerged and only rarely surfaced. Still, there were many biologists among the Fellows this year, and my impression is that in the end some of the other Fellows got a bit fed up with always being offered a biological perspective on this and that. There can of course be too much of a good thing.

After some soul searching, I come to the conclusion that my experience as a Fellow has provided me with a clearer view of where I place myself as an intellectual in relation to the world of ideas known to me. The effect is subtle but still profound, as when lifting fog reveals the features of a landscape. My world has grown bigger with new insights, but also smaller because more is now familiar. It is not clear to me what, if anything, I will do with this. I can imagine that the experience changes how I value ways of doing science, perhaps strengthening my preference for work that aims at breadth in understanding. It might also change the attitudes I express in writing and teaching.

Last June, returning to Berlin from a trip to Sweden, I rode a taxi from Tegel airport to the Wallotstraße. Passing along the absurd jumble of roads and buildings near the Messegelände, I was surprised by a sweet feeling of recognition. What had once seemed alien and difficult to place in perspective now appeared familiar and even friendly. Having learned something of the history of the area – for instance about the AVUS, which was built as a race track in 1921 and then became Germany's first Autobahn – and having explored the area on my bike, I had incorporated it into my world. Simple things like

having a beer and a plate of Berliner Bouletten in the company of Fellows at the Floh restaurant near the S-Bahn Grunewald, or going for a bike ride along the waterways of Berlin with Peter and Marlies Hammerstein, all contributed to my feeling of well-being during my stay. The white dashed lines drawn on the ground in the Berlin intersections started to make sense to me. Perhaps foolishly, I even stopped worrying about *Abbiegefehler*.



BRUCHSTÜCKE  
ANGELIKA LINKE

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Angelika Linke ist Professorin für germanistische Sprachwissenschaft an der Universität Zürich und ständige Gastprofessorin am Forschungskolleg „Language and Culture in Europe“ der Universität Linköping, Schweden. Ihre linguistischen Arbeiten sind kulturanalytisch orientiert, zu ihren Forschungsschwerpunkten gehören die Sprachgeschichte der Neuzeit, Sozialemiotik, Körperkommunikation und die Kulturgeschichte des Gesprächs. Sie ist Mitherausgeberin der *Zeitschrift für germanistische Linguistik*, Vorsitzende des Wissenschaftlichen Beirats des Instituts für Deutsche Sprache (IDS) in Mannheim und Kuratoriumsmitglied des MA-Studienganges „Kulturanalyse“ der Universität Zürich. Neuere Veröffentlichungen: „Historische Semiotik des Leibes in der Kommunikation: Zur Dynamisierung von Körper und Sprache im ausgehenden 17. und im 18. Jahrhundert.“ In *Sprache intermedial: Stimme und Schrift, Bild und Ton*, hrsg. von A. Deppermann und A. Linke, 2010; *Oberfläche und Performanz: Untersuchungen zur Sprache als dynamische Gestalt*, 2009 (mit H. Feilke); „Sprache, Körper und Siegestesten: Eine Skizze zur historischen Normiertheit von sprachlichem wie körperlichem Gefühlsausdruck.“ In *Gefühle zeigen: Manifestationsformen emotionaler Prozesse*, hrsg. von J. Fehr und G. Folkers, 2009. – Adresse: Deutsches Seminar, Abteilung für Linguistik, Universität Zürich, Schönberggasse 9, 8001 Zürich, Schweiz. E-mail: alinke@ds.unizh.ch

Mein Berliner Fellow-Jahr war doppelt anders. Es war ein Leben fern vom universitären Alltag, das mir neben sonstigen Denkwürdigkeiten das schon beinahe vergessene Glück des wilden Lesens beschert hat. Gleichzeitig war es für mich ein Leben mit einer erst kurz zuvor diagnostizierten bedrohlichen Krankheit samt harten Therapien, die mich

dem Wiko und dem Lesen mehrfach und für lange Wintermonate entzogen haben. Meine Mit-Fellows haben mich mit anschaulichen Schilderungen von Schnee und Eis, von Ausrutschen und schmerzhaftem Umstülpen auf den Berliner Trottoirs getröstet, und sie und der so freundliche „staff“ haben vieles dazu getan, um ein gegenseitiges Fremdeln beim jeweiligen Wiederkommen möglichst gar nicht erst entstehen zu lassen. Trotzdem war ich in der doppelt anderen Situation manchmal etwas verloren.

Dafür stand für mich am Ende des Wiko-Jahres nicht nur der Abschied von Berlin, der mir wie den meisten schwerfiel, sondern auch eine neue Gesundheit.

Was noch aussteht, ist der „Arbeitsbericht“ für das Wiko-Jahrbuch. Doch was in meiner verkürzten und verzettelten Berliner Zeit an akademischer Arbeit zusammengekommen ist, sind eben auch nur kurze und verzettelte Dinge. Die kann man auflisten: ein Aufsatzmanuskript, drei Vorträge, Kleinarbeit. Aber man kann nicht viel darüber berichten, außer dass es sich bei allen Arbeiten um mehr oder weniger direkte Beiträge zu dem Forschungsfeld handelt, welches sich zunehmend als das mir wichtigste herauschält: die Kulturgeschichte der Kommunikation. Das größere Projekt in diesem Rahmen, das ich im Wiko-Jahr weit vorantreiben wollte (*Verzehr und Kommunikation: Eine Sinngeschichte ihrer Verschränkung*), war Ende Juli, als ich meine Umzugskisten gepackt habe, gerade erst aus dem Stadium der suchenden Lektüre in dasjenige der Quellenarbeit geraten. Ins Brandenburgische Landeshauptarchiv nach Potsdam, wo solche Quellen lagern, habe ich es nicht mehr geschafft. Doch ich tröste mich damit, dass es am Wissenschaftskolleg das Institut des „Gastes“ gibt – ich werde mich einfinden.

Was mir mein merkwürdiges Wiko-Jahr trotz seiner Verkürzung und Zerstückelung gebracht hat, lässt sich schwer in einen Text fassen. Es bleibt für diesen „Arbeitsbericht“ deshalb bei ein paar Bruchstücken.

### Unerwartete Begegnung

Das Grunewaldschlösschen liegt in Spazierdistanz zum Wiko, die meisten Fellows der meisten Jahrgänge waren wohl einmal da, der Weg lohnt sich. Mir hat dort eine kleine Portrait-Ausstellung eine ganz unerwartete Begegnung mit Johann Jakob Engel beschert. Wenn man sich, wie ich, mit der Geschichte der Körperkommunikation befasst, kommt man an Johann Jakob Engels *Ideen zu einer Mimik* – eine Lehre der Schauspielkunst, 1785 erschienen – nicht vorbei. Dass Engel als wichtige Figur der Berliner Aufklärung auch Erzieher der Humboldts und des späteren preußischen Königs Friedrich Wilhelm III

war, macht ihn zusätzlich interessant. Doch die Anziehungskraft, Wärme und Bezauberung, die von dem Gesicht und den Augen ausgehen, in die einen Anton Graff in seinem Portrait blicken lässt, sind völlig unerwartet. Wie der Zeitsprung, der sich von Angesicht zu Angesicht ergibt. Ich bin dann noch ein zweites Mal hingegangen und hätte es, wäre die Zeit gewesen, auch noch ein drittes Mal getan.

#### Food and sex

Das hab ich von den Biologen am Wiko gelernt: Wenn man sich mit der Evolution von tierischer Kommunikation und folglich mit tierischem Sozialverhalten beschäftigt, dann gilt: *Its all about food and sex*. Natürlich hätte jeder meiner biologischen Fellows auch sofort zugegeben, dass die ganze Sache letztlich komplizierter ist. Andererseits: Es gibt sehr einfache Konzepte, die trotzdem nicht falsch sind.

#### Mein grüner Lesesessel

Wer immer – wohl schon vor längerer Zeit – die Lehnstühle samt Fußhocker ausgesucht hat, die in den schönen Fellow-Wohnungen in der Villa Jaffé stehen und nicht nur sehr bequem, sondern auch sehr ansehnlich sind: Ich hab' darin Gemütlichkeit und Leseglück gefunden und bedanke mich dafür.

#### How can you know that you are right?

Diese Ein-Satz-Frage hat Klaus Zuberbühler in einem der Wiko-Dienstagskolloquien im Anschluss an den Vortrag einer kunstwissenschaftlichen Mit-Fellow gestellt. Der Vortrag hatte sich mit zwei Installationen auseinandergesetzt, Formen analysiert, Deutungen versucht, Bezüge hergestellt. Es war ein klassischer geisteswissenschaftlicher Vortrag gewesen, kenntnisreich argumentierend und wohl formuliert. Und dann: *How can you know that you are right?* Damit war die wohl in jedem Wiko-Jahrgang präsente Kluft zwischen geisteswissenschaftlichem und naturwissenschaftlichem Selbst- und Fremdverständnis auf den wunden Punkt gebracht. Und die einzig mögliche Antwort auf die Frage ist wohl: „We (denn ich rechne mich zur geisteswissenschaftlichen Fraktion) never know.“ Unsere Vorträge sind oft in erster Linie Plädoyers für Interpretationen, die auf Daten beruhen, die ihrerseits oft schon Interpretationen sind – was unsere Arbeit in die

Nähe von Indizienprozessen rückt – und zu unseren Analyseinstrumenten gehört ein „Ahndungsvermögen“, das schon Wilhelm von Humboldt als unabdingbar für die „Aufgabe des Geschichtsschreibers“ erachtete. Doch solche „Ahndungen“, aufgrund derer wir Zusammenhänge herstellen, Kausalreihen erzeugen und die uns Deutungen ermöglichen, führen nicht zu Wissen, dass und wie etwas *ist*, sondern zu Überzeugungen, dass es so sein *muss*.

Wir wissen also tatsächlich kaum jemals, ob wir recht haben – auch wenn wir gute Argumente dafür haben.

### Eindeutige Objekte

Ich bin auf die Biologen, die in unserem Jahrgang reichlich vertreten waren (die grammatisch maskuline Bezeichnung ist berechtigt, es waren merkwürdigerweise alles Männer) und in deren Vorträgen ich so viel gelernt habe, doch auch eifersüchtig geworden. Ich neide ihnen ihre Forschungsobjekte, die konkret, benennbar und in ihrer Gegebenheit fraglos sind: Ameisen, Bienen, Affen, Delfine, Tintenfische. Da muss man nichts erklären und rechtfertigen.

### Zweisamkeit

Es gibt so etwas wie intellektuelle Zweisamkeit. Die kann ganz überraschend entstehen, etwa wenn man sich in einer Diskussion bei einem der Donnerstagabend-Essen mit einem Mit-Fellow plötzlich auf derselben argumentativen Seite findet und dann wie beim Tennis die Bälle der anderen im Doppel zurückschlägt. Das Gefühl von Zusammenverstand, das in solchen Momenten entsteht, ist angenehm.

### Uniqueness

Wir haben in unserem von Steven Lukes initiierten Diskussionsgrüppchen zu *human uniqueness* die Frage nach der Einzigartigkeit des Menschen gegenüber seinen Mit-Tieren aus sehr vielen Winkeln betrachtet: Sprache? Geteilte Intentionen? Empathie? Musik? Spiel? Moral? Schmuck? Und wo und wann fängt das jeweils an?

Und wo wir hingesehen haben, sind die Unterscheidungen undeutlich und die Konzepte selbst – Sprache, Intention, Empathie ... – problematisch geworden. Das hätte zu



Frustrationen führen können. Aber wir haben die Diskussionen genossen. Und schon am späteren Nachmittag Wein dazu getrunken. Und keine Protokolle geführt und uns keinen gemeinsamen Aufsatz vorgenommen.

Dass man sich einen solchen Freiraum für geselliges Denken ohne Verwertungszwang einfach nehmen kann und vor allem: dann auch tatsächlich nimmt, das gehört zu den Einzigartigkeiten eines Wiko-Jahres.

### Abschiedszauber

Die Umzugskisten vor den Türen haben Unruhe gebracht und natürlich mochten die meisten von uns den Abschied von der Wallotstraße und aus der Fellow-Gemeinschaft nicht, zumindest nicht schon *dann*. Aber es hat sich gerade daraus in der Berliner Sommerabendwärme eine Intensität und Unerschrockenheit im Umgang miteinander ergeben, die ihren ganz eigenen Zauber hatte. Erfahrene Staff-Mitglieder kennen das – es sei immer so, eine Art Mechanismus. Aber wem es gerade passiert, für den ist es trotzdem schön.



THE NATURE OF NURTURE IN SOCIAL  
INSECTS: THE EVOLUTIONARY  
IMPORTANCE OF SOCIAL INTERACTIONS  
TIMOTHY A. LINKSVAYER

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Born in 1976 in the USA. 1998, BA Carleton College, Biology. 2005, Ph.D. Indiana University, Evolution, Ecology, and Behavior. 2006–08, National Science Foundation Post-doctoral Fellow, Arizona State University. 2008–10, European Union Marie Curie Post-doctoral Fellow, University of Copenhagen, Centre for Social Evolution, Boomsma Laboratory. 2011–present, Assistant Professor, Department of Biology, University of Pennsylvania. – Address: Department of Biology, University of Pennsylvania, 415 S. University Avenue, Philadelphia, PA 19104, USA. E-mail: [tlinksvayer@gmail.com](mailto:tlinksvayer@gmail.com)

During my brief (month-long) but delightful stay as a short-term Fellow at the Wissenschaftskolleg, I mainly participated in the workgroup convened by Manfred D. Laubichler and Robert E. Page, “Social Insects as a Model System for Evolutionary Developmental Biology”. Briefly, my research is centered in evolutionary genetics and evolutionary ecology, with a focus on how social interactions affect the genetic basis, evolution, and development of complex phenotypes. I integrate theory and empirical study by using evolutionary genetic models together with quantitative genetic, genomic, and field- and lab-based experimental approaches. I use social insects as a model system because they are exemplars of social evolution, yet the genetic and evolutionary implications of their extensive social interactions are not well understood. Furthermore, social insects are established model systems for long-standing themes of social evolution research, such as the evolution of cooperation and conflict. My research provides novel insights into these traditional areas of social evolution research, but, more fundamentally, into the broader biological question of the genetic basis, evolution, and development of complex phenotypes. Thus,

my two main research topics, how social interactions affect the genetic basis, evolution, and development of complex phenotype and the evolution of cooperation and conflict in societies, fit very well within Rob and Manfred's workgroup.

I found the Wissenschaftskolleg to be an ideal setting for our workgroup, consisting while I was there mainly of Rob Page, Manfred Laubichler, Olof Leimar, Tanja Schwander, Harald Wolf, and Adam Wilkins. We had casual meetings at least once a week where we progressed through a series of discussions about social insects as a model for Evo Devo and Devo Evo. I would say that the relaxed but extremely intellectually stimulating atmosphere of the Wiko enabled us to start with the basics, each bringing different expertise, and move on to advanced discussions that I do not think would have been possible in other academic settings. Some of the topics I personally enjoyed discussing and learning about most were further details about gene regulatory networks from Manfred Laubichler and Adam Wilkins, as well as adaptive dynamics approaches to study evolution and the contribution of genetic and environmental factors to polymorphic traits with Olof Leimar and Tanja Schwander.

I was also fortunate to be able to attend a four-day workshop on Developmental Evolution of the Superorganism (January 14–17, 2010) attended by many leaders in the fields of social insect evolution and Evo Devo, including Bert Hölldobler, Mary Jane West Eberhard, Ehab Abouheif, Klaus Hartfelder, Raghavendra Gadagkar, and others. While we did not reach a consensus, and in fact much of the workshop involved the leaders of the field expressing their various and sometimes opposing opinions, the atmosphere of the workshop was certainly enjoyable and I think all of the associated discussion very productive.

Besides the many stimulating discussions on a wide array of topics with various Fellows and short-term Fellows, the main material result of my stay at the Wissenschaftskolleg was that I completed two manuscripts, one with Rob Page and Gro Vang Amdam and one with Manfred Laubichler, both of which are currently in review:

Linksvayer, T. A., O. Kaftanoglu, E. Akyol, S. Blatch, G. V. Amdam, and R. E. Page Jr.

“Larval and nurse worker control of developmental plasticity and the evolution of honey bee queen-worker dimorphism.” *PLoS Biology*, submitted.

Linksvayer, T. A., J. Fewell, J. Gadau, and M. Laubichler. “Developmental evolution in social insects: regulatory networks from genes to societies.” *Journal of Experimental Zoology B: Molecular and Developmental Evolution*, in review.

Finally, I also must say that the location of the Wissenschaftskolleg is itself inspiring: the architecturally diverse neighborhood is wonderful to walk through, in particular with autumn colors, and it is also conveniently located within easy reach of the rest of Berlin. Other highlights of my stay include the delightful common meals and of course table tennis with Tanja Schwander, Olof Leimar, and others. The main thing I regret about my stay was that it was too short and I hope that if I am ever able to come again I will be able to stay longer!



THE ROLLS ROYCE OF INSTITUTES  
STEVEN M. LUKES

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Steven Lukes is Professor of Sociology at New York University. He studied Philosophy, Politics and Economics at Oxford, where he wrote his doctoral thesis on Durkheim under the supervision of the anthropologist E. E. Evans-Prichard. He has held posts in Politics and Sociology at Balliol College, Oxford, in Political and Social Theory at the European University Institute in Florence, in Moral Philosophy at the University of Siena and in Sociology at the London School of Economics. He is a Fellow of the British Academy and an editor of the *European Journal of Sociology*. His writing and teaching have ranged over Political Science, Political and Moral Philosophy, Sociology, Anthropology and the Philosophy of the Social Sciences. His published works include *Émile Durkheim: His Life and Work. A Historical and Critical Study*; *Individualism; Marxism and Morality*; *Liberals and Cannibals: The Implications of Diversity*; *The Curious Enlightenment of Professor Caritat: A Comedy of Ideas* (novel); and *Power: A Radical View*, which recently appeared in a much expanded second edition, and he co-edited *Rationality and Relativism* and *The Category of the Person: Anthropology, Philosophy, History*. His most recent book is *Moral Relativism*. – Address: Department of Sociology, New York University, 295 La Fayette Street, 4th floor, New York, NY 10024, USA. E-mail: steven.lukes@nyu.edu

I spent the year at the Wissenschaftskolleg with my wife Katha Pollitt, writer, poet and columnist for *The Nation* magazine. Our year here was exhilarating, life-enhancing and horizon-expanding. When I write “our” and “we” here and below it is significant. Because of Wiko, much of the experience of being here was fully shared. The complete acceptance of spouses and partners into the Wiko fellowship (minus the few obligations,

such as writing this and giving a Tuesday colloquium) is unusual and makes a decisive difference to the quality of lives here.

It was not easy to persuade Katha to come. Indeed it took a year, riskily postponing my invitation and sabbatical leave, to persuade her that living in Germany, given the horrors of its recent past, was worth a try. I was aided by the unanimous enthusiasm of numerous ex-Fellow friends. Once here, the evidence of the pervasive confrontation with the German past and the civility of life in Berlin were so clear that Katha's worries vanished within days.

I myself had several strong motives to come. One stemmed from my family history. My mother's father was a rabbi and schoolteacher in a small town, Euskirchen near Cologne, where she and her five brothers grew up, all escaping the Holocaust with their parents. My sister and her family live in Cologne (her husband is secretary of the synagogue) and in November we made an extraordinary pilgrimage with four of our cousins to Euskirchen and to an even smaller town Meudt, in the Westerwaldkreis in Rhineland-Palatinate, from which the family came, where the whole community solemnly greeted us and other Jewish families in the cemetery amidst the gravestones. My mother would never speak German with us, which was a second motive for coming: to draw on such linguistic rudiments as I had, from her and from school German lessons, to try to master the language. (Vain hope! The language courses were great and I ended up reading Nietzsche with the wonderful Eva von Kügelgen, but there is still far to go.) A third reason was that in the 1970s I had been a member of the Bertrand Russell Tribunal investigating the repressive practice of Berufsverbot, blacklisting state employees for their political views. And a fourth was that I had visited the GDR in Communist times and was intensely curious to see what reunification has achieved. What I found was an extraordinarily transformed country.

There were also work-related reasons. My long-awaited sabbatical would be a time to pursue a long-cherished project that I labelled "the sociology of morals" – a topic once central to sociology and anthropology and to which most moral philosophy is resistant. How much moral diversity is there and how deep does it go? And how can such questions be pursued empirically? Among other directions, I began to engage in conceptual and linguistic history and, of course, the German sources were central. Here the unmatched Wiko human resources came to aid me: the librarian Kirsten Graupner and translator Kevin McAleer gave invaluable professional assistance. Preparing for my colloquium was also wonderful discipline, forcing me to try to formulate discussable ideas *before* they

were worked out (the best kind of discussion, at least for the speaker). Two other Wiko-generated opportunities pushed me onwards. One was the request to do an interview on moral progress with the journalist Ralf Grötzer for the Wiko magazine *Köpfe und Ideen*: His sharp, penetrating questions were a real challenge and the published interview a true work of art (on his part). And the other was the invitation to give the Beirats Lecture. I used that to reflect on the question of whether the idea of progress is still viable. This connected with two other lines of interest. One was in the thought of the Marquis de Condorcet, author of the “testament of the Enlightenment”, the *Esquisse d'un Tableau des progrès de l'esprit humain*. While at the Wiko I prepared with Nadia Urbinati of Columbia University (guest at Wiko for two weeks in January) a new English edition of the *Esquisse* along with other political writings illustrating his democratic theory of liberty. The other line of interest was in the current condition and prospects of social democracy, about which I have written and want to research more, and here was a further work-related reason to be in Germany, where experience of and reflection upon such questions is distinctive and far in advance of the USA, where I live and work.

I tried to follow the informal requirement gently communicated at the outset of our stay to accept invitations to give talks in Berlin while resisting those from elsewhere (only partially succeeding in the latter). Truth to tell, I was really reluctant to leave Wiko, where working conditions were so perfectly attuned to one's needs and companionship so congenial. I gave talks at the Free University, the Humboldt University, the Wissenschaftszentrum and the Einstein Forum and in Jena, at a centre for the study of the Enlightenment and modernity, and in Frankfurt, at an “excellence cluster” focusing on “normativity” and I slipped over to Madrid for a great conference in honour of Jose Maria Maravall (an old friend and former Minister of Education) on the prospects for social democracy. Anything more would have been a distraction. I strongly advise future Fellows to resist these temptations.

I have so far described what I was able to make of the projects I came with to Wiko. But, to my surprise and delight, a new path opened up while here. Two early conversations with the biologist Adam Wilkins and the linguistic anthropologist Penny Brown led me to propose setting up a regular discussion group about the question of what makes humans unique – it soon became known as the “human uniqueness” group. Adam, whose constant companion is his dog Jessie, had some intriguing thoughts about anthropomorphism and also about the evolutionary aspects of the question and Penny, who had with her husband written a classic work on “politeness”, provoked in me the question of

whether such a concept was indeed uniquely human in application and, if so, why. The result was a series of great discussions, focussing each fortnight on a different concept – we covered teaching, language, emotions, culture, morality and norms, hierarchy and equality, music, play and coalitions. Sometimes there were visitors and some Fellows dropped in and out but the core group remained loyal. The biologists and animal psychologists were endlessly informative about the latest findings across their fields (notably primates and dolphins) but the discussions were, inevitably, wide-ranging and, of course, inconclusive. For me these discussions and the readings we did were revelatory, since I had never thought about these issues before in any serious way. What fascinates me are the questions: which concepts travel across the non-human/human divide and, of those that do, what seems to be missing from the non-human variant, as it is understood and deployed by biologists and students of animal behaviour? My conclusion from our intensely interesting discussions was that there is no single unifying answer to the second question, but different answers in respect to different concepts.

Whether all these various activities of mine will add up to a coherent set of writings time will tell, but what is already clear to me is that Wiko not only facilitated but decisively shaped them. One example, just mentioned, was listening to the biologists talk and argue (often among themselves) – not only those in the “human uniqueness” group but also the insectologists, including Harald Wolf on walking ants (some of them on stilts) and Robert Page on honey-bees and “the spirit of the hive” (I was glad to introduce him to Mandeville’s *Fable of the Bees*). They have pushed me to think in new ways about what “social” and “social cooperation” can mean and to entertain a less sceptical view of evolutionary just-so stories. A second example, very important to me, has been the providential planting of Dieter Thomä in the office next to mine. His philosophical interest in the “sentimentalist” tradition in moral philosophy, deriving from Hume and Smith, dovetailed beautifully with the direction my inquiries into morality were taking me, but it also turned out that we had other closely convergent interests, in Condorcet and his brilliant philosophe wife Sophie de Grouchy, to whose *Letters on Sympathy* he introduced me, and in collecting antiquarian books. And a third example was my having to reflect on the reactions to my Beirats lecture on progress, not least that of Yogendra Yadav, the brilliant political scientist from India, who challenged me with the very acute observation: that in focussing on what Condorcet called the “unbreakable chain” linking progress in knowledge with progress of other kinds, I was avoiding the question of the ways in which Western-led progress has proceeded by dismantling knowledge of more traditional kinds.



It was fairly late during my time here that I realized why it was that I felt so at home in the Wissenschaftskolleg. I have spent some twenty-nine years of my life attached to Oxford colleges, as undergraduate, then graduate and finally for twenty years as Fellow of Balliol College. Of course I should have realized, as Joachim Nettelbeck pointed out to me, this is not called a Kolleg by chance. The key features that Wiko shares with Oxbridge colleges – and that exist rarely elsewhere – are commensality and disciplinary diversity under one roof. Lunching and dining together – conversing, while engaged in the intimate activity of eating and drinking with colleagues in fields often remote from one's own – shapes and deepens collegiality. In other places where I have worked – the European University Institute in Florence, the University of Siena, the London School of Economics and now New York University – nothing like that exists and academic and intellectual life are much the poorer for it. And I would go a little further with this parallel, or homecoming. The students, undergraduates and graduates, are, of course, missing – and that must be so in an institution hosting one-year visits. But also missing, thankfully, is the aura of self-satisfaction and what I call cosmopolitan provincialism – the sense, now perhaps on the way out, that Oxford and Cambridge set the standards to which the rest of the world can only aspire.

There is no such aura at Wiko, and I hope it will not arise there. And yet I am convinced, on the basis of all the reports I have had from friends and colleagues, that, among Institutes for Advanced Studies, Wiko does constitute the gold standard. It is, I venture to say, the Rolls Royce of such institutions. On the basis of my experience, it is an exceptionally finely-honed context for developing as-yet-undeveloped ideas and for discovering new lines of thought and inquiry. I do not recommend coming here with a whole set of almost completed projects; you can complete them anywhere, ideally somewhere suitably boring. Here you should even be ready to abandon what you thought you were here to do.

It has the huge advantage too of being in Berlin, about which I have written nothing here. Let it suffice to say that if you are in love with museums, with art, traditional or contemporary, or music, classical or jazz, or opera (you have three great opera houses, each with its distinctive traditions) or architecture or the club scene or just walking the city streets, the Wiko is the perfect base and point of access, above all at the hands of the extraordinarily warm, generous, helpful and interesting keeper of the *Empfang*, Vera Schulze-Seeger, with whom most Fellows are in daily contact about pressing matters, large and small. Our experience of Berlin was thus, inevitably, Grunewald-based and

hence very limited and indeed distorted. But Wiko made really imaginative efforts, assigning at the outset a historically minded architect, Rolf Zimmermann, to show us areas beyond the touristic comfortzone. Berlin is physically and socially open, less aggressive in its capitalism and less abrasive in its social interactions than any other metropolitan city I know. Exploring it was still at too early a stage as our year ends and Katha, I am more than happy to report, is as keen as I am to return, as soon as possible.



AT HOME AT WIKO  
ION MANOLESCU

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Born in 1968 in Bucharest, Romania. Ph.D., Associate Professor of Romanian Literature, Faculty of Letters, Bucharest University. Fiction writer. Studied Philology and Theory of Literature at Bucharest University. Scholarships/Academic Career: 2005–06; 1997, New Europe College Fellow, Bucharest. 2003–04, Gastprofessor, Institut für Romanistik, Universität Wien. 1998, Netherlands Institute for Advanced Study in the Humanities and Social Sciences Fellow, Wassenaar. Publications: “Cognitive Science and Literature. What Does the Mind Read?” In *Orientation in the Occurrence*. Cluj-Napoca, 2009. “Impossible Objects. Literary Representations.” In *Text(e)/Image. Interferences*. Bucharest, 2009. “Alexander”. In *Im kalten Schatten der Erinnerung. Eine Anthologie zeitgenössischer Prosa aus Rumänien*. Ludwigsburg, 2009. – Address: Faculty of Letters, Bucharest University, Str. Edgar Quinet 5-7, Sector 1, Bucharest. Romania. E-mail: imanol@opensys.ro

During the spring of 2010, I had the privilege and pleasure to be invited to the *Wissenschaftskolleg zu Berlin* as an Andrew W. Mellon Fellow in the Humanities. From the very beginning, it struck me as obvious that the interdisciplinary project I had submitted to Wiko, involving literature, cognitive psychology and cognitive philosophy, was about to find its perfect research ground, as the Kolleg’s scientific, academic and, not to forget, gastronomic reputation had already spread far beyond the borders of Germany, reaching New Europe College, Institute for Advanced Study in Bucharest. My literary robots, cyborgs, androids, brains without bodies and minds out of brains were eagerly waiting to colonize Berlin and to meet with several groups of neurobiologists, the amazing library of

the Kolleg and the delicious culture of the *Spargel* soup, *Spargel soufflé* and *Spargel pie*. And so they did.

At first, I looked more like *The Invisible Man* than *Robocop* or *Terminator* (three science-fiction movies that had quite a lot to do with my work). Since I came to Berlin in the last months of the academic year and since I was the only Fellow to live in an apartment in the office building, people kept on coming to work early in the morning only to meet a sleepy person in the hall with a cup of tea in one hand and a book in the other. They would politely smile to that person, while asking the same questions: “Who are you?” and “What is your project about?” Time and time again, I had to tell my story concerning cognitivism and cyberpunk fiction: about the mind as a possible “software” of the brain, about what it “sees” in reality and in literary texts, as well as about the mysterious, uncharted spaces where literary images may emerge from – the mind of the author, the “body” of the text or the mind of the reader. To reveal the functions of imagery production, processing and maintenance, by comparing the works of psychologists and philosophers such as Stephen Michael Kosslyn, Daniel C. Dennett, Douglas R. Hofstadter or Alva Noë with the postmodernist novels of authors such as William Gibson, Bruce Sterling, Rudy Rucker or Neal Stephenson, would have been my main theoretical goal. Everybody agreed that the topic sounded quite interesting; after a couple of weeks, *The Invisible Man* had become *The Romanian Cyber Fellow*.

My academic activity at Wiko quickly became related to three main sequences of events and fields of exploration. First of all, the refreshing Tuesday Colloquia, where interdisciplinary debates on quantum physics, fractals, evolutionary biology, the philosophy of mind or the future of robotics were of the utmost interest to me. Exchanging ideas with scientists coming from areas quite different from mine, but still familiar in their theoretical approach, proved to be one of the greatest pleasures and benefits one could get at the Kolleg. Then, the individual research enabled by the Wiko library and its generous staff. No matter what book I was interested in reading or consulting, no matter which library or country it was taken from, after a couple of days, it was waiting for me on the shelf, under the same friendly note: “*Herr Manolescu*”. I cannot be grateful enough to the Wiko library staff for providing me with hundreds of books on recent trends in cognitive psychology and philosophy (such as the enactive theory of the conscience, which I would later relate to neuro-technological cyborg devices used by the characters in cyberpunk and steampunk fiction), on the latest theories on cyberculture, Virtual Reality and Artificial Intelligence or on updated perspectives on the role of imagery in science-fiction com-

ic books and graphic novels. Last, but not least, the academic lunches and dinners, where one could easily combine intellectual and gastronomic pleasures. Under such circumstances, discussing the philosophical consequences of the sensorimotor approach in neurobiology and postmodernist fiction became as wonderful a challenge as finding out the recipe of the delicious Rhabarber-Pie made by the newly appointed *Chef de Cuisine*.

Stimulated by the view of the aristocratic villas on Wallotstraße, as well as by the daily long walks in the almost endless forests of Grunewald, I managed to keep myself in good shape for completing a large part of my academic project in Berlin. After months of reading, making notes and confronting opposite theories dealing with my field of research (examining the cognitive mechanisms of the human conscience; studying the “hard”-“soft” relation between brain and mind; establishing different levels of biotechnological cognition in the evolution of cyberpunk fiction characters), a large section of my future book on literature and cognitivism was ready. At the same time, since I came to Wiko not only as a professor and researcher, but also as a *Schriftsteller*, I had the joy of being invited to two significant literary events: a reading, as a guest from Romania, at the Fontane Festspiele Neuruppin and a meeting with readers of my novel *Derapaj (Im Schleuderkurs)* in 2006 at Kafé Szimpla in Berlin. Taking part in these events was a great experience, which provided me with the opportunity to accommodate German readers to the postmodernist profile of recent Romanian fiction and culture.

I cannot end this report without expressing my half-human, half cybernetic, entirely warm gratitude to all the people who made my stay at Wiko an unforgettable experience: academic board, administrative staff, fellow colleagues and everybody involved in the perfect functioning of the Kolleg. I may have bothered quite a few people at the reception with my annoying questions about bus tickets and FedEx packages; I may have requested quite a few rare books from the library service, even at the weekends; and, sometimes during lunches, I may have taken an extra scoop of the chef's exquisite *mousse au chocolat* with forest fruits, under the amused look of the Rector. It always felt like home in the large family of Wiko.



## MEIN JAHR IM WISSENSCHAFTSKOLLEG MARTIN MOSEBACH

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Martin Mosebach, 1951 geboren, Jura-Studium in Frankfurt am Main und Bonn; 1979 II. Staatsexamen. Seit 1980 lebt er als Schriftsteller und Lyriker in Frankfurt am Main. Er wurde u. a. mit dem Heimito von Doderer-Preis, dem Großen Literaturpreis der Bayerischen Akademie, dem Kleist-Preis und 2007 mit dem Georg-Büchner-Preis ausgezeichnet. Zuletzt erschienen: *Der Mond und das Mädchen* (2007), *Die Stadt der wilden Hunde* (2008) und *Was davor geschah* (2010). – Adresse: Carl Hanser Verlag, Postfach 860420, 81631 München.

Nach Berlin kam ich mit der ersten Fassung meines neuen Romans, die ich kurz zuvor abgeschlossen hatte. Ich mache meine Bücher auf eine Weise, die bei Wohlmeinenden mit einem kaum verhohlenen Lächeln, bei den weniger Wohlmeinenden mit Verständnislosigkeit und schon geradezu verächtlichem Kopfschütteln aufgenommen wird: die erste Fassung schreibe ich mit der Hand in so kleiner Schrift, dass es sehr schwierig für mich ist, Korrekturen anzubringen, ja, sie auch nur zu lesen. Dann diktiere ich diese Fassung – unter Zuhilfenahme einer großen beleuchteten Lupe und gelegentlichem Beträufeln der Augen mit entzündungshemmenden Tropfen – auf ein schweres Tonbandgerät aus dem Jahr 1964, auf das mein Vater einst seine Gutachten sprach. Eine kluge und sprachliche Dunkelheiten listenreich erhellende Frau schreibt daraufhin die Bänder ab und dann bin ich schließlich im Besitz eines Typoskripts, das ich bearbeiten kann.

Meine Zeit im Wissenschaftskolleg begann mit dem Diktat und das war eine Zeit des Missvergnügens und der Unlust. Schon das Öffnen eines abgeschlossenen Manuskripts weckt in mir jene Gefühle, mit denen ein Mörder sich noch einmal an den Ort der Tat

begibt, weil er seine Sonnenbrille dort vergessen hat. Ich habe diesmal besonders viele Stunden damit zugebracht zu enträtseln, was ich geschrieben hatte; besonders schwer lesbare Buchstabenballungen enthielten zu meiner Überraschung meist besonders simple Wörter: „schön“, „wahrscheinlich“ oder „Wohnungsschlüssel“, das war wie ein Seifenblasenplatzen. Abgeschrieben war das Buch dann überraschend schnell; der Aufsatz, den ich in der Wartezeit angehen wollte, war noch nicht fertig, da lag der Papierstapel vor mir, der für meine Erinnerung aus der Zeit des Diktierens vor allem eine lange Reihe auseinanderfallender, jedenfalls nicht sehr fest verbundener Beobachtungsbröckchen enthalten musste. Die abschreibende Frau, deren Urteil ich vertraue, hatte mir aber Mut gemacht: sie habe öfters gelacht. Eine Frau zum Lachen zu bringen, ist einer der schönsten und ernstzunehmendsten Erfolge, die in einem Erdenleben möglich sind. Ein Berliner Freund, Fellow eines früheren Jahrgangs, hat mir dann schließlich die Scheu vor dem Manuskript genommen, indem er es gründlich las und mit Bleistiftschlangelinien, Fragezeichen, Ausrufungszeichen und – seltenen, dafür aber umso eindrucksvolleren – „Nein!“-Marginalien versah. Das war aber nicht alles, was er tat: er reichte das Manuskript dem ihm befreundeten Maler Nikolaus Heidelberg weiter, der gleich ihm ein großer Leser war, der gleichfalls Schlangelinien malte, vor allem aber, als Hommage an das Buch, jenen weißen, wie aus Rasierschaum ins Grau gesprühten Kakadu aquarellierte, der dann auf den Umschlag des Buches flattern sollte. Inzwischen war ich seelisch so weit gefestigt, um mich selbst mit dem Roman zu beschäftigen, und so wurde denn dies im Januar 2008 begonnene Vorhaben tatsächlich während meiner Zeit am Kolleg zu einem Ende geführt, im Juli 2010 lag das Buch schließlich vor mir, so dass ich es in den letzten Tagen des gemeinsamen Aufenthaltes den Kollegiaten, die noch nicht abgereist waren, vorstellen durfte.

Es mag keine neue Einsicht sein, dass über den Erfolg eines Aufenthaltes am Wissenschaftskolleg entscheidet, in welcher Lebensstunde er stattfindet. Ich bin ziemlich sicher, dass ich weniger glücklich gewesen wäre, wenn ich die Rohmasse meines Romans, die eigentliche Erfindung, nicht beim Beginn meines Berlin-Aufenthaltes schon abgeschlossen hätte. Die einzige Zeit meines Lebens, in der ich einer geregelten Beschäftigung nachgegangen bin, war meine Referendarszeit am Hanauer Landgericht. Das Einhalten von regelmäßigen Mahlzeiten habe ich leider nie gelernt – ich beklage das, weil ich glaube, dass im Entwickeln von festen Gewohnheiten ein wichtiger Teil der Lebenskunst verborgen liegt. Aber die langwierige Arbeit des Polierens und Rostkratzens an meinem Manuskript, die ließ sich durchaus auch unterbrechen und diese Unterbrechungen be-

standen keineswegs nur in den Verpflichtungen, die der Tagesplan des Kollegs den Kollegiaten auferlegt. Das Wissenschaftskolleg liegt, wie wir wissen, „zu Berlin“, in einer der eigentümlichsten, wahrhaft schwer zu fassenden Stadt unter den Städten dieser Welt, der mit vollem Recht tausend schlechte Eigenschaften nachgesagt werden, – aber diese tausend schlechten Eigenschaften bilden zusammen einen Stadtkörper, der alles, was es sonst an Städten im deutschen Sprachraum gibt, in den Schatten stellt. Ich gestehe, dass ich mit einem heftigen antipreußischen Affekt nach Berlin gekommen bin, um hier die große Überraschung zu erleben: ich durfte meinen Affekt, von dem ich mich ungern verabschiedet hätte, behalten und mich in Berlin trotzdem so wohl fühlen, wie schon lange in Deutschland nicht mehr. Erst waren es die Menschen, die ich in Berlin getroffen habe, die mir dies Wohlgefühl vermittelten, den verrückten Eindruck, dass der Strom von Leuten, mit denen es sich lohnte zu sprechen, nicht abreißen würde, aber zum Schluss sind mir auch die spezifischen Hässlichkeiten von Berlin immer lieber geworden; vor Freunden aus London oder Paris habe ich mich für die Frankfurter Hässlichkeiten immer geschämt, aber solches Schamgefühl des armen Verwandten stellte sich hier nicht ein, im Gegenteil, ich durfte von der Schamlosigkeit, ja, der Unverschämtheit dieser Stadt profitieren und mich von ihr erfrischen lassen. Es gibt Liebesaffären, die man nicht in eine Ehe überführen sollte, und so werde ich denn – vorerst? – nicht nach Berlin umziehen, aber geträumt habe ich von dieser Möglichkeit dennoch.

Gehört ein Schriftsteller eigentlich in die Gesellschaft ernstzunehmender Wissenschaftler? Die legendären Zeiten, in denen Schriftsteller und Dichter sich mit Mathematik und Physik beschäftigten, sind vorbei; die guten Gründe, warum Dichter sich von den Einsichten der Naturwissenschaften für die eigene Produktion nichts Fruchtbare mehr erhoffen, müssen hier nicht ausgebreitet werden, obwohl ich die heiße Sommernacht, in der der Physiker Ulrich Schollwöck in einem Garten am Schlachtensee bei Kerzenschein einem vergnügungssüchtigen Kreis die Rätsel der Quantenmechanik erörterte, nicht vergessen werde, es war eine Atmosphäre wie auf Wright of Derbys berühmten Luftpumpen-Gemälde. Aber einmal nicht nur Professor, sondern schon beinahe Institutschef spielen zu dürfen, das war allzu verführerisch. Dies Erlebnis haben mir die Bibliothekarinnen des Kollegs verschafft, die meine Bücherwünsche nicht nur erfüllten, sondern erst eigentlich entstehen ließen, und zwar ohne dass ich Bestellzettel ausfüllen musste, mit Angaben, die oft genug nur Andeutungen waren. Wie soll mein zukünftiges Leben ohne Sonja Grund und ihre klugen und liebenswürdigen Kolleginnen aussehen? Wie soll sich ein zur Verwahrlosung neigender Bohemien wieder an einen Zustand gewöhnen, in dem



es nicht diese stets lächelnden Damen und Herren gibt, die jedes kleine Hindernis von seinem Pfad entfernen und alle seine Hypochondrien mit generöser Geduld ertragen? Ich habe mein ganzes Leben fern von Institutionen verbracht und sogar einen bescheidenen Stolz darauf empfunden, aber nun habe ich vom süßen Gift der Institution genossen und eine Ahnung vom Charme des gelehrten Betriebes erhalten und nun seufze ich leise: Du hast vielleicht doch etwas verpasst.



JUST ANOTHER FELLOW  
KIRAN NAGARKAR

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Kiran Nagarkar (born 1942) is an Indian novelist, playwright, film and drama critic and screenwriter both in Marathi and English and is one of the most significant writers of postcolonial India. Amongst his most known works are *Saat Sakṅam Trechalis* (Seven Sixes Are Forty Three), 1974; *Ravan and Eddie*, 1994; the epic novel, *Cuckold* (book), 1997 for which he was awarded the 2001 Sahitya Akademi Award in English by the Sahitya Akademi, India's National Academy of Letters; and *God's Little Soldier* (Gottes kleiner Krieger), 2006. – Address: 75, B. Desai Road, Mumbai, 400026, India.

E-mail: knagarkar@gmail.com

Note for Wiko

*We hereby give notice to the authorities at Wiko that a group of former Fellows and I are about to write to the Bundestag complaining about certain highly objectionable practices in the Institute. More importantly, we're going to ask the German Parliament to change the Charter of the Wissenschaftskolleg zu Berlin.*

*Every ten months, the current Fellows are asked to leave their quarters unceremoniously. Their monthly grant is discontinued and those who are from the Indian subcontinent and other Asian countries find that they have no alternative but to return to their country of birth. This is patently unfair. At the very least, the ten-month term should be enhanced to ten years; and in the case of social parasites like me, Wiko owes it to us to raise the limit till death do us part.*

*In addition, considering our advancing age – and unless we are mistaken, the reverse phenomenon is altogether unknown – we should not be saddled with responsibilities like attending colloquia or giving talks. Instead of being forced to attend lunch and dinner sessions, the choicest*

*meals along with a select range of wines, whiskeys, cognacs and liquors should be sent to our apartments. ("Choicest" as in what we like and choose and not what the catering service or Wiko likes to serve.) The authorities would be well advised never to underestimate the paramount importance of victuals. They might recall that during 2009–10, there was something like a serious revolt brewing amongst the Fellows. Far be it from us to suggest that the Fellows are not a civil lot, but it would not be out of place to remind all parties that the belly precedes the intellect and, as we have learnt the hard way, most scientists, intellectuals, social scientists and artists seem to come with highly developed gourmet palates.*

*Needless to say, the Fellows' stipends should not keep pace with inflation, but be way ahead of it.*

*Oh, one last thing. For those Fellows who come unaccompanied by husbands, wives, companions and/or mistresses and vice versa, an advanced and enlightened institute like the Wiko should set a long-overdue precedent by making the current equivalents of Hollywood heart-throbs like Valentino, George Clooney, Michelangelo's David in the flesh and the celestial hours available. Frankly, not only for the lonely hearts' club but on a need-based equitable system.*

*A suggestion for an amicable settlement. We are sure Wiko would prefer that the Bundestag did not interfere and bring the full weight of the German people to bear upon its private affairs. Why not change the Charter of the institution and inform all former Fellows of the progressive steps undertaken and thus avoid all that unwanted publicity?*

As you surely have realized by now, it has not been easy to part from Wiko, the companionship of the Fellows and the extraordinary warmth, hospitality and helpfulness of the staff there. It's too soon and too close an experience for one to gain distance and perspective on the institution, its strengths and benefits and one's relationship with it. Wiko, like almost any other organization or academy, is a microcosm of the world and as such it would be hypocritical and unfair to its high traditions to praise it uncritically. There's no escaping that each of the Fellows brought his own vision, agenda and baggage. And of course individual expectations.

I like to eat but unfortunately I'm not a "foodie" as the Americans call connoisseurs of (high-class) cooking. So the heated discussions about meals at one point were a trifle alien to me. It might be worth bearing in mind, however, that if Wiko had catered to every taste then it would have been an academy of fine cooking and not a home of intellectual ferment. The same would hold for other areas. So five or ten years down the road, call me up and we can talk about just what Wiko meant to me.

For the moment let me tell you about a place ten minutes from Wiko, *Gleis 17*. Or rather why it is one of the iconic keys to my understanding of the role of memorials, sculpture and art. I am not an artist, art historian or theoretician of art. As such my views will be seen for what they are: naïve, uneducated and simplistic, if not downright wrong. In 2008 Sunil Khilnani was visiting Wiko, where he was about to host a seminar on, I think, political and sociological theory. I was not part of this programme but had gone over to meet him before his work started in earnest. I owe Gleis 17 to him since he suggested that I walk over to Grunewald S-Bahn station and see the place.

My sense of geography is unique. I have a sixth sense for places and I am unerringly wrong. You can give me foolproof and failsafe directions. You can hand me a GPS. Rest assured I will still manage to get lost. I didn't know what *Gleis* meant. Yet after some searching, I was able to locate the Grunewald station where this thing called Gleis 17 was. It was unlike any of the old magnificent railway stations. It was picture-postcard pretty and very small. There was a bakery there and a doener kebab place that led to a tunnel. The first fork was to the right, while the rest were all to the left. There was a small board outside the former announcing Gleis 17. I climbed up and found myself on a long-abandoned railway platform. It was a mystery why Sunil would send me to see a platform with gravel and tracks with dense shrubs and grass and rather lovely tall birches growing along the tracks and sometimes inside them. Accidentally I caught sight of the lightly rusting, perforated-iron sheets covering half the length of the platform. Every now and then someone had placed a single rose or a small, black stone on one of the iron panels. At the edge of Gleis 17 just before it dipped down to the rail track, each latticed iron sheet had an embossed caption in the same unobtrusive rust colour. The steel legends enumerated the precise number of Jews sent off from this station and this platform.

Between October 1941 and March 1945, Gleis 17 was a busy place. Every few days, sometimes daily, anywhere between sixty to over a thousand Jewish families and individuals were forcibly taken away from their homes and deported to Lodz, Riga, Theresienstadt and some time later directly to Auschwitz. Grunewald was one of the three stations that transported 55,000 Jews from Berlin on these death trains.

That was it, slab after iron slab with the same grill pattern even after you took a u-turn till you reached March 1945.

Step out of Gleis 17 and you were face-to-face with another memorial. A rough wall of concrete had been gouged out at the centre with giant fingers. Six million Jews extirpated from life and extinguished. One of the axioms one is taught in school is that the

universe cannot tolerate a vacuum. Maybe so in physics. But some hiatuses in history can never be filled.

The second memorial too was a powerful one. But the one that gutted one's innards was the Gleis. It was low-key, so low-key that you could almost miss it. Even when you discovered the reason why it was such a major marker in the German psyche, what struck you was that there was no fanfare, no breast-beating, no heavy symbolism. It was elliptical and it hit you in the solar plexus and you crumpled. It left you bereft of words and the easy emotion.

Some years back, the British artist Aneesh Kapoor did a major show in Munich. The major installation there was also about the Holocaust. An empty wagon that carried a burden of red goo-like wax was dragged almost imperceptibly on rail tracks and at the end of this laborious journey splattered the red sticky muck on the walls. Art, to repeat a threadbare platitude, is subjective. The critics found it a memorable and outstanding contribution to Holocaust art. My friends found it moving. I must be perverse. It was so obviously contrived, its symbolism so loud and clear and fake (most of the Nazi death camps were lethally efficient and bloodless), it left me cold and angry. One of the qualities of great art is that it can be ambiguous and ambivalent and you can read it any way you want. But this installation by Kapoor was just heavy-handed and pretentious.

It was Oscar Wilde who said all great art lies in concealing art. Gleis 17 has a simplicity and directness to it that are almost artless. They leave you to sort out your own thoughts and face up to the fact of our collective guilt. For we've learnt nothing. The genocide committed by the Serbs against the Muslims in Bosnia, the Israeli persecution of the Palestinians, the endless atrocities and massacres conducted by the Taliban, Al Qaida and other jihadis in the name of God, the utterly barren Indo-Pak conflicts that bleed both nations, the holier-than-thou Americans with their Abu Ghraibs and renditions, the slaughter and carnage in so many countries in Africa ... nothing has changed.

Gleis 17 was an eye-opener as was the monument to the burning of the books on Bebelplatz near the Berlin State Opera on Unter den Linden and the Käthe Kollwitz sculpture "Mother with her Dead Son", dedicated to the victims of war and tyranny.

I am sure my debt to Wiko is much bigger but only time and distance will help me understand it.



TRANSITIONS  
TOBIAS J. OSBORNE

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Born in 1977 in Tasmania, Australia. Studied Mathematics and Physics at the University of Queensland, Australia, Ph.D. 2003. Since 2010 Professor of Theoretical Physics, Gottfried Wilhelm Leibniz Universität, Hannover. Publications: Osborne, Tobias J. (2006). “Efficient approximation of the dynamics of one-dimensional quantum spin systems.” *Phys. Rev. Lett.* 97, 157202, quant-ph/0508031. Osborne, Tobias J. and Michael A. Nielsen (2002). “Entanglement in a simple quantum phase transition.” *Phys. Rev. A* 66, 032110, quant-ph/0202162. Burrell, Christian K. and Tobias J. Osborne (2007). “Bounds on information propagation in disordered quantum spin chains.” *Phys. Rev. Lett.* 99, 167201, quant-ph/0703209. – Address: Gottfried Wilhelm Leibniz Universität, Institut für Theoretische Physik, Appelstraße 2, 30167 Hannover.  
E-mail: tobias.osborne@itp.uni-hannover.de

I am sitting on the plane at the moment. I hardly know what to write here. How can a couple of pages possibly do justice to the impact of my experiences of the past year? I guess they cannot. Especially since I am not exactly a proficient writer. I could regale you with my impressions of Berlin and Grunewald and Wiko lunches and Dienstagskolloquia and the amazing helpful and wonderful staff (I am in awe of their incredible patience and good nature), and all that. But I won't: Having read the reports of many of the former Fellows I realise that anything I could, and would, say has been said before, and far more eloquently. What is different about my experience at the Wiko, though, is *me*, so I have decided to share my experiences in maybe a slightly different way: I am young enough, and inexperienced enough, that my autobiography, such as it is, can fit in three

pages. In this way you can understand the context in which my experiences were framed. So, for what it's worth, here it is.

I was born in a small mining town called Savage River that *was* in Tasmania, Australia. It's no longer there, having been removed after the natural resources were exhausted. After several moves I then spent my final formative years in another mining town of some 3000 people, this time situated in central Queensland. The nearest "city" was two and a half hours drive away, and, besides a large coal mine, the town was surrounded only by farmland. During my highschool years there I worked several jobs, variously as a farm hand and a shelf stacker in the local supermarket.

For as long as I can remember I have always felt restless. Luckily I did well enough at school to be offered a place at university (although not good enough to get into a medicine degree, thank heavens). Thus I ended up in a general B.Sc. science program. After experimenting with Biology, Chemistry and Computer Science I was hooked by the allure of Physics. At this time physics was very popular in the media and the genre of "popular science" was just taking off. And so, after a rather lacklustre performance in my first year, I finally started to study. Still, I was restless. I enjoyed my student years but I never felt as though I reached what I wanted.

Several years later I was disillusioned by physics and ended up accepting a Ph.D. position in the mathematics department. Finally I felt as though I'd found my calling. Although, predictably, the excitement of research began to pall and I dawdled aimlessly through a couple of years of non-work before meeting my final Ph.D. supervisor (I changed Ph.D. supervisors several times). There followed a whirlwind of activity and within a year I was done. During those intervening four years I had led a settled and comfortable life and my highest ambition was to settle down in Australia after a couple of requisite years overseas.

After some applications I was offered a position in Bristol, UK, which I readily accepted. At the same time I also experienced some personal dramas. Thus I ended up in Bristol in the midst of a cold dark winter with a suitcase and impractically located accommodation. Despite the dark start, Bristol turned out to be easily the most exciting time in my life. It is hard to imagine the satisfaction of having "made it out" of my country town and gotten as far as the UK. I wasted no time in immersing myself in the social and cultural scene in Bristol. This all came at the detriment of my research.

Today I am astonished that I didn't quit academia then; I was on a clear trajectory down and out. But somehow things picked up and I luckily became motivated again.

This is due, in no small part, to an acquaintance I made at that time, namely, Jens Eisert, whose influence on me is visible to this day.

After a couple of years at Bristol I had the great and, to me, still unbelievable fortune to be offered a permanent position in the mathematics department at Royal Holloway, University of London. Finally I *had* made it, and I expected that it would be my final move. We bought a house, settled down and became comfortable.

But Germany exerted a subtle influence on me. Via Jens Eisert I was introduced to Uli Schollwöck. And thanks to Uli I was invited to apply to the Wiko. Well, I could hardly say no. So I applied and was accepted as a Fellow for 2009/2010. Okay, in the very least, I could enjoy a year away from teaching.

But nothing went quite as expected.

When writing my proposal for what to work on I chose something that I thought was relatively safe and yet still reasonably important. So I hoped I would have some freedom with what to do after I'd written up my proposed (but mostly completed) research. I had decided to experiment with the freedom from external commitments that the Wiko afforded.

Thus, upon arrival, I sequestered myself away from my academic community and worked on something completely different. This experience was interesting yet frustrating. As a theoretical physicist I found that being cut off from my usual academic peers was a disorienting experience. But it was also kind of like a holiday; in interacting with the other Fellows I gained a completely new perspective on things: when exposed to the sheer diversity of academic life that is present at the Wiko it is hard to deny we are all small cogs in the academic machine. Which sounds like a bad thing. But it isn't. I really enjoyed the sensation that we are part of something *bigger*. Also, I enjoyed the sheer *humanity* (and all the good and bad that that entails) of the other Fellows; I felt honoured to meet the wonderful people, and felt arrogant to meet the not-so-wonderful people.

But it was complicated.

There were both good things and bad things. The most interesting and happy result of my stay at the Wiko was that my research took several unexpected turns throughout the fellowship: I began having resolved to change my research dramatically from predominantly physics to predominantly mathematics. And I did apply myself strenuously to that task. But halfway through, in collaboration with Jens Eisert and Uli Schollwöck, we made some rather unexpected breakthroughs on some rather different problems, lying squarely



within the field of physics. So productive was this work that I can see it will occupy my attention for many years to come, perhaps decades ...

If I try to think of any given day during the past year I can't remember many singular events that stand out especially beyond the usual things: interesting talks, pleasant meals, etc. But somehow my impression of the year as a whole is of something more momentous; somehow the sum was greater than the parts. This year marked the beginning of many transitions.

But every end is a beginning.

Thus begins the next stage of my life: at the commencement of my fellowship I was made aware of a position in Hannover that I was invited to apply for. It was a "shot to nothing", so I applied. Incredibly I was accepted and now, instead of moving back the UK we have moved to Hannover.

The future is very unclear to me right now. In packing up all my belongings into a pile of boxes it is hard to feel anything other than melancholy and displacement. I look forward to reading this in a year when I'll know what happened ...



THE SPIRIT OF THE WIKO  
ROBERT E. PAGE JR.

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Professor Page is the Dean and Foundation Professor of Life Sciences at Arizona State University. After retiring from the University of California at Davis, where he served as Chair of the Department of Entomology, he took on responsibilities at Arizona State University to build and grow a new School of Life Sciences that now is recognized internationally for its novel interdisciplinary structure and function. His research is on the evolution of honey bee social behavior and sex determination, resulting in numerous publications on the behavioral genetics of division of labor and foraging specialization and on the identification of the primary gene responsible for haplodiploidy in honey bees. Professor Page is the author of more than 200 research papers, book chapters, and popular articles. He is a Fellow of the American Association for the Advancement of Science, the Brazilian Academy of Science, the German National Academy of Sciences Leopoldina, and the American Academy of Arts and Sciences and is a recipient of the Alexander von Humboldt Foundation's Senior Scientist Award. – Address: School of Life Sciences, Arizona State University, P.O. Box 874501, Tempe, AZ 85287-4501, USA.  
E-mail: [repage@asu.edu](mailto:repage@asu.edu)

I came. I wrote a book. I went home. That captures the professional essence of my year of accomplishment at Wiko, but completely misses the true meaning and value of this year. When I arrived I planned to hold a workshop that explored the use of social insects as models for developmental evolution. I wanted to ask whether we could substantiate our claims, and the claims of several other groups, that we can learn something about the developmental evolution of individual organisms by studying social insects. Are there broad

developmental principles of complex organizational structures that are maintained across different levels of biological organization and are the targets for natural selection? The workshop would be followed by a joint effort with my workgroup members to write a book about it. However, with the workshop I discovered that developmental evolution means different things to different people. And within the social insect community it has even more meanings, and, even more importantly, different levels of importance with respect to research agendas. The workshop did not develop along the principles I wished, and did not lead to a satisfactory answer to my question.

I became very skeptical of our objective, and the claims that we were going to explore, and decided that we were far from sitting down and writing a book about this very fuzzy, poorly articulated, and poorly understood topic. But, I had a wonderful distraction. I was invited to give the Ernst Mayr Lecture to the Berlin-Brandenburg Academy of Science. I had just recently read *The Life of the Bee* by Maurice Maeterlinck and was fascinated by his very romantic and mystical treatment of the social organization of honey bees. He called it the “spirit of the hive”. I took that as a theme for my lecture and tried to work through how social organization emerges as a self-organized property of complex systems, and how it evolves in honey bees. I had the theme for a book.

I never planned to write this book. I never had the intention of being a sole author, and especially never planned to write a book that is geared more for a general audience than for professional specialists. But that is the beauty of the Wiko experience. I had lots of time on my hands, I had a wonderful staff to support my effort, and I had constant encouragement from all of the regulars and Fellows at Wiko. Wiko nurtures creativity. Even if you don't think you have that kind of creative drive or ability, it rubs off on you from all of the creative people who surround you and accept your feeble efforts as interesting and worthwhile. I thank all of them for constant encouragement.

My book is done (at least in draft form), and my Wiko year is over. The weekly colloquia, the Thursday night dinners (the highlight of the week for my wife Michele), the German classes that were so important for Michele, the wonderful ambience of the Wiko in the Grunewald, and of course Berlin, the most exciting city I have experienced. I will return to my university and my normal routines refreshed and eager to get back to work. And, I will work to keep my relationship with this very special institution.



CONSIDERATIONS OF MY  
STAY AT THE WIKO  
MARCIA PALLY

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Professor Dr. Marcia Pally teaches at New York University in Multilingual Multicultural Studies and is a permanent Fellow of the New York Institute for the Humanities. She spoke at the World Economic Forum in 2010 and has been awarded the Mercator Guest Professorship at Humboldt University, Berlin from the Deutsche Forschungsgemeinschaft (DFG). Additionally, she is the co-recipient of a DFG research grant (2009–11), and has been a Fellow at the Wissenschaftskolleg zu Berlin in 2006/07 and 2009/10. Her most recent books are: *Part of the Solution: The Evangelical Call for Democracy and Economic Justice* (working title, Eerdmans Publishing, 2011), published in Germany as: *Die neuen Evangelikalen: Freiheitsgewinne durch fromme Politik* (Berlin: University Press, 2010); *Die hintergründige Religion: Der Einfluss des Evangelikalismus auf Gewissensfreiheit, Pluralismus, und die US-amerikanische Politik* (Berlin: University Press, 2008); *Warnung vor dem Freunde: Tradition und Zukunft amerikanischer Außenpolitik* (Berlin: Parthas, 2008). – Address: Department of Multilingual Multicultural Studies, New York University, 239 Greene Street, 6th floor, New York, NY 10003, USA.  
E-Mail: [marciapally@earthlink.net](mailto:marciapally@earthlink.net)

### Sundry Thoughts

Since this was my second time at the Wiko, I had a chance to see – or perhaps feel would be a better word – something that the staff often talks about: the inevitable, ineffable difference in Wiko classes. In both years, I met people with whom I will stay in contact, had exciting intellectual discussions with people from a range of disciplines, learned a great

deal for the colloquia, and laughed a lot. And yet the two experiences were significantly different.

Before I go on, I want to say what an ingenious institution the Wiko is and what a gift it is to be here. The chance to live and in a way work with such a high level of scholars from around the world is unique and life-changing. It is not only the intellectual exchange that is invaluable, but all the living itself and learning how people from different parts of the world see it – subtly, through meals, jokes, body language, interaction with children, etc. Perhaps this is especially important for me, in Multilingual Multicultural Studies. It is also why I spend so much of each year outside my own country (the US): to be faced with a world of different assumptions (tacit and not) where my gut-level impulses are called into question explicitly and implicitly. But I think this living-aspect is important not only for me, but for Fellows overall. It's from this that curiosity, friendships, and the spirit of the group, so to speak, develop.

One of the great pleasures for me this year was to talk with political scientists from India, Rajeev Bhargava in particular. He was kind enough to point to some of his writings, which I read, and we talked a good deal about the variants of secularism, pluralism, democratic structures, toleration, etc. worldwide. Because the Western European model is so predominant worldwide (owing to the prestige of the European Enlightenment) and because I write often for the European audience, I have had to give a good deal of thought to the differences between the European and US experiences historically, culturally, and politically. Though the US is heir to the European tradition, the development of democracy, statism/grassroots civil society, Church-State relations, and pluralism has been rather different on the two continents (even accounting for differences among European countries), owing to the immigration experience of the US, the frontier, the de facto pluralist mix in the US, the lack of the territorialization of religion (as Europe had after the Westphalian Treaty in 1648), the influence of British liberalism and of pietistic and evangelical religions.

Yet this year I was able to learn a bit about the Indian experience and how India's variant of democracy, pluralism, and civil society is similar to and different from the US and European ones. In many ways, the Indian emerging model is more similar to the US's than is Western Europe's. In any case, India's groping with religious and ethnic difference amid great class inequalities under democratic structures is something to consider very carefully, as these circumstances account for much more of the world's population – in India and other countries – than does Western Europe's modern history.

It was also an immense pleasure, and illuminating, for me to talk with the musicologist Annegret Fauser, her husband Tim (also a musicologist), and the composer, Gyula Fekete. Since the “other half” of my life is dance and choreography, I was delighted by their work and by their responses to the dance projects in which I’m currently involved. As they are involved with the arts, I also found them, in spirit and approach, greatly warming.

Finally, perhaps most thrilling for me was to finally dance myself at the Wiko. It was my gift to the staff at the final party to perform (along with a wonderful student dancer) a short duet that I choreographed, to Bach’s Concert for Oboe d’amore, Strings and Basso Continuo, BWV 209 III. As dance is a tremendously important source of insight and energy for me, and since it contributes much to the way I see and approach my surroundings, performing a piece that I had choreographed, I feel, brought this important rest of me to the Wiko for the first time.

To return to the differences among Wiko classes: I don’t think I can explain this better than does the staff, which has had years to consider the differences among classes. But I would say that the group, as it comes together, moves in a certain way as a group; the “cultural” assumptions of what is done, not done, what is said and not said, how quickly, with whom, in what sequence, with what meaning, even where and how people sit at lunch and at colloquia, etc. develop. Individuals within the group contribute to that “culture” and then move within it, improvising, extending what’s done, etc. These cultures, I imagine, are influenced by the individual Fellows but also by the physical plant (weather, for instance), and chance events (a good performance at the Philharmonie). In short, all the things Bourdieu described pertain to the Wiko culture as well. And so the paths and personality of the classes are distinct.

One specific aspect of the 2009–10 year was the composition of the Fellows. Unlike my first year (2006–07) – which had working groups in religion (to which I belonged), biology, and other disciplines – the dominant influence this year was the biology group. Though there was also a humanities group, it was somehow less visible or present. As a result there was not quite the same balance among the disciplines – not quite the feel that they were all at the same sea level, so to speak. Perhaps there was also a different feel for what the Wiko (or this year at the Wiko) could offer: Was the main but tacit feel one of extending what one was already doing or one of cross-pollination (to borrow from the biologists)?

This does not mean that I lacked fascinating conversation with Fellows from other disciplines, but rather that the float of people and conversation among Fellows was affected. This of course could be explained by saying that the ease of conversation with me, in particular, was less fluid for whatever reason. And this well may be the case. But listening to other Fellows, as the year came to a close, I found that they offered similar observations.

I have always understood that the selection process of Wiko Fellows is important and delicate, and now I understand this even more. I also think the priorities of the Wiko itself, its staff and vision, influence what eventually becomes Fellow conversation or cross-pollination. An emphasis by the staff on one discipline, region, topic, or other aspect may inadvertently affect what I'm calling the flow of talk and curiosity among Fellows.

### About My Work

This year at the Wiko I was able to complete a book addressing at least a part of a question I've been studying for some years: what are the conditions under which devout believers may support liberal democracy, thrive under it, and contribute to democracy's flourishing? The question is pressing because there are today 600 million Buddhists, 800 million Hindus, 1.5 billion Muslims, and 2.3 billion Christians. Religion is ever in the news, often in connection with intolerance, persecution, and violence – whether it's the role of Catholicism in Poland, Pentecostalism in Africa, the fate of Christians in Malaysia, or the direction of Islam in Europe and the Mideast. It appears that religion has not faded away, as secularization theory predicted. Indeed, secularization theory has sustained neither its explanatory power in the face of religion's tenacity (consider the US or South Korea) nor its predictive power about how people behave in mobile, multicultural conditions.

Thus, if we are unable to develop ways in which the devout may support and even contribute to liberal, democratic governance, the prognosis for liberal democracy is bleak. Moreover, left unresolved, the issue leads potentially to polarization, with believers seeking to strengthen religion in the public sphere while secularists seek to limit/privatize it, fearing that, unless carefully managed, religion will rise and devour modern life in a resurrection of the repressed. Extremist groups who use religion to justify violence reinforce this view.

In looking for examples in which devout believers support and contribute to democratic structures, I did a case study of America's "new evangelicals", those who have separated themselves from the Religious Right in self-identification, political aims, and means. They are neither fundamentalist nor fanatic, not only democratic but often progressive, and on many issues, supporters of President Barack Obama. They embrace liberal constitutional law and see themselves not as imposing Scripture on the state but as part of civil society, with priorities in poverty relief and environmental protection. Like other civil society groups, they criticize the government when it transgresses liberal democratic principles, such as using torture.

In investigating "new evangelicals", I looked at books, sermons, newsletters, blogs, and political and social activism and guided open-ended interviews with scholars, pastors, political advisors, and the laity across a broad demographic range of "new evangelicals" in the US between 2004 and 2010. Interviewees included men and women ranging in age from 20 to 74, from scores of Christian denominations across the country. Professions range from firemen and construction workers to nurses, church staff, professors, and political consultants.

Perhaps most interesting for me was "new evangelical" discourse. As devout believers, they express their politics in the discourse of faith – not Montesquieu and Kant but Matthew and Paul. Perhaps this may enable other devout communities to take them seriously. Their approach to holy text may be familiar, and the trajectory from Bible to democracy may be one that other devout people might consider and adjust to their own circumstances – not as mechanical reproduction, as that is impossible because contexts vary, but so that functional equivalents may be developed.

- Religious communities may be interested in the question: How do "new evangelicals" retain their religious values while embracing liberal, constitutional law and cooperating with non-believers?
- Secularists may be interested in knowing: How do "new evangelicals" embrace pluralism and liberal, constitutional law, even as they retain religious values?

It is this work that I wrote about in my book, to be published in Germany in the fall of 2010 (Berlin University Press) and in the US (Eerdmans Publishing).



## Suggestions for the Future

In thinking of how I can be of further use to the Wiko, two things come to mind: to bring more dance here, as music and the plastic arts are already somewhat established, and to develop a structure for the ongoing study of religion and politics. This might be to have a Fellows' working group on the topic each year, or most years, somewhat like the continuing presence of biology. Or it may be some other structure. I'd like to discuss with the staff how this might come about in a way that would be of most benefit.



RAUSCHEN (FARBIG)  
FRANK PASEMANN

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Frank Pasemann ist Gastwissenschaftler am Institut für Kognitionswissenschaft der Universität Osnabrück. Er studierte Physik und Mathematik, promovierte (1977) und habilitierte sich 1985 in Theoretischer Physik an der TU Clausthal. Danach leitete er Arbeitsgruppen in den Bereichen Mathematische Physik, Neurodynamik und Evolutionäre Robotik an Institutionen wie der TU Clausthal, dem Forschungszentrum Jülich, dem Max-Planck-Institut für Mathematik in den Naturwissenschaften, Leipzig, der Universität Jena, dem Fraunhofer Institut für Autonome Intelligente Systeme, Sankt Augustin und an der Universität Osnabrück. – Adresse: Institute of Cognitive Science, Universität Osnabrück, Albrechtstraße 28, 49076 Osnabrück.

E-mail: [frank.pasemann@uni-osnabrueck.de](mailto:frank.pasemann@uni-osnabrueck.de)

Aus der Vielzahl der Assoziationen, die durch Gespräche und Vorträge am Wissenschaftskolleg induziert wurden, seien hier einige zufällig herausgegriffen.

Sind Demokratien als transiente Organisationsformen einer sich entwickelnden Weltgesellschaft zu verstehen? Konvergieren die verschiedenen Prozesse gegen eine universelle, globale, zeitweilig stationäre bzw. optimale Struktur gesellschaftlicher Interaktion? Oder können diese grundsätzlich nur historisch und technologisch bedingte, lokale Formen des Zusammenlebens sein? Wo sind in diesen Prozessen die Bifurkationspunkte, d. h. jene kritischen Parameter bei denen sich die Art der Organisation qualitativ ändert?

Aus den Fenstern der ISS nimmt man keine Staatsgrenzen wahr. Nur das abstrakte Gemälde von Oberflächenstrukturen. Keine hungernden Massen. Nicht den Besitz von

Land und Wasser. Aber Stürme und Feuer. Und die Leuchtdichte der Ballungszentren. Wie unterscheidet sich ein solcher Blick von dem in Google Earth?

Der Begriff Fortschritt wurde meist im Zusammenhang mit gesellschaftlichen Phänomenen verwendet. Zugespitzt ging es etwa um Fragen wie: Demokratie als Fortschritt, Fortschritt oder Demokratie, oder um den Fortschritt der Menschheit. Gelegentlich war auch vom Fortschritt der Technik bzw. der Technologie die Rede. Die zu Grunde liegende Annahme war offensichtlich, dass es eine den Entwicklungsprozessen immanente Zielrichtung hin zum Größeren, Schnelleren, Schöneren, Bequemerem, Kultivierterem usw. gibt.

Die Irritation von Geisteswissenschaftlern, hervorgerufen durch die Bemerkung von Biologen, dass die Biologie keinen Fortschritt kennt; genauer, dass der biologische Evolutionsprozess wertneutral verläuft.

Als Naturwissenschaftler mit der Aussage konfrontiert, dass Naturwissenschaftler doch zum Fortschritt (der Technologie, der Gesellschaft) beitragen, sei festgestellt, dass dies vermutlich von der Mehrheit der Angesprochenen nicht unbedingt als das ihre wissenschaftliche Arbeit antreibende Motiv verstanden wird. Letztlich bleibt festzuhalten, dass der Begriff „Fortschritt“ eine in der Regel posthoc artikulierte Wertung eines ansonsten neutral verlaufenden Prozesses ist.

Inwieweit ist die (meine) Erkenntnis über die Welt abhängig vom Finanzstatus des Staates, von der Kompetenz der Finanzeliten? Inwieweit ist die Funktionsfähigkeit von Wirtschaftsprozessen (und Seminaren) abhängig von größeren Vulkanausbrüchen (Eyjafjallajökull)?

Will man denn gesellschaftliche (soziokulturelle) Prozesse wertneutral verstehen, entledigt man sich allerdings weitgehend der Vorstellung, dass der Mensch die natürlichen und technischen Prozesse seiner Umwelt ursächlich kontrollieren bzw. steuernd beeinflussen kann. So scheint denn auch die Vorstellung, dass die Menschheit (bzw. ihre Eliten) letztlich Herr über die Geschehnisse dieses wunderbaren blauen „Raumschiffs Erde“ sind, im Schwinden begriffen. Dies angesichts der heraufdämmernden Einsicht, dass die Wirkungen der sich wechselseitig bedingenden globalen Geld-, Waren-, und Informationsflüsse weitgehend unverstanden und auch mit klassischen Methoden nicht zu verstehen sind. Diese Einsicht wird bestärkt durch nun wahrnehmbare bzw. medial vermittelte Vorgänge wie Klimaveränderungen, Instabilität der Finanzmärkte und so weiter.

Das Wissen um die Bedeutung von griechischen Trinkgelagen, die Rolle der Frau in der Polis. Das Plato Zitat (Symposium, 206c ff.) führte zu der Frage, ob Entwicklungs-

prozesse in produktiver Weise als Ersetzungsprozesse zu verstehen sind. Voraussetzung für diese Art der Betrachtung ist die Anerkennung der Tatsache, dass die Dinge unserer Welt endlich sind in allen Dimensionen. Insbesondere ist alles von endlicher Dauer. Endlich ist die Lebensdauer von Pflanzen, Tieren und Menschen. Endlich ist die Existenz von Staaten und Staatsformen, endlich sind die materiellen Ressourcen dieses Planeten, endlich ist auch der Einsatz und die Verbreitung einer spezifischen Technologie. Dies vorausgesetzt wird Weiterentwicklung nur durch Ersetzung des Vergänglichen möglich. So wie, nach Plato, die Frauen (mit Hilfe der Männer) die sterbenden Männer (und Frauen) ersetzen, die Männer (und Frauen) aber die immer wieder verbleichenden kulturellen Inhalte der Gesellschaft zu ersetzen haben, so wird eine alte Technologie durch eine neue, eine Produktionsweise durch eine andere, eine Regierung, eine Regierungsform durch eine weitere ersetzt. Das Ersetzende wird in der Regel nicht mit dem Ersetzten identisch sein. Das Neue ist nicht unbedingt das erneuerte, reparierte, verschönte Alte. Es sind, wenn ich eines der Argumente der Evolutionsbiologen richtig verstehe, die kleinen Variationen des Ersetzten, die den Fortgang der Dinge ausmachen. Bis auf gelegentliche, sprungartige Veränderungen, falls ein Bifurkationspunkt überschritten wurde. (Immer wieder: Die Prozesse der Welt sind nichtlinear.)

Ersetzungsprozesse sind, bedingt durch die Endlichkeit der Ressourcen bzw. die biologischen und physikalischen Eigenschaften der beteiligten Komponenten, wesentlich durch den sigmoiden (S-förmigen) Verlauf der Teilprozesse charakterisiert (sofern diese als Wachstumsprozesse zu verstehen sind). Also: Ist zum Beispiel die Zahl der sich vermehrenden Individuen einer Population von Lebewesen zunächst gering, so ist auch das Wachstum der Population vernachlässigbar. Bei hinreichend vorhandenen Ressourcen wächst die Population jedoch stetig an, bis das Wachstum durch die sich erschöpfenden Ressourcen gebremst wird. Dies gilt entsprechend für die Verbreitung einer neu aufkommenden Technologie: Diese ist zunächst gering. In der Mitte des Prozesses wird das Anwachsen ihrer Verbreitung am stärksten sein und so lange andauern, bis die Endlichkeit von Ressourcen und der Einsatz notwendiger Primärtechnologien der Verbreitung dieser Technologie Grenzen setzen und diese in einen relativ stabilen Sättigungszustand überführen. Entsprechend kann eine alte Technik durch eine neue Technik ergänzt bzw. ersetzt werden.

Eine Technologie erschöpft sich also nicht durch ihre innere Beschaffenheit, sondern im Ersetzungsprozess. Das Mooresche „Gesetz“ beschreibt bestenfalls den zurzeit vermutlich maximalen Anstieg (Wendepunkt) der verwendeten Silizium-Technologie. So

wurden Pferde durch Dampfmaschinen, diese durch Benzinmotoren, und letztere durch Elektromotoren ersetzt. Lochstreifen wurden durch Magnetbänder, Festplatten durch Festspeicher substituiert. Welche Art von Technologie wird die digitale Siliziumtechnologie verdrängen?

Bleibt die Frage nach der Zeit. Trivialerweise ist Zeit ein Parameter, ein Prozessparameter. Aber wie kann Zeit Gegenstand der Wahrnehmung sein, wenn es kein biophysikalisches Sinnesorgan für die Zeit gibt? In welchem Sinne existiert sie dann?

An der Zeit ist wesentlich, dass sie vergeht. Aber es ist keine Eigenschaft der Zeit zu vergehen. Vergehen beschreibt die Erfahrung von Veränderungen in der Konstellation von Objekten im physikalischen Raum, sowie Veränderungen im psychischen bzw. im metabolischen Raum. Ist Zeit also eine Eigenschaft des Denkens? Oder eine Eigenschaft der Dinge? Oder eine Eigenschaft des Raumes?

Ist Zeit Ergebnis eines stochastischen Mittelungsprozesses, induziert durch Mikrofluktuationen? Warum nicht Zeit als Orthogonalprojektion auf den Tangentialraum an das 4-, 5-, 9- oder 13-dimensionale kompakte Universum verstehen? Oder ist doch eher eine quaternionische Sicht angebracht, die Zeit als die einzig reale Dimension begreift? Oder ist Zeit nicht doch zyklisch? Oder ist Zeit als ko-relationale Abbildung von Parallelprozessen zu verstehen, und somit weder zyklisch noch reversibel?

Verlaufen die technische und die biologische Evolution auf unterschiedlichen Zeitskalen?

Es könnte sein, dass die technische Entwicklung sich von der biologischen Evolution entkoppelt hat. Erstere hat in den letzten 200 Jahren eine außergewöhnliche Beschleunigung erfahren und scheint dabei ihre eigene Gesetzmäßigkeit entwickelt zu haben. Sie könnte sich schneller fortentwickeln als es die meisten biologischen Organismen je in der Lage sein werden. Ist dann der Mensch (die Menschheit) fähig, sich hinreichend schnell an jene Veränderungen seines (ihres) Environments anzupassen, die durch eine sich beschleunigende Technikentwicklung bedingt sind?

Das Besondere am Menschen, d. h. weswegen er sich von anderen Tieren unterscheidet, ist unter anderem, dass er sich – neben dem Artgedächtnis, das als Genom vorliegt, und dem im Nervensystem eingebetteten Individualgedächtnis – ein drittes, externalisiertes Gedächtnis geschaffen hat, und zwar in Form der Technik. Behauener Feuerstein, Ritzzeichnungen, Schrift auf Ton, Stein, Papier, Malerei, Fotografie, Film, Festplatten. „Dadurch wird es zum ersten Mal in der Geschichte des Lebens möglich, individuell erworbenes Wissen zu übertragen und zu überliefern, ohne auf biologische Mechanismen

zurückzugreifen.“ (Bernard Stiegler. *Denken bis an die Grenzen der Maschine*). Wie verhält es sich mit dem Computergedächtnis? Hat sich die Technik mit diesem ihr eigenes Gedächtnis geschaffen? Sozusagen das Gedächtnis des dritten Gedächtnisses?

Tatsächlich hat sich die Technik mit der Festkörpertechnologie – im Zusammenklang mit vielen notwendigen Primärtechnologien – ihr eigenes Gedächtnis geschaffen. Wie ein konkretes Auto gebaut wird (z. B. ein Jaguar) ist eher aus einem Chip abrufbar als aus dem menschlichen Gedächtnis. Mit wem ich am 26. 7. 2010 über Duns Scotus telefoniert habe, ist eher einer Software als meinem Gedächtnis zugänglich. Und wie diese Software geschrieben ist, weiß ein Computerspeicher eher als die Gruppe von Menschen, die diese Software entwickelt hat. Würden wir (oder die unsere momentane Lebensform stützenden Systeme) nicht jedes Jahr neu designte Gebrauchsgegenstände benötigen, dann käme letztlich der ganze industrielle Produktionsprozess ohne menschliches Individualgedächtnis aus.

„Natürliche Gedächtnisse“ haben eine endliche Kapazität und besitzen daher notwendigerweise einen Modus des Vergessens. Wird das Gedächtnis der Technik in Form von Datenspeichern und Netzen je seine Inhalte verlieren? Ist Löschung von Daten noch programmierbar? Erfolgt das Vergessen durch Materialalterung? Oder wird ein Vergessensprozess autonom im Gesamtsystem ohne Eingriff von außen generiert?

Falls sich ein künstliches, mit kognitiven Fähigkeiten ausgestattetes, autonom agierendes System in Form von Computern und Netzwerken und deren Peripherie realisieren lässt, dann kann dieses System unter bestimmten Bedingungen die Art seines eigenen Entstehungsprozesses „memorieren“, weil es gegebenenfalls Zugang zu seinen mechatronischen Bauplänen und zu den seine Autonomie induzierenden Regelungssystemen hat. Aber kann es sich dann auch selbst reparieren? Kann es sich selbst verbessern, seine Morphologie verändern, seine Aktuatoren effektiver gestalten, seine (Überlebens-)Strategien optimieren? Einzelne technische Systeme sind bisher nicht im biologischen Sinne „lebend“. Sie haben (noch) nicht die Tendenz zur Selbstorganisation bzw. Selbsterhaltung entwickelt.

Betrachten wir jedoch die anwachsende Menge aller technischen/künstlichen Systeme auf der Erde. Welchen Einfluss hat diese beständig wachsende Population von Nicht-Wesen auf das Gesamtsystem Erde? Wie wirkt sie auf die Komponenten von Gaia? Vielleicht ist es gar nicht die Menschheit, die entscheidend in die Rückkopplungsschleifen und die Fließgleichgewichte eingreift; oder vielleicht tut sie dies nur indirekt? Falls eine direkte, d. h. vom Menschen unabhängige Wechselwirkung des Unorganisch-Techni-

schen mit dem Gesamtsystem Erde (Gaia oder Nicht-Gaia) existiert, was ist deren Wirkung? Wenn doch eine ökologische Homöodynamik mit technischen Komponenten nicht realisierbar ist?

[Obige Überlegungen wurden u. a. durch die Vorträge von Rajeev Bhargava, Yogendra Yadav, Maria Luisa Catoni, Claus Pias, Ulrich Schollwöck und Bernard Stiegler. *Denken bis an die Grenzen der Maschine*. Berlin: diaphanes, 2009, angeregt.]



WILLKOMMEN AUF DER „ELITE“,  
ODER: WINDSTILLE IM INNEREN:  
EINE ZITATENSAMMLUNG  
CLAUS PIAS

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Claus Pias studierte Elektrotechnik in Aachen sowie Kunstgeschichte, Germanistik und Philosophie in Bonn und Bochum. 1993 wissenschaftlicher Mitarbeiter für Architekturgeschichte an der neu gegründeten Bauhaus-Universität Weimar. 1996 wechselte er ebendort zum Lehrstuhl für Geschichte und Theorie künstlicher Welten. 2002–04 Juniorprofessor für Medientechnik und Medienphilosophie an der Ruhr-Universität Bochum; 2004–06 Professor für Medien- und Kommunikationstheorie an der Universität Duisburg-Essen; 2006–10 Professor für Erkenntnistheorie und Philosophie der Digitalen Medien an der Universität Wien. Im Wintersemester 2010 wechselte er an die Leuphana Universität Lüneburg. Er war Fellow des IFK Wien und des IKKM Weimar. Publikationen: *Cybernetics – Kybernetik. The Macy-Conferences 1946–1952* (2 Bde., Hg., 2003/04). *Abwehr: Modelle – Strategien – Medien* (Hg., 2009). *PowerPoint* (zus. mit W. Coy, 2009). *Think Tanks* (zus. mit S. Vehlken und T. Brandstetter, 2009) – Adresse: Institut für Kultur und Ästhetik Digitaler Medien (ICAM), Leuphana Universität Lüneburg, Scharnhorststraße 1, 21335 Lüneburg. E-mail: [pias@leuphana.de](mailto:pias@leuphana.de)

Wir sagen es Ihnen gleich vorweg: Die Gerüchte, dass Kreuzfahrten teuer, langweilig und nur etwas für Senioren seien, sind schlichtweg falsch. Bei näherer Betrachtung werden Sie schnell feststellen, dass eine Kreuzfahrt im Vergleich zu anderen Reiseformen das beste Preis-Leistungs-Verhältnis bietet, weil die gebotenen Inklusivleistungen an Bord ganz besonders umfangreich sind. Ein Kreuzfahrtschiff bietet Spitzenleistungen,



wie es sie sonst nur in Luxushotels gibt – und dies rund um die Uhr.<sup>1</sup> Generell sind im Preis alle Mahlzeiten, Softdrinks, Kaffee und Tee inbegriffen, ebenso wie ein reichhaltiges Angebot an Bordaktivitäten, vielseitige Kultur- und Musikangebote und die Benutzung der Schiffseinrichtungen wie Bordbibliothek, Fitnesscenter und Sonnenliegen. Neben den touristischen Ozeanriesen, die in Zukunft die Meere bevölkern werden, gibt es Alternativen: die hocheleganten, kleineren Schiffe wie die „Elite“ mit etwa 50–60 Passagieren und ebensoviel Mann Besatzung. Ein Kreuzfahrtschiff im Yachtstil! Entsprechend ist auch die Atmosphäre an Bord vergleichbar mit einem exklusiven Club von Auserwählten. Keine Massen, kein Gedränge, keine Warteschlangen. Auch keine große Show, wenig Animation, aber ein hohes Niveau. Wissenschaftliche Vorträge von hochkarätigen Fachleuten und ein Prominenter aus der Welt der Klassik. Und obwohl es zuletzt sicherlich Kreuzfahrtschiffe gibt, die sich mit ihrem Angebot speziell an ältere Passagiere wenden, liegt das Durchschnittsalter der Passagiere auf unserem internationalen Schiff bei nur 58 Jahren.<sup>2</sup> Familien, Paare und Singles sind hier herzlich willkommen und können sich auf ein abwechslungsreiches, unbekümmertes Reisevergnügen freuen.

### Einchecken

Alles beginnt beim Einchecken: Wie bekomme ich meinen Koffer in die Kabine?<sup>3</sup> Wie finde ich mich auf dem großen Schiff überhaupt zurecht? Sorgen Sie sich nicht, hilfreiche Geister helfen Ihnen gern weiter. Zunächst durchlaufen Sie eine ähnliche Prozedur wie am Flughafen. Neben den Reiseunterlagen geben Sie auch Ihren Reisepass ab. Im Gegenzug erhalten Sie in der Regel eine elektronische Bordkarte. Sie dient nicht nur dazu, alle anfallenden Leistungen abzurechnen, die nicht im Reisepreis enthalten sind, sondern sie ist gleichzeitig auch eine Art Boarding-Pass und Ausweis.

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1 Auf Schiffsreisen sind in der Regel die §§ 651 a – l BGB anzuwenden. Danach muss der Veranstalter dem Kunden die im Reisevertrag versprochenen Leistungen erbringen. Vertragsgrundlage ist in der Regel der Prospekt (bzw. die Website) des Veranstalters, in dem er seine Leistungen beschreibt. Wird die Reise nicht vertragsgemäß erbracht, kann der Kunde Abhilfe verlangen, d. h. er muss den Veranstalter-Vertreter auffordern, ihm zu gewähren, was er im Reisevertrag versprochen hat.

2 Für Personen über 69 Jahre wird bei der Reiserücktrittsversicherung ein Zuschlag berechnet.

3 Gäste mit Hermès-Gepäckdienst: Bitte versehen Sie ihr Gepäck mit gelben oder blauen Bänderolen und wenden Sie sich an den Hermès-Beauftragten.

## Kabinen

Kabine – das Wort erscheint klein. Unsere entzückenden und geräumigen, mit allen hygienischen und behaglichen Erfindungen neuzeitlicher Raumkunst ausgestatteten Wohnungen haben mit der nüchternen, engen Schiffsbehausung, die man gemeinhin Kabine zu nennen pflegt, nichts gemein. Denn übereinander angebrachte Kojen gibt es auf unserem Schiff nicht mehr. Unsere Gäste entspannen sich in freistehenden Betten auf luxuriösen Teppichen.<sup>4</sup> Geräumige Schränke und Wäschekommoden aus Kiefern- oder Eichenholz dienen zur Unterbringung der Kleidungsstücke. Schreibtisch, Toilettentisch und Chaiselongue, bequeme Armsessel und Waschtische mit fließendem heißen und kaltem Wasser, Spiegel und Glasplatte vervollständigen die Bequemlichkeit der elegant eingerichteten Reisewohnungen.

Hier finden Sie eine kurze Übersicht über die verschiedenen Kabinentypen an Bord:

- Einzelkabinen sind oft nur in begrenzter Anzahl vorhanden (siehe auch „Singles“)
- *Zweibettkabinen* haben zwei unten stehende Betten, die auseinander stehen, bei Bedarf aber auch zusammengestellt werden können.
- *Doppelbettkabinen* verfügen über ein Doppelbett. Sie sind häufig größer als eine Zweibettkabine.
- Suiten bieten neben einem Schlafraum einen separaten Wohnraum. Sie liegen meist auf höher gelegenen Decks.

Darüber hinaus gehören *Mehrbettkabinen* und Kabinen mit Verbindungstür zum Standard auf unserem Schiff. Auch behindertengerechte Kabinen werden angeboten.

## Willkommen

Am Abend des ersten Seetages erwarten der Kapitän, der Kreuzfahrtdirektor und sein Erster Stewart die Gäste am Eingang des Salons. Jeder Gast wird persönlich begrüßt. Dann stellt sich der Kapitän mit seiner Crew und dem sogenannten „Staff“ vor. Die wichtigsten Mitarbeiter, wie Offiziere, Chefkoch, Bibliothekar, Zahlmeister usw. werden vorgestellt. Das Glas wird zum Wohle der Gäste und in der Hoffnung, „dass immer eine handbreit Wasser unter dem Kiel des Schiffes sei“ geleert.

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<sup>4</sup> Zwiebsuppenfarben [Anm. d. Hrsg.].

## Essen und Trinken

Böse Zungen behaupten, auf Kreuzfahrten stehe das Essen im Mittelpunkt. Im Prinzip stimmt das auch. Wie jede Reederei ist auch unsere bestrebt, ihren Gästen eine exzellente Küche zu bieten. Art und Charakter der Speisen variieren von Reise zu Reise. Entscheidend ist der Rang des Schiffes, sowie die Fähigkeit des Chefkochs. Neben vegetarischen Gerichten, kalorienarmen Diätgerichten oder Vollwertküche erhalten Sie selbstverständlich auch Fisch und Fleisch. Und natürlich können Sie ohne weiteres einmal eine Mahlzeit auslassen.

Frühstück wird in der Regel von 8 Uhr morgens an serviert, Lunch ab 12:30, Abendessen gegen 18:00 Uhr. Kindern unter zwölf Jahren und der Dienerschaft wird besonders serviert. Die Küche an Bord unseres Schiffes hat einen Weltruf erlangt, und an Weinen und anderen Getränken werden nur die besten Marken an Bord geführt und zu mäßigen Preisen verkauft.

Das Mittagessen und das Abendessen werden meist durch einen Gong angekündigt. Nicht selten erhält der Obersteward für einen guten Tisch deshalb auch schon mal ein Trinkgeld von den Gästen. Da es sich bei den Tischen meist um Sechser- oder Achter-Tische handelt, wird man die ganze Seereise über hoffentlich mit sympathischen Tischnachbarn speisen.

Grundsätzlich gilt: Das Essen ist Bestandteil des Reisepreises. Essen können Sie an Bord immer soviel Sie mögen, und das ohne dafür extra bezahlen zu müssen. Bei den Getränken sollten Sie sich jedoch im Vorwege genau darüber informieren, ob Tischwein, Bier und alkoholfreie Getränke zum Essen im Preis eingeschlossen sind. Alles was Sie außerhalb der Mahlzeiten z. B. an den Bars oder in den Shows an Getränken konsumieren, müssen Sie in der Regel extra bezahlen. Besonders muss noch hervorgehoben werden, dass es an Bord weder Wein- noch Trinkzwang gibt. Gutes Trinkwasser wird mitgeführt und kostenfrei zu den Mahlzeiten zur Verfügung gestellt.

## Der Tischplatz

Es ist nicht egal, wo und mit wem Sie so viel Zeit verbringen. Ein guter Tisch mit angenehmer Tischnachbarschaft kann die ganze Kreuzfahrt verschönern – und umgekehrt. Sind Sie zu zweit, können Sie einen Zweier-Tisch nehmen. Der Vorteil: keine unangenehmen Tischnachbarn; der Nachteil: keine Chance für angenehme Bekanntschaften.

Empfehlenswert auch für Singles sind dagegen große Tische mit 6–8 Personen. Hier bestehen gute Chancen Kontakte zu knüpfen. Und unangenehme Tischgenossen sind im großen Kreis leichter zu ertragen.

### Ausflüge

Ausflüge sind das Salz in der Suppe einer jeden Kreuzfahrt: Ohne Sie bleibt die Reise auf Dauer eintönig. Doch beachten Sie: Eine Kreuzfahrt ist immer in erster Linie das Leben an Bord und erst in zweiter Linie der Besuch von Land und Leuten. Die Zeiten für Landgänge sind eher kurz, weil das Schiff meist auf Reede liegt, d. h. weit draußen vor dem Hafen ankert und die Gäste erst mit Tenderbooten an Land gebracht werden müssen. Das benötigt viel Zeit.

Ausflüge sind in der Regel Halb- oder Ganztagesausflüge. Sie werden meist mit dem Bus durchgeführt. Nach Ankunft des Schiffes im Hafen stehen die Busse in Reih und Glied und warten auf die Gäste. Zu den Vorteilen der von der Reederei organisierten Ausflüge gehört, dass Sie alle im Programm angegebenen Sehenswürdigkeiten besichtigen werden, dass ein mehr oder weniger kundiger Reiseleiter Land und Leute erklärt, und dass Ihre persönliche Sicherheit gewährleistet ist, sofern Sie den Anweisungen der Reisleitung Folge leisten.

### Welche Sprache spricht man an Bord?

Auf den von uns angebotenen internationalen Reisen ist die Bordsprache Englisch, aber auch für Reisende, die mit der englischen Sprache nicht so vertraut sind, sollte dies kein Problem darstellen. Auf den Schiffen sind Schiffshostessen, die Ihre Fragen kompetent in deutscher Sprache beantworten können. Außerdem können Sie die Speisekarten und die tägliche Bordzeitung in deutscher Sprache erhalten.

### Sport, Spiel und Gesundheit

Der Aufenthalt an Bord und die reichlichen Mahlzeiten verleiten zur Unbeweglichkeit. Daher wird Sport und Spiel großgeschrieben. Frühstücksgymnastik, Yoga und Tischtennis gehören seit jeher zu den beliebtesten Sportarten. Shuffleboard ist ein ruhiges, schiffseigenes Spiel an Deck; es bringt Menschen in Bewegung ohne körperliche Anstrengung.

## Darf an Bord geraucht werden?

Rauchen ist nicht jedermanns Sache. Immer mehr Menschen fühlen sich durch Rauchen belästigt. An Bord unserer Schiffe ist das Rauchen grundsätzlich möglich, allerdings nur in den ausgewiesenen Raucherzonen auf den Freiluft-Decks.

## Bordunterhaltung

Die Kreuzfahrtanbieter legen sehr viel Wert auf die Unterhaltung ihrer Gäste. Von 9:00 Uhr morgens bis in die Nacht hinein wird den Reisenden ein breitgefächertes Angebot an Entertainment geboten. Dabei reicht die Palette von Bildungsangeboten bis hin zu sportlichen Aktivitäten. Natürlich darf die künstlerische Unterhaltung nicht zu kurz kommen. Musiker, Schauspieler und Schriftsteller gehören zu jeder Kreuzfahrt dazu. Während tagsüber überwiegend Kurse oder Lichtbildervorträge zur Zerstreuung geboten werden, steht am Abend das Showprogramm im Mittelpunkt. Unsere Reederei bietet sogar Stars aus der klassischen Musik auf, um ihre Gäste zu unterhalten. Darüber hinaus werden auch Tanzveranstaltungen geboten. Für das Lesebedürfnis der Fahrgäste sorgt eine aus tausenden von Bänden bestehende, sorgfältig ausgewählte Bordbibliothek, die in breiten, mit Glastüren versehenen Schränken Aufstellung gefunden hat. Inzwischen hat auch der Kinofilm seinen Weg auf Passagierschiffe gefunden und ist bei den Fahrgästen äußerst beliebt. Die Filme werden nach dem Anspruch ausgewählt, die Touristen zu unterhalten und die Einwanderer zu erziehen.

## Themen-Kreuzfahrten

Neben der üblichen Unterhaltung gibt es bestimmte Strecken, die Attraktionen zu einem Thema anbieten. Die langen Seetage können sinnvoll dazu benutzt werden, um sich mit einem Hobby oder gar einer berufsbezogenen Thematik auseinanderzusetzen. Ein weiterer Vorteil ist die Chance, sich mit Gleichgesinnten zu treffen und dabei angenehme Stunden zu verbringen. Solche Themen sind beispielsweise: *Geschichte*: Vorträge und Filme im Themenbereich der Landschaften und Kulturen, die angefahren werden; Besuch von historischen Stätten und Museen. *Literatur*: Anwesenheit eines oder zweier Autoren an Bord; Lesungen, Diskussionen, Vorträge über ältere oder neuere Literatur. Schauspieler rezitieren Texte oder spielen literarisches Theater. *Klassik*: Konzerte an Bord, verbun-

den mit dem Besuch von Musikveranstaltungen am Festland. *Bildende Kunst*: Mal- und Zeichenkurse, verbunden mit Vorträgen zur Kunstgeschichte. Im Rahmen von Landgängen werden Sammlungen und Architekturdenkmäler unter fachlicher Anleitung besucht. *Flora und Fauna*: Vorträge und Filme über die Pflanzen- und Tierwelt. Touren auf dem Festland, verbunden mit dem Besuch von Naturkundemuseen und Botanischen Gärten.

### Kleidung an Bord

Nichts schafft mehr Unsicherheit bei potentiellen Kreuzfahrern als der Dresscode an Bord. Sicherlich gibt es auf vielen Schiffen die Gala-Abende, an denen festliche Kleidung erwünscht ist. Doch generell sind inzwischen modernere Zeiten in der Kreuzfahrt angebrochen.

Tagsüber geht es an Deck meist recht ungezwungen zu. Empfehlenswert sind sportliche Kleidung und rutschfeste Schuhe.

Für zwanglose Abende: Ensemble aus Hose und Top oder Rock und Bluse für die Damen; sportlich legere Kombination aus Hemd und Hose für die Herren. (Sportkleidung sollte nur für den Sport benutzt werden. Der Aufenthalt in Clubräumen oder Restaurants in Sportkleidung ist unpassend und stört die anderen.)

Zum Lunch und für informelle Abende: Kleid oder Hosenanzug für die Damen; Sportjacket oder Blazer für die Herren. (Meine Herren, Sie müssen nicht zu jedem Essen mit Krawatte erscheinen. Sie sollten sich aber zu jedem Essen nett und gepflegt ankleiden. Damit werten Sie nicht nur den Raum, die Speisenfolge und die Mitreisenden auf, sondern auch sich selber. Die Damen benötigen derartige Empfehlungen in der Regel nicht.)

Für festliche Abende: Cocktail- oder Abendkleid für die Damen; Anzug und Krawatte bzw. Smoking oder Dinnerjackett für die Herren. (Bedenken Sie: Auf dem Festland gibt es immer weniger Möglichkeiten, sich festlich zu kleiden. Ein Stück Tradition geht damit verloren. Auf der Kreuzfahrt aber lebt diese Tradition weiter. Sie sollten die Möglichkeit nicht nur nutzen, sondern auch genießen!)

Für etwaige Kostümfeste ist zu empfehlen, sich mit entsprechender Garderobe zu versehen.

## Zahlungen an Bord

Die überwiegende Zahl der Kreuzfahrtschiffe ist *cash-free*. Das heißt nicht, dass alles an Bord kostenfrei ist, sondern dass Zahlungen des Gastes über ein bordeigenes Zahlungssystem abgewickelt werden. Hierzu erhalten Sie eine „Bordkarte“, die als Zimmerschlüssel und Bordausweis verwendet wird. Ob Getränke an der Bar oder Wellness-Behandlungen, die der Gast über dieses Abrechnungssystem sammelt, werden am Ende der Reise über seine Kreditkarte abgerechnet. In der Regel erhält der Gast während der Kreuzfahrt jedoch eine Zwischenabrechnung, um im Rausch des Angebots nicht den Überblick über seine Ausgaben zu verlieren.

## Seekrankheit

Auch bei Kreuzfahrten gibt es ein Thema, das nicht immer ganz angenehm ist: die Seekrankheit. Darunter verstehen Ärzte alle Reaktionen des Menschen auf an sich ungewohnte Abläufe. Von der Seekrankheit kann jeder betroffen werden, in ca. 90% der Fälle verschwinden die Symptome aber nach einiger Zeit. Bei den ersten Anzeichen der Reisekrankheit muss reagiert werden. Sie sollten an die frische Luft gehen und sich mit einer leichten Beschäftigung ablenken. Seeleute haben eine ganze Reihe von Empfehlungen, wie man der Seekrankheit auch ohne Medikamente Herr werden kann:

- wenig Alkohol am Vorabend
- genügend Schlaf für alle (Mittagsschlaf)
- gesunde Ernährung
- soziale Zuwendung.

## Das Ende

Ereignisreiche Tage vergehen schnell. Auch die Zeit der Kreuzfahrt neigt sich dem Ende zu. Eindeutige Zeichen sprechen dafür: Hinweise der Schiffsleitung über Einzelheiten der Ausschiffung liegen in der Kabine, die ausgeliehenen Bücher müssen der Bibliothek zurückgebracht werden, und die Rechnung für Getränke wird präsentiert.

Am letzten oder vorletzten Abend findet die feierliche Verabschiedung der Gäste statt. Wieder wird um festliche Kleidung gebeten. Kurze Ansprachen des Kapitäns und des Kreuzfahrtdirektors, mit Dank an alle, die die Fahrt ermöglicht haben. Es wird die

Hoffnung ausgesprochen, dass die Gäste treu bleiben und ein baldiges Wiedersehen stattfinden möge. Anschließend wird ein lukullisches Abendessen im Restaurant serviert. Schließlich die letzte große Show im Musiksalon. Mit herzlichem Applaus werden die „Lieblinge“ verabschiedet. Eine Autogrammstunde ergänzt die Showveranstaltung. Es folgt der letzte Abschied von den neu gewonnenen Freunden, Austausch von Visitenkarten, Verabredungen, Versprechungen für die Zukunft. Inzwischen läuft bereits das große Reinemachen, und alles wird für die nächste Kreuzfahrt vorbereitet.

Am Ende der Kreuzfahrt werden die Gäste dann nach dem Grad der Zufriedenheit gefragt. Der Veranstalter möchte genau wissen, wie der Passagier die einzelnen Leistungen nachträglich beurteilt. Gewünscht ist eine Stellungnahme über Kabinen, Küche, Personal, Ausflüge, Unterhaltungs- und Informationsprogramm, Sportmöglichkeiten und nicht zuletzt den Service an Bord. Eine Verbesserung der Leistungen kann nur bei einer klaren Übersicht der Stellungnahmen erfolgen.

Die Nachfrage nach Kreuzfahrten in der Welt steigt ständig, und das Angebot an Schiffen und Routen wird immer größer. Die Konkurrenz unter den Anbietern ist hart. Wünsche und Beanstandungen der Passagiere sollten von jedem seriösen Reiseveranstalter ernst genommen werden.

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DIE EUPHORIE UND DIE GEHEIMNISSE  
DER BIOLOGIE  
ANDREI G. PLEȘU

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Andrei Gabriel Pleșu wurde 1948 in Bukarest geboren. Er studierte Kunstgeschichte und Philosophie, war Lizenziat für Geschichte und Theorie der Kunst, bevor er als Professor an der Universität Bukarest Kunstgeschichte und Religionsphilosophie lehrte. In der Ceaușescu-Ära politisch verfolgt, gründete er nach der Wende in Bukarest das „New Europe College“ und die Zeitschrift *Dilema*. Zwischen 1990 und 1991 war er Kulturminister, zwischen 1997 und 1999 Außenminister Rumäniens. Publikationen: *Reflexion und Leidenschaft: Elemente einer Ethik des Intervalls* (1992); *Wer in der Sonne steht, wirft Schatten* (2000); *Eliten – Ost und West* (2000); *Das Schweigen der Engel* (2007). – Adresse: New Europe College, Strada Plantelor 21, 023971 Bukarest 2, Rumänien.  
E-mail: aplesu@nec.ro

Seit mehreren Jahren schon, entweder als *Permanent Fellow* oder als *Short-Term Fellow*, spürte ich, wie die Biologie eindringlich an die Türen des Berliner Wissenschaftskollegs klopft. In allen Debatten rund um dieses Thema war ich eher zurückhaltend, tatsächlich aber unzufrieden. Ich sagte mir, dass das ursprüngliche Profil der Institution darunter leiden wird, weil die Naturwissenschaften eine andere *forma mentis* erzeugen als die Geisteswissenschaften, und dass der Dialog zwischen Wissenschaftlern aus so unterschiedlichen Bereichen erschwert werden wird. Alle Biologen aus dem Umfeld des Kollegs waren mir sehr sympathisch, aber die Entwicklung schien mir riskant. Umsonst erinnerte ich mich an die Worte von Constantin Noica, einen rumänischen Jan Patočka: „Man kann heute keine Philosophie betreiben, ohne sich gewisse naturwissenschaftliche Kenntnisse zu eigen zu machen. Und da ich euch für unfähig halte, Mathematik oder

Physik zu verstehen, fordere ich euch auf, wenigstens Biologie zu lernen.“ Ich habe nicht auf ihn gehört, entweder aus jugendlicher Arroganz oder aus intellektueller Trägheit. Die zwei Monate, die ich dieses Jahr in Berlin verbrachte, führten mich dazu, meinen Ungehorsam zu bereuen. Ich befand mich plötzlich bei einigen fesselnden „Dienstagskolloquien“ und erlebte eine Art „Biologie-Schock“, obwohl die Vertreter der Geisteswissenschaften nicht minder interessant waren. (Es genügt, an die Diskussionen zu denken, die ich mit Martin Mosebach über seine Kontakte mit dem östlichen Christentum führen konnte, an die wagemutige Lebendigkeit, mit der Yogendra Yadav das Problem der Universalität der Demokratie re-evaluierte, oder an die von Marcia Pally neu eröffneten Perspektiven der Beziehung zwischen Kirche und Staat in den evangelischen Medien der USA). Aber die Vorträge der Biologen wurden, zumindest für mich, unerwartet das intellektuelle *Ereignis* des Berliner Aufenthaltes. Sie gefährdeten keineswegs die Tradition der Institution, ganz im Gegenteil, sie waren *Wiko at its best*: ein Ort des Heraustretens aus der Routine, der riskanten Provokationen, des Entgrenzens.

Wenn es darum geht, den Anteil an Reflexivität zusammenzufassen, den ich unter anderem den Beiträgen der Kollegen aus der Biologie zu verdanken habe, würde ich folgende Themen erwähnen:

1. Wir können – sogar auf dem Niveau einer höchst wissenschaftlichen Expertise – nur *anthropomorphisch* denken: Wenn wir je ein Lebewesen unter Beobachtung nehmen, neigen wir dazu, über „Intelligenz“, „Neugierde“, „Gefühl“, „Humor“, „Affektivität“ usw. zu sprechen. Binyamin Hochner von der Hebrew University of Jerusalem beweist, indem er sich auf das Nervensystem der „Arme“ eines Tintenfisches bezieht, dass wir es mit einem sehr „klugen“, „einsamen“ Wirbellosen zu tun haben, der fähig ist zu lernen, zu spielen (Verstecken spielen), eine determinierte Aktion zu planen und empfindsam zu reagieren. Indem wir erforschen, wie der geschickte Kopffüßler die Tentakeln bewegt, könnte es sein, dass wir Neues über das menschliche Denken herausfinden. Wenn es so ist, können wir in naher Zukunft eine wissenschaftliche Arbeit über die *Psychologie* des Tintenfisches erwarten, über seine Freuden, seine Leidenschaften und seine Verzweiflungen ...

2. Das „positive“ Wissen der Naturwissenschaften ist, paradoxerweise, Geheimnis erzeugend. Je mehr Entdeckungen, desto mehr zusätzliche Fragen, desto mehr Verblüffungen. Es ist ein Privileg, das sich in dem Beitrag der Geisteswissenschaften so nicht finden lässt. Im Bereich der Naturwissenschaften vergrößert sich das Wissen nicht auf *Rechnung* des Unwissens. Die Erweiterung der Grenzen eines abgeholzten Territoriums

verursacht nicht eine Einschränkung, sondern eine spontane *Ausdehnung* des unberührten Territoriums. Wenn Bert Hölldobler mehr oder weniger ernst behauptet, dass es schwieriger ist, uns den Planeten ohne Ameisen als ohne Menschen vorzustellen – da die Ameisen eine vital-hygienische Funktion für den Metabolismus der Erde erfüllen, während die Menschen eher Unordnung erzeugen – sehen wir uns mit einem immensen kosmogonischen Dilemma konfrontiert. Wenn der Mensch nicht unentbehrlich und in der Ökonomie der Natur eigentlich auch nicht willkommen ist, heißt es, dass er in der Evolution der Spezies ein Element darstellt, das auf einer anderen Linie entstanden ist als diejenige, die der Harmonie der Gesamtheit zu Grunde liegt. Das Auftreten des Menschen erscheint dann fast als eine störende Fehlentwicklung: Ein Unfall in der Entwicklung oder das Werk eines bösen, ungeschickten Schöpfers. Wenn der Mensch, ganz im Gegensatz zur Auffassung Darwins, die letzte krönende Stufe der zoologischen Skala ist, dann bleibt es unverständlich, warum alles, was unter- und vor-menschliche Natur bedeutet, sich „mobilisiert“ hat, um einen Ausschuss, ein toxisches Agens zu kreieren, das dazu geschaffen zu sein scheint, sein Fundament zu zerstören, seinen Kontext zu sprengen. Mit anderen Worten, es gibt zwei Möglichkeiten: Entweder ist der Mensch ein in letzter Minute entstandener Fehler, der die globale Konstruktion kompromittiert, oder die gesamte Konstruktion ist defekt, indem und solange sie sich auf ihre eigene Implosion vorbereitet.

3. Infolge der Forschungen im Bereich der Zoologie scheint die Hierarchie der „Perfektionen“ aus dem Tierreich ernsthaft beschädigt zu sein. Indem die Tiere der ansteigenden Laufbahn der Evolution folgen, sind sie nicht notwendigerweise besser angepasst. Das was sie einerseits gewinnen, verlieren sie an einer anderen Stelle. Sie vervollkommen sich in eine Richtung und erleben woanders einen Rückfall. Man könnte eher behaupten, dass jede Spezies der Tiere ihren eigenen Anteil an *Superiorität gegenüber allen anderen hat*. Was ein Regenwurm tun kann – beispielsweise um zu überleben, auch wenn er in zwei Teile geschnitten wird –, kann ein ihm überlegenes Säugetier nicht. Was ein Krake mit seinen Armen tun kann, kann ein Mensch mit den seinen nicht – von der Fähigkeit des willentlich gesteuerten Wechsels der Hautfarbe ganz zu schweigen. Aus der Perspektive solcher Leistungen steht der Mensch schlecht da: minder ausgestattet, weniger „intelligent“ als der Krake. Man könnte fast sagen, dass die Forschungen im Bereich der Zoologie darum konkurrieren, den Menschen in ein unvorteilhaftes Bild zu rücken ...

Ich ahne, dass meine Überlegungen auf der Seite der Experten mehr oder weniger ungeduldige Ironien wecken könnten. Man kann nicht ungestraft von den Geisteswissenschaften zu den Naturwissenschaften übertreten. Aber einer der Gewinne meines zweimonatigen Aufenthalts im Wiko war eben diese Wiederentdeckung des Genusses der Naivität, die Unschuld einer gierigen Interrogativität, die Freude frei zu denken, ohne den Ansprüchen einer Kastenkompetenz entsprechen zu müssen.



UNTRoubLED PURSUITS  
VASILIS POLITIS

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I was born in Athens in 1963, and went to Aarhus in Denmark, in 1970, where I spent my childhood and adolescence. In 1982 I went to Oxford to study Philosophy, with a year spent at the Stiftung Maximilianeum in Munich, and in 1992 came to Trinity College in Dublin to teach and work, and this has since been my home. Though I have wide interests in philosophy, Plato and Aristotle are what I concentrate on. For some time now, what has been occupying me is the place of *aporia* in philosophical inquiry – *aporia* understood as the puzzlement that befalls one when, facing a certain kind of question, one is pulled in opposite directions. I have written quite widely on this, regarding both philosophers. (“Explanation and Essence in Plato’s *Phaedo*.” In *Definition in Greek Philosophy*, ed. D. Charles, Oxford University Press, 2010). I am currently occupied with a major project, which is to show that we must seriously wonder why the demand for definitions is so important for Plato; and that, if we grasp the place and role of *aporiai* in the inquiries that make up his dialogues, then we can see what motivates and justifies this thoroughly distinctive Platonic (and Aristotelian) demand. – Address: Department of Philosophy, Trinity College Dublin, College Green, Dublin 2, Ireland. E-mail: vpolit@tcd.ie

But come now, let us look at this thing together, and see whether what we have here is really fertile or a mere wind-egg. (Plato, *Theaetetus*)

It is, for reasons that are not altogether transparent to me, somewhat with a sense of shame that I confess to my uppermost thoughts and desires on coming to the Wissenschaftskolleg. For these were attached not so much to the twin prospects of sharing in a

hub of excellent Fellows from such diverse disciplines, or the delights of a German metropolis, but more private passions, concerning that man, Plato, and those irresistible if intractable questions that I had set myself for a good while: Why, and with what justification, did he keep asking “What is that?” or “What makes this thing what it is?” (for example, “What is courage?”, “What makes us have courage?”); and Why, and on what grounds, was he so troubled and torn by certain questions of a quite different form (such as, for example, *whether or not self-knowledge is possible, and, if so, whether it is of any use to one*) as apparently to dismiss even that trace of humility in his mentor, that other man, Socrates, who at least seems to have harboured some suspicions that such questions had better be left to the gods. If, therefore, true happiness lies in the untroubled pursuit of those thoughts and desires by which we are most drawn, then not only did those ten months with the Wiko present for me no less a prospect, but fulfilled the promise. For having decided that trying to answer these questions was what I was going to do, it is what I did: starting on page 1 on October 2, 2009, and finishing on page 385 exactly nine months later, in time for the Old Fellows Meeting, the End of Year Party, and leaving only winding down and preparing for departing. But this I did with the assistance of the kindness, good humour and everyday practical support of the good people in the library and kitchen especially; the happy regular distractions occasioned by friendships made among the Fellows along the way; the play, fun and noise when my two children came for their regular visits and got together with the other children in the Villa Walther; and in the company and by the side of a true scholar, constant friend and kindred spirit.

I realize now, of course, that this, our individual projects, cannot represent the principal focus of the Wissenschaftskolleg, which, once having offered us Fellows a precious and generous opportunity to attend to these in whatever way and to whatever extent each of us may wish, leaves us to get on with it while enlisting us in the communal activities and larger matters, in essence political as it seems to me, in which it properly deals; in the sure expectation, that is, that these common things will in more or less direct and evident ways feed back into and sustain those private ones. Whether, to what extent and in what ways I trust that I, through my active participation, have lived up to this expectation, I find hard to tell with much confidence or clarity when looking back only a short while after. One or two things stand out at this point with some distinctness. *That*, be it as the result of random chance, good fortune or wise forethought in the allocation of Fellows to one year or the other, I was able to share my studies more or less daily with a scholar working in a genuinely related area, and of this much I am in no doubt, that this has

made a difference to and left marked traces in my studies, in whole and in part, and beyond. *That*, quite apart from being such a thoroughly distinctive spectacle, for it is probably the most richly polyphonic academic seminar of its kind, the *Dienstagskolloquia*, those weekly get-togethers so expertly organized by the Wiko staff in which each Fellow gets a single chance to present his or her current project and interests to a critical plenum, most of whom know little if anything about the subject, not only taught me a good many particular things that I fear I will soon forget (e.g. about the life of ants, bees, dolphins; the relationship between Galileo and the figurative artists around him; what it takes to look at an ancient sculpture with any appreciation; and much more); but also stimulated in me some hopefully fertile wider thoughts (e.g. that making sense of the paradoxical aspects of quantum theory may require a metaphysical re-orientation not unlike that recommended by Heraclitus when he said that “all things are one”); as well as teaching me the following lesson: that there really does appear to be a difference in how we academics, be it in the sciences, humanities or however we like to divide ourselves, go about our core business, but that this may be a difference not so much between distinct approaches as between having a recognizable approach – a problem to articulate, a claim to defend, an argument to pull apart, evidence to collect or to assess – and not having any approach that is at all easy for an outsider to detect. *That*, finally, those same good natural scientists, and friends, whose methodological acumen stands out as a model when they are working squarely within their discipline (I have, on that account, resolved from now on regularly to attend science lectures at that end of College) appear to be at a loss of compass or direction when it comes to such more general and diffuse questions as used to be called “philosophical” (such as “What makes us human?”, the question on which a handful of us met every two weeks as part of a working group whose “findings” were presented at the Old Fellows Meeting), and to be all too ready to take hold of some momentous assumption (such as, for example, that questions such as this one are properly to be addressed, and an answer attempted, on the basis of the latest findings in evolutionary biology) of whose claim to belong within a science, or any one specialist discipline, it might be thought that there is at least a question mark; and do so not only without apparent hesitation or worry (possibly excepting for the curious excuse that the assumption may justly be adopted for methodological purposes) but with some suggestion that to think it might be questionable and that alternatives might be considered, or at least aired, would amount to intellectual suicide, or at any rate is not worth our while.



A DRAMA OF IDEAS  
MARTIN PUCHNER

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Born in 1969, Martin Puchner studied philosophy and literature at the Universität Konstanz, the Università di Bologna, and the University of California, Santa Barbara before earning his Ph.D. at Harvard University in 1998. Between 1998 and 2009 he taught at Columbia University, first as Assistant Professor and later as the H. Gordon Garbedian chair in English and Comparative Literature. Since 2010, he has been Professor of English and of Comparative Literature at Harvard University. Among his book publications are *Stage Fright: Modernism, Anti-Theatricality and Drama* (2002), *Poetry of the Revolution: Marx, Manifestos and the Avant-Gardes* (2006; winner of the MLA's James Russell Lowell Prize), and *The Drama of Ideas: Platonic Provocations in Theater and Philosophy* (2010), as well as numerous collections and anthologies, including *Against Theatre: Creative Destruc-tions on the Modernist Stage* (2006), and *The Norton Anthology of Drama* (2008). – Address: Department of English, Harvard University, Barker Center, 12 Quincy Street, Cambridge, MA, 02138, USA. E-mail: puchner@fas.harvard.edu

The book project I was supposed to work on during my year at the Wiko is called *The Drama of Ideas*, a study of intersections between theater and philosophy starting with Plato's dialogues. But because I had had to postpone my Wiko year several times, I arrived with the book more or less completed. Instead I worked piecemeal on various projects and, towards the end of the year, spent much time with a large editorial undertaking, a new edition of the six-volume *Norton Anthology of World Literature*, whose title betrays its impossible scope and explains the many attendant headaches it has caused me over the years.



At first, I was dismayed by the prospect of not having a single neat project to focus on during this welcome sabbatical from teaching and administration. But soon I began to realize that this year was going to unfold under the sign of the drama of ideas after all. Not so much the book project, which nevertheless accompanied me through talks and presentations, including one at the Wiko colloquium, but the thing itself: the drama of ideas. For it turned out that Wiko was an institution devoted to staging precisely such a drama every year.

Philosophers such as Plato pay attention to the scene, the need to create a setting amenable to the engagement of thought. Spanning a period of almost thirty years, the Wiko has become expert at creating an ideal setting for a drama of ideas. The central scene is of course the *Dienstagskolloquium*, where different dramatic actions unfold, including heated debates on method, objects of study, and modes of presentation. This year's highlights included the question posed by a primatologist to an art historian, "How do you know that what you say isn't wrong?" and the assertion that the world is a Turing machine. We also had whistling dolphins, a playing octopus, and all kinds of social insects. One biologist – yes there were *many* biologists, though who would say, *too many* (some, after all, became friends) – was dismayed by the frequent references to Plato and echoed Ford's famous dictum that "history is bunk".

Most participants were constructively minded most of the time despite sometimes trying – and comical – circumstances. Page upon page of quickly scribbled math formulas was one; humanists using PowerPoint for the first time and reading long blocks of text from the screen, another. The fact that one of us had just published a polemic against PowerPoint did not prevent such scenes, but we must have provided him with fodder for future editions of the book.

Some people feel that every play needs a grand confrontation, a *scène-à-faire*, but our drama also included less predictable constellations. One example was a discussion on method that we organized halfway through the year, which revealed a number of interesting connections, for example a kinship between biology and history, which both deal with temporal developments.

Even more important than the *Dienstagskolloquium* were the many sideshows and *entr'actes*, from luncheons and dinners to evening lectures and the many formal and informal discussion groups that formed throughout the year. On the more formal end was our 1930s working group, composed of literary historians, philosophers, musicologists, and art historians; on the informal end, a *Timaeus* reading group. For my own thinking, the

most important such sideshow was a small conference I organized with Dieter Thomä on theater and philosophy, which yielded many pages of notes for future use.

In the theater, you need not only scenes and actors, you also need a director, stage managers, set designers, and much more. Here Wiko's team proved incredibly professional and enabled the 40 guest actors who suddenly descended upon them in late summer to play the roles they had been engaged to perform. Without their kind and efficient engagement, our performance would have fallen flat.

For me, the drama of ideas was not confined to the Wiko even though that remained its central location. Over the last twelve years, I had immersed myself in New York theater, with its overwhelming number of theater productions, which are arranged in several parallel universes that rarely meet (Broadway, off-Broadway, off-off-Broadway, etc.). I used this year to sample Berlin's theater world from our local theater, the Schaubühne on Ku'Damm, all the way to the Volksbühne at the Rosa-Luxemburg-Platz and Sasha Waltz's wonderful space, Radialsystem on the Spree. Berlin theater is smaller than New York theater, but it is more interconnected. One has the impression that everyone involved is watching each other, responding to each other, making fun of each other. The master of this intra-theatrical game is René Pollesch, whose theater, at once fascinating, symptomatic, and maddening, sums up for me this year of Berlin theater. Pollesch's approach to theater is to use theory – mostly a Marxist and neo-Marxist critique of capitalism – and put it in the mouth of actors let loose in a mad meta-theatrical universe. It's an acquired taste, to be sure, and after many Pollesch productions, I'm not sure I quite acquired it. But it definitely was yet another version of a drama of ideas.

My book emphasizes the tendency of the drama of ideas towards comedy. Perhaps appropriately, the year found its conclusion in the end-of-the-year party, where we did a sketch based on Monty Python's Philosophers' Football applied to the various protagonists of our very own "humanists versus scientists" drama. The Wiko show must go on, should go, and will go on – and I feel very fortunate to have been a bit player during its 2009–10 season.



ORT OHNE ORT IN DER ZEIT  
ULRICH SCHOLLWÖCK

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Theoretischer Festkörperphysiker. Geboren 1967 in München. Von 1987 bis 1993 Studium der Physik an der Universität München und dem Balliol College, Oxford, als Stipendiat der Stiftung Maximilianeum. Nach Master (1991, Oxford) und Diplom (1993, München) Promotion von 1993–95 bei der französischen Atomenergiebehörde (CEA), Saclay/Paris. Habilitation in theoretischer Physik in München 1999; Arbeitsgruppenleiter am Max-Planck-Institut für Festkörperphysik, Stuttgart, 2002/03, C3-Professor an der Ludwig-Maximilians-Universität München 2003/04, Lehrstuhl für theoretische Physik an der Rheinisch-Westfälischen Technischen Hochschule Aachen 2004–09 und an der Ludwig-Maximilians-Universität München seit 2009. Rufe an die University of California, Los Angeles, die Universität Innsbruck, und die Freie Universität Berlin. 2000 Gerhard-Hess-Preis der Deutschen Forschungsgemeinschaft, 2000 Mitglied und 2002/03 Sprecher der Jungen Akademie, Berlin, 2006 Fellow der American Physical Society, 2007 ordentliches Mitglied der Nordrhein-Westfälischen Akademie der Wissenschaften und Künste. Seit 2008 Vizepräsident des Deutschen Hochschulverbandes. – Adresse: Department für Physik, Ludwig-Maximilians-Universität München, Theresienstraße 37, 80333 München. E-mail: schollwoeck@lmu.de

Zwar hatte ich das Wissenschaftskolleg bereits einmal besucht, doch war mir klar, dass eine Führung durch die üppigen Räume des Haupthauses und der Villa Jaffé, die Bibliothek und den Speisesaal keinen wirklichen Einblick in das Leben des Kollegs geben würde, das ja – nach allem, was man so gehört hatte – vor allem um Dienstagskolloquien und gemeinsame Mittag- und Abendessen herum gebaut sein würde, von denen aus sich zahl-

reiche Verästelungen menschlicher und wissenschaftlicher Interaktion ergeben würden. Als ehemaliger Angehöriger der Stiftung Maximilianeum in München sowie eines Oxford College fühlte ich mich jedoch als alter Profi in Formen des betreuten Wohnens und blickte demgemäß dem Wissenschaftskolleg sehr gelassen entgegen. Die schemenhaften Vorstellungen, die ich mir bei Gelegenheit machte, pendelten daher auch ohne Nachdruck zwischen den Höhen und Niederungen meiner Vorerfahrungen: Mittagsgespräche über bayerisches kommunales Verwaltungsrecht – für manche eine der größten Schöpfungen des menschlichen Geistes – bis hin zur Geistesgeschichte des englischen *libertarianism*, eifrig um einen guten Eindruck und geziemlichen Gesprächsbeitrag bemühte Mitinsassen bis hin zu Fällen, die auch englisches *understatement* nur noch als „highly excentric“ bezeichnen konnte, feinste Küche bis hin zu den Unsagbarkeiten, zu denen sich Oxforder Collegeküchen aufschwingen können, gepflegte, hohe Zimmer bis hin zu zugigen, kalten Ruinen, an denen sich immer noch eine zähe Menschheit festklammert. In irgendeiner Weise würde aber das Wissenschaftskolleg eine Krönung des Ganzen darstellen, gepflegte Räume mit köstlichem Essen, interessante Konversation mit der Bekanntschaft mit ungewöhnlichen Menschen aus aller Welt und jeglichem intellektuellem Hintergrund verbinden – so, wie man sich als Student einen Oxforder *senior common room* vorstellte, in den sich die Götter des Olymp zu gepflegter Konversation bei uraltem Port zurückzogen, und der so unendlich fern erschien.

Meine Ankunft in Berlin begann gleich mit einem Höhepunkt, der Unterbringung in einem der schönen Studios der Villa Jaffé, die mir vom Geist der großen Zeit des Stadtteils Grunewald mehr bewahrt zu haben scheinen als die in den achtziger Jahren eher lieblos zu Tode sanierten (jetzt aber in Erneuerung befindlichen) Räume der Villa Walther. So war es denn auch auszuhalten, dass im strengen, endlosen Winter 2009/10 die Temperaturen auch bei Höchstleistung der Heizung nicht über 18 Grad klettern konnten ... Eine kleine Antiklimax war dann aber das erste gemeinsame Abendessen, angesichts dessen festlichen Rahmens ich mir mehr als – in der Bezeichnung verbräme – Nudeln in Tomatensoße erhofft hatte. Aber das war ja nicht der zentrale Grund des Kommens gewesen, und die reichlich vorhandenen privaten Küchen versprachen ja auch Abende des gemeinsamen Kochens mit neu gefundenen Freunden. Und bei Nudeln in Tomatensoße blieb es dann ja auch im Folgenden nicht!

Ort ohne Ort in der Zeit – genau das hatte ich mir eigentlich vom Wissenschaftskolleg erhofft. Ist es doch die zeitliche Gebundenheit der wissenschaftlichen Tätigkeit, die sie oft so frustrierend erscheinen lässt: In einem Tagesablauf, der für die meisten Professoren

durch ein Hetzen von einer Besprechung zur nächsten, von einer Kommission zur anderen gekennzeichnet ist, kann an den Universitäten kaum wirklich Neues entstehen: Selbst wenn man am Tag fünf Stunden zur Forschung hat, so sind diese zumeist wertlos, da sie in Häppchen von halben bis ganzen Stunden zerfallen und jeglicher Versuch, originell zu denken, bereits im Schatten des nächsten Termins steht. Eigene, nicht bloß delegierte Forschung ist daher an deutschen Universitäten zu einer Freizeit- und Wochenendbeschäftigung geworden, und das Wissenschaftskolleg setzt es sich ja geradezu zum Ziel, diesen Rhythmus zu durchbrechen. In der Tat, die ersten Wochen gestalteten sich in fast beunruhigender Unstrukturiertheit und Leere: Ich hatte es schon fast verlernt, mehrere Tage ohne Unterbrechung an ein und demselben Thema zu arbeiten – das hatte es seit der Doktorarbeit nicht mehr gegeben. So war ich schon fast froh um die Unterbrechung des Tagesablaufs durch das obligatorische Mittagessen, um wenigstens ein wenig vertraute Interruptionsrhythmik zu verspüren. Vielen, so schien es mir im Gespräch, war dieser Bruch schon fast zu viel, ich kann sie nur um ihre sonst, wie es scheint, noch ungestörter fließende Arbeitszeit beneiden.

Nach einer gewissen Zeit fand ich mich jedoch in den neuen Umständen gut zurecht, leider nur rechtzeitig zu den nach einer kurzen Atempause wieder einsetzenden Unterbrechungen und Ablenkungen von draußen: Da, wie es scheint, Naturwissenschaftler bei allem „publish or perish“ (oder vielleicht gerade deswegen) einer oralen Wissenstradierung immer größeren Raum einräumen, also immer weniger lesen und eher zur Kenntnis nehmen, was auf Konferenzen vorgetragen und unter vier Augen diskutiert wird, entwickelt das Karussell der Konferenzen immer höhere Umdrehungszahlen; will man wahrnehmen und wahrgenommen werden, gilt es jedoch, sich wacker an seinem kleinen Pferdchen festzuhalten. Mit der Residenzpflicht des Wissenschaftskollegs ist das vor allem für jüngere, noch aktive Naturwissenschaftler kaum vereinbar. Daraus ergibt sich das Dilemma, ob man eher jüngere, in der aktuellen Forschung aktiv teilnehmende Naturwissenschaftler als Fellows berufen möchte, deren Präsenz nur lückenhaft sein kann, oder ältere Wissenschaftler, die vor allem Leitungstätigkeiten ausüben, ihr Institut gut verwaltet wissen, daher eine sehr hohe Präsenz entfalten können, aber nicht mehr unbedingt selbst an vorderster Forschungsfront stehen. Auch die universitären Verpflichtungen werfen ihre langen Schatten: natürlich ist es nicht zwingend, an den Vorbereitungstreffen für die nächste Runde der Exzellenzinitiative teilzunehmen; niemand wird es einem nachtragen. Aber genauso wenig darf man sich dann wundern, wenn der eigene Name im Finanzplan des Antrags wenig prominent aufscheint. Auch das Leben nach

dem Wissenschaftskolleg will geplant sein, und dies führt zu schmerzlichen Zielkonflikten. Für mich persönlich am schwierigsten war jedoch die Führung meines Lehrstuhls aus der Ferne, die durch den gerade erst erfolgten Umzug von Aachen nach München nicht erleichtert wurde: Die doch sehr stark in der täglichen Diskussion mit Diplomanden und Doktoranden stattfindende Forschung in den Naturwissenschaften leidet, wenn dieser Austausch nur alle paar Wochen stattfindet und nicht durch permanente wissenschaftliche Mitarbeiter ausgeglichen wird – Postdocs, die zugleich auf der Suche nach ihrer eigenen Professur sind, können diese Lücke nur teilweise füllen, sie müssen ihre Eigeninteressen bedenken und werfen damit ein klassisches „principal-agent“-Problem, wie man es in den Wirtschaftswissenschaften kennt, auf.

Im engeren Sinne fachwissenschaftlich war dieses Jahr daher nicht produktiver als sonst, auch wenn mehrere Veröffentlichungen, darunter ein *opus magnum*, ein Review über mein aktuelles Forschungsgebiet, fertiggestellt werden konnten, genauso wie mehrere erfolgreiche Drittmittelanträge und, heute womöglich der Gipfel des Nachweises „wissenschaftlicher“ Aktivität, zahlreiche Gutachten über Drittmittelanträge, Stipendienanträge, Berufungslisten und so fort. Von letzterer Warte betrachtet war es sogar ein sehr gutes Jahr.

Letztlich war das aber alles keine große Überraschung nach mehreren Jahren Lehrstuhlerfahrung, und von Anfang an war es auch nicht meine Hauptabsicht gewesen, in mönchischer Isolation nun möglichst viele physikalische Veröffentlichungen zu produzieren. Nach 100 Publikationen erhebt sich ja doch die Frage, welcher intellektuelle Gewinn aus der 101. für die Fachwelt und vor allem für den Autor selbst resultiert. Sinn des Aufenthalts am Wissenschaftskolleg ist es in meinen Augen ja gerade, über das eigene Fach hinauszublicken und für sich und vielleicht auch für die zukünftige wissenschaftliche Tätigkeit neue Perspektiven zu gewinnen. Dies ist ein risikoreiches, nicht von beliebig hohen Erfolgsaussichten gekennzeichnetes Unterfangen, aber allemal besser, als in der *splendid isolation* des „brillanten Idioten“ zu verharren, dem sein Fach die Welt darstellt.

Als theoretischer Physiker mit geisteswissenschaftlichen (v. a. historischen) Neigungen hatte ich mir im Vorfeld im engeren fachlichen Sinn manches von einer philosophischen und im weiteren Sinne von einer geisteswissenschaftlichen Perspektive erwartet; über Naturwissenschaften wollte ich gar nicht so viel hören. Hier schienen mir die Dienstagskolloquien der geeignete Ausgangspunkt; ich muss aber bekennen, dass mir leider bei dem einen oder anderen vorgestellten Vorhaben gerade in den Geisteswissenschaften

nicht klar wurde, worin die intellektuelle Pointe bestehen sollte, warum zumindest der Vortragende von seinem Thema mitgerissen wurde und inwieweit die seit Jahrzehnten propagierte Ablösung einer eben nur vermeintlich objektiven „Wahrheit“ durch kontextgebundene Narrative nicht zu einer Art von intellektueller Beliebigkeit geführt hat, die ihre Begrenzung in einem gewissen akademischen *juste milieu* findet. Ob dieser Eindruck nur das subjektive Gemeckere eines geisteswissenschaftlich überforderten Naturwissenschaftlers, ein strukturelles Problem eines Kolloquiums, das sowohl den Fachleuten wie auch den Laien gerecht werden möchte, oder Ausdruck einer tieferliegenden Krise ist, vermag ich nicht zu beurteilen. Völlig unerwartet viel produktiver und prägender für mich war dagegen die Begegnung mit Schriftstellern, Musikern und Künstlern; ihre Neugier und disziplinäre Arglosigkeit war für mich begeisternd und hoffentlich für die Zukunft wegweisend. Noch mehr davon im Wissenschaftskolleg! Allein schon dafür werde ich das Jahr im Wissenschaftskolleg in allerbesten und dankbarsten Erinnerung behalten.

Ort ohne Ort in der Zeit: Aus der Zeit herausgefallen zu sein, hat seine eigenen Tücken. Das gilt nicht nur, wie oben angedeutet, für den einzelnen Fellow, sondern auch für eine Institution. Das Wissenschaftskolleg blickt mittlerweile auf bald 30 Jahre äußerst erfolgreicher Tätigkeit zurück, oder anders ausgedrückt: Die Zeit vom Ende des Zweiten Weltkriegs bis zur Gründung des Kollegs ist bald kürzer als die von der Gründung bis zur Gegenwart. Die Zeit, in der das Kolleg intellektuelles Leuchtfeuer einer Oase der Freiheit in der Wüste eines totalitären Unrechtsregimes war, ist mittlerweile viel kürzer als die im wiedervereinigten Berlin mit seiner neuen politischen Perspektive und anderen Problemen und Potentialen. Aus einer zentralen Lage im alten Westberlin ist eine idyllische Randlage geworden. An die Zeit, in der Grunewald ein Ort der Begegnung politischer, ökonomischer und akademischer Eliten war, wird man nicht mehr anknüpfen können; dazu ist nicht zuletzt der sozioökonomische Abstand zu groß geworden. In einem größer gewordenen Berlin und einer politischen Kultur, in der Intellektuelle bei nüchterner Betrachtung bedeutungslos sind, ist es auch kaum noch vorstellbar, dass eine solche Institution eine Art intellektuell verankerten gesellschaftlichen Mittelpunkt bilden könnte. Beim Blick in die Erfahrungsberichte früherer Jahrbücher scheint mir viel zu oft ein für Gegenwart und Zukunft der Stadt wie der Institution wenig fruchtbarer, da geistig schon erschöpfter Rekurs auf Zeiten von Krieg und Diktatur auf; viel zu wenig hingegen Fragen etwa nach der Rolle einer Stadt und eines Landes, deren Bedeutung im Rahmen globaler Schwerpunktsverschiebung abnimmt, deren Bevölkerungs- und Alters-

struktur sich dramatischer ändert als je zuvor und deren über Jahrhunderte gewachsener kultureller Kernbestand sich den nächsten Generationen kaum noch mitteilt. Vielleicht könnte das Wissenschaftskolleg hier sich und seinen Fellows neue Perspektiven auf Gastgeberland und -stadt erschließen.

Nicht unerwähnt bleiben kann der Winter des Jahres 2009/10, in der Erinnerung vieler und auch den Aufzeichnungen der Meteorologen der strengste Winter seit Menschengedenken, in dem sich eine zunächst strahlend weiße, Grunewald in ein ebenso gleißendes wie romantisches Licht tauchende Schneedecke schnell in eine zuletzt gletschergrüne geschlossene Eisdecke auf Straßen und Gehwegen verwandelte. Während diese von der Stadtverwaltung im öffentlichen Bereich weitgehend naturbelassen und vom Regierenden Bürgermeister mit lockeren Sprüchen abgetan wurde, hatten sich bereits die ersten Fußgänger teils schwerste Verletzungen eingefangen und Hausbesitzer saftige Bußgeldbescheide, die eifrige Vollstrecker in den Bezirksämtern für Verletzungen der privaten Räumspflicht verteilten. Ich denke, es war aber weniger die Inkompetenz der Stadtregierung, die andere Fellows und mich deprimierte, sondern das Gefühl des sich nicht Bewegkönnens, der fehlenden Sonne, des dauernden Frierens, bei dem sich ein Lagerkoller geradezu zwangsläufig manifestieren musste. Im Wissenschaftskolleg brach er sich Bahn in einer fast hochwissenschaftlichen Diskussion über Qualität, Quantität und Zusammensetzung des Essens, in der sich Fleisch-, Salat-, Buffet- und andere Fraktionen teils unversöhnlich gegenüberstanden. Ich gestehe meine Mitwirkung. Am Ende löste sich diese aber durch eine deutliche, von der Leitung des Kollegs veranlasste Veränderung, die dann geschickterweise auch noch mit einer deutlichen Verbesserung des äußeren Klimas zusammenfiel, in schönsten Wohlgefallen auf.

Vor allem die letzten Wochen am Wissenschaftskolleg haben mir den Abschied sehr schwer gemacht, denn der einsetzende Frühling und der Sommer weckten die Lebensgeister: Die Arbeit ging rascher von der Hand, die Gespräche unter den Fellows wurden entspannter und doch intensiver, endlich konnte man Balkone und Terrassen des Wissenschaftskollegs zu Arbeit und Gespräch nutzen, so hätte es dann doch noch lange weitergehen dürfen. Auch die Fußballweltmeisterschaft stärkte die Bande unter allen Angehörigen des Wissenschaftskollegs und wurde zu einem echten Gemeinschaftserlebnis – über die vereinzelt Unterstützer des spanischen Teams im Halbfinale wollen wir verachtungsvoll schweigen!

Ein Erfahrungsbericht sollte nicht schließen ohne die vielleicht nachdrücklichste Erfahrung, die ich wie viele andere Fellows vor mir und mit mir machen durfte: Die unend-



liche Hilfsbereitschaft, ständige Verfügbarkeit, überwältigende Freundlichkeit, die uns die Mitarbeiter des Wissenschaftskollegs bewiesen haben. Hier einzelne Namen zu nennen, würde andere ungerecht zurücksetzen, und soll daher unterbleiben. Die Professionalität des „Stabs“ des Wissenschaftskollegs setzt Maßstäbe, nicht nur für Wissenschaftler, die an deutschen Universitäten oft das Gefühl bekommen können, sie existierten um der Verwaltung willen, und daher schon sehr einfach glücklich zu machen sind. Nein, hier wird ein absoluter Standard gesetzt! Allen sei daher hier nochmals von Herzen gedankt.

*Nachtrag: Der Titel meines Beitrags lehnt sich, so mich meine Erinnerung nicht trügt, an den eines Berichts von Hans Ulrich Gumbrecht über seine Zeit im Maximilianeum in München an, den ich vor mehr als 20 Jahren gelesen habe. Für diesen Fall sei ihm dafür gedankt.*



“SCIENCE” AND “NON-SCIENCE” WORLDS  
TANJA SCHWANDER

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Born on 3 July 1978, Dr. Schwander studied Biology at the University of Lausanne with a main focus on Evolutionary Biology. During her Ph.D. (2003–07) at the same University, she studied caste differentiation in an ant species complex in which inter-specific hybrids develop into workers and non-hybrid individuals develop into new queens. During her postdoctoral training at Simon Fraser University (2007–09), she started investigating the transition from sexual reproduction to parthenogenesis and worked on the evolutionary history and population dynamics of a group of North American stick insects. The same topic is also the focus of her recent work, but for her time at the Wissenschaftskolleg as a member of the group “Social Insects as a Model System for Evolutionary Developmental Biology” she switched back to the research field of her Ph.D. – Address: Centre for Ecological and Evolutionary Studies, University of Groningen, 9751 NN Haren, The Netherlands. E-mail: tsa19@sfu.ca

I had the opportunity to join the Wiko in November for three months as a part of the John Maynard Smith prize awarded by the European Society for Evolutionary Biology. At the time I was a postdoctoral Fellow at Simon Fraser University in Canada, but I was hoping to come back to Europe in the spring (pending acceptance of a research proposal submitted to the Dutch Science Foundation). I liked the idea of a “transitional period” between labs where – in addition to working on my project at the Wiko – I could write up completed projects while being unable to distract myself with the start of new experiments. (I have a somewhat annoying tendency of generating too many different project

ideas – “annoying” because as a postdoc, the “practical parts” of the experiments usually cannot be delegated.)

At the Wiko, I joined Rob Page and Manfred Laubichler’s focus group “Social Insects as a Model System for Evolutionary Developmental Biology”. Even though the name of the focus group may suggest that it falls within the field of my previous research, it turned out to be not quite the case. When trying to explain an example of phenotypic variation, my standard approach would be to think about ultimate factors and processes, with proximate mechanisms being somewhat secondary. The aim of the focus group, however, was to integrate knowledge from developmental genetics – detailed proximate mechanisms – with an evolutionary biology framework, in order to provide a more explicit and thus comprehensive model of phenotypic evolution. And, as revealed by work on queen versus worker developmental trajectories from Rob Page’s lab, social insects can provide an elegant model for such an approach. Thus, thanks to the members of the social insect focus group, I ended up reading through much developmental biology literature – a very educational exercise. This was further extended during a workshop meeting at the Wiko, organized by the topic group, where the list of attendees, including names such as Bert Hölldobler, Mary-Jane West-Eberhard, and Ehab Abouheif, already reflects the merging of developmental biology and social insects.

Some of our discussions addressed the question of how complex gene networks and developmental cascades affect the distribution of phenotypic variation and how they could facilitate the evolution of novelties. This topic is loosely linked to a view much emphasized in recent years, that the first step towards the evolution of intra- and inter-specific variation would typically stem from environmentally triggered, developmental plasticity, as opposed to genetic variation among individuals. Thus, during one of the focus group discussions, Olof Leimar and I started thinking about where one could find explicit examples illustrating the two evolutionary sequences. We started looking for studies that documented the relative influence of genetic variation and plasticity on the expression of alternative phenotypes (for example, the queen and worker phenotypes in social insects, or male and female phenotypes in animals, or different colour morphs known within a single butterfly species). There are an almost infinite number of such studies, encompassing a wide range of organisms. The challenge was thus to find cases in which enough information would be available to infer whether, ancestrally, these phenotypes were controlled by environmental factors or by genetic differences among individuals. For this rather tedious task, we made great use of the Wiko library and we were able to

build a literature collection that included book chapters and papers from somewhat obscure journals or older periods. The task ended up being consequential enough for me to come back to the Wiko, after my three months stay, for a week in the spring, to work with Olof on transforming the literature collection into a readable review.

Maybe not surprisingly, we found that there was evidence for both evolutionary sequences. There are nice examples in which genetically determined morphs are derived from pre-existing developmental plasticity. This is the case for many conspicuous left-right asymmetries. On the other hand, there are also well-supported cases in which environmentally controlled phenotypes are derived from pre-existing genetic polymorphisms, such as the long-winged and wingless morphs in certain beetle groups. The same evolutionary sequence also seems to be typical for colour polymorphisms, even though these traits can be associated with very different adaptations. Some of these tendencies may be directly explained by the developmental cascades underlying phenotype differentiation. Some cascades are easily modulated by variable environmental conditions, others may require genetic changes to generate new phenotypes. However, a more interesting perspective than identifying the first type of cue used for phenotype control may be to predict under which conditions plasticity and genetic polymorphism are beneficial and whether the frequency and direction of transitions that can be documented in empirical systems would fit these predictions. Another approach for studying how genetic polymorphisms and developmental plasticity generate and modify phenotypic variation would be to investigate intermediate steps in transitions from continuous phenotypic variation to discrete alternative phenotypes. This would require studying taxa related to species with alternative phenotypes, but in which the trait of interest displays continuous instead of discrete variation. I hope that our literature review, once it will be published, might help attract more studies to resolve some of the mechanisms underlying transitions between genetic and environmental control of phenotype differentiation.

Relative to the interdisciplinary exchange, the Tuesday colloquia and lunches also made me more conscious about apparent differences between the “science” and “non-science” worlds. There were two points I found to be the most striking. First, it is fundamental for us not to over-interpret data and we would earn much criticism for forcing preconceptions onto empirical observations. In the “non-science world” however, the observer’s personal opinion on an ensemble of data appears to be at least as important as the data themselves, and therefore disentangling “accurate” from “wrong” is of no interest whatsoever. Second, a technical term in the exact sciences would simply be a label, with-

out any value *per se*, that conveniently shortens a description. Outside the exact sciences however, semantics can be the major focus of an animated discussion. This is nicely illustrated by a debate following a colloquium given by Klaus Zuberbühler and Vincent Janik on communication in animals. Klaus Zuberbühler demonstrated how gibbons use a repertoire of calls to inform group members about an approaching predator. While I was trying to understand whether this behaviour might be a likely stepping-stone towards the evolution of a more complex language, the ongoing debate was on whether it was appropriate or not to refer to “syntax use” in this context.

Overall, my stay at the Wiko was not only rewarding in educational terms or direct scientific output; the long debates during coffee breaks, lunches, and the colloquia also broadened my view in many ways. When leaving the Wiko, I was inspired to set up experiments in which I could implement some of the discussion topics, such that I have started selection lines for higher and lower parthenogenesis rates and set up crossing experiments designed to determine the genetic architecture underlying different colour morphs in my stick insect model system ... yet another set of exciting new experiments.



## NICHT DER TEUFEL STECKT IM DETAIL DIETER THOMÄ

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Dieter Thomä, geboren 1959, war nach einem Volontariat an der Henri-Nannen-Journalistenschule in Hamburg Redakteur beim Sender Freies Berlin, studierte Philosophie, Germanistik und Romanistik an der Albert-Ludwigs-Universität Freiburg sowie an der Freien Universität zu Berlin und lehrte nach der Promotion 1989 Philosophie in Paderborn, Rostock, New York, Berlin und Essen. 1996 erhielt er den Preis für Essayistik beim Internationalen Joseph-Roth-Publizistikwettbewerb Klagenfurt. Seit 2000 ist er Professor für Philosophie an der Universität St. Gallen. Ein Stipendium der Alexander von Humboldt-Stiftung führte ihn nach New York, er war Fellow am Getty Research Institute in Los Angeles und am Max Weber Kolleg in Erfurt. Zu seinen Büchern zählen: *Die Zeit des Selbst und die Zeit danach* (1990); *Eltern: Kleine Philosophie einer riskanten Lebensform* (1992); *Erzähle dich selbst* (1998); *Unter Amerikanern* (2000); *Vom Glück in der Moderne* (2003); *Heidegger Handbuch* (Hg., 2003); *Totalität und Mitleid* (2006); *Väter: Eine moderne Heldengeschichte* (2008). – Adresse: Fachbereich Philosophie, Universität St. Gallen, Gatterstraße 1, 9010 St. Gallen, Schweiz. E-mail: dieter.thomae@unisg.ch

Der Teufel steckt im Detail, heißt es. Ich möchte gegen diesen Satz Protest einlegen und mich an Aby Warburg halten; er soll bekanntlich gesagt haben, dass der liebe Gott im Detail stecke. Auch das Wissenschaftskolleg steckt im Detail, es hat demnach – wie messerscharf geschlossen werden darf – viel mit Gott gemeinsam.

Verlegt sich das Sakrale ins Detail, dann verliert es allen Pomp, alles Übermächtige und Unheimliche; es nimmt die Form zarter, überraschender Geschenke an. Diesen

sakralen Erfahrungen, die das Wissenschaftskolleg gewährt, habe ich mich ein ganzes Jahr lang hingeben dürfen.

Jean Paul hat einmal von den „heiligen Übertreibungen“ gesprochen, „durch welche der Mensch ins kurze Leben eine noch kürzere Freude einwebt“. So war auch mein Jahr am Wissenschaftskolleg ein heiliges Jahr „kürzerer Freuden“, die mich in dem Glauben wiegten, dass die Welt gut eingerichtet und ich mit meinem kurzen Leben in ihr gut aufgehoben sei. Wie waghalsig!

In Guillaume Apollinaires Gedichtband „Calligrammes“ findet sich ein Gedicht mit dem Titel „Il y a“, in dem in achtundzwanzig Anläufen, in achtundzwanzig langen Zeilen gesagt wird, was „es gibt“. Das Ganze gibt es nicht. So gibt es auch das Wissenschaftskolleg nicht – oder nur im Detail. Gut, meinerwegen in achtundzwanzig Details.

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Es gibt den mit Holz vertäfelten Salon und an den Wänden die verglasten Türen, die sich knarrend öffnen, als wären die Regale Schatzkammern.

Es gibt das Gefühl, in guter, zu guter Gesellschaft zu sein, wenn man die Namen der Autoren auf den Büchern liest.

Es gibt die Fahrt mit dem Fahrrad von der Ansbacher Straße in die Wallotstraße an einem kühlen Morgen und die Idee, die mich an der roten Ampel überfällt.

Es gibt den doppelten Espresso am Buffet und die besorgte Frage, der wievielte es denn sei.

Es gibt die Kohlmeisen vor meinem Fenster, die nach Körnern picken bei bitterer Kälte, und die Katze, die vorbeistreunt und die Vögel nicht erwischt.

Es gibt nach einem dieser langen Donnerstage, an denen das Schreiben sich so leicht anfühlt, als hätte man nie etwas anderes gemacht und als würde man nie mehr etwas anderes tun, die Limettenscheibe im Aperitif auf der Terrasse.

Es gibt den Salat mit Himbeeren und das Glück, beim Essen mit den richtigen Leuten am Tisch zu sitzen.

Es gibt die langen Gespräche über Schauspieler und Zuschauer, über Theater und Philosophie, die mich in dem Glauben an die Interdisziplinarität bestärken, welchen ich bei anderen Gelegenheiten wieder verliere.

Es gibt das langsam an Sicherheit gewinnende Gefühl, nun endlich zu wissen, was ich wirklich will.

Es gibt die Freude darüber, bei Francis Hutcheson die Formel „*our pursuit of their happiness*“ entdeckt zu haben; also auch die Einsicht in die herausragende Rolle, die der Sympathie, der Konsonanz, dem teilnahmsvollen Miteinander in modernen Gesellschaften zukommt; also auch die Chance, all jenen eine lange Nase zu drehen, die meinen, man dürfe den „*pursuit of happiness*“ nur aufs egoistische Eigeninteresse beziehen oder allenfalls noch auf die allgemeine Wohlfahrt.

Es gibt die große Frage, was Gesellschaften zusammenhält und auseinandertreibt, und meine übermütige Vermutung, dass aus diesem Jahr irgendwann zwei Bücher hervorgehen könnten, die dieses Auseinandertreiben und Zusammenhalten behandeln: eines über die Geldgier und eines über die Sympathie.

Es gibt die eigene Ungeduld darüber, dass keines dieser Bücher schon fertig ist, und die Geduld der Gastgeber, die ich als wunderbar großzügige Geste empfinde.

Es gibt die Erstausgaben aus dem 18. Jahrhundert, die mir mein Büronachbar zeigt, und die Ideen über *sentiment* und *sentimentalism*, die wir austauschen.

Es gibt den Verdacht, es könne eine Verwandtschaft geben zwischen Sympathie und Symposion: ein Verdacht, der nach einem Gespräch aufkommt, in dem mich jemand „*my polemical idol*“ nennt.

Es gibt die Vermutung, dass das griechische Wort für „gleich“, nämlich „*isos*“, auf das Wort „*aleison*“ zurückgeht, welches wiederum ein Trinkgefäß bezeichnet; also auch die Vermutung von der Geburt der Gleichheit aus dem Geist des Gelages.

Es gibt den Besuch im Theater und den Wortwechsel zwischen Schürzinger und Karoline, den sich Ödön von Horváth ausgedacht hat; Schürzinger sagt: „Wenn man zum Beispiel Geld hätte –“, und sie unterbricht ihn und sagt: „Geh sei doch nicht so fad!“

Es gibt eine Antwort auf die Frage, wie die Geschichte des kalifornischen Goldrauschs, der 1848 mit dem Fund des ersten Goldkorns bei Sutters Mühle ausgelöst wurde, mit der Theorie der Moderne zusammenzubringen ist; also auch endlich ein Konzept für das Buch, das ich darüber schreibe.

Es gibt den Kniefall vor der Bibliothekarin und ihr Lächeln.

Es gibt die Absicht, bei ihr das Buch auszuleihen, das man erst noch schreiben muss, und die an Sicherheit grenzende Wahrscheinlichkeit, dass sie es schon jetzt auftreiben wird.

Es gibt das wilde Stelldichein von Quellen und Texten aus allen möglichen Zeiten und Weltgegenden auf einem einzigen Regalbrett neben meinem Schreibtisch, wo sie



sich gegenseitig beschnuppern und merken, dass sie eigentlich wunderbar zusammenpassen.

Es gibt den Fund, dass Bergleute aus Cornwall bei Karl Marx, John Stuart Mill und Richard Wagner vorkommen, woraus eine ganze Menge über den kalifornischen Goldrausch, die Geldgier und die Moderne zu lernen ist.

Es gibt das schlechte Gewissen, so wunschlos glücklich zu sein, dass man all den hilfreichen Geistern am Wissenschaftskolleg gar nicht mehr den Gefallen eines Wunsches tun kann.

Es gibt die Gespräche am Kopierer und die Stärkung der Armmuskeln durch das Drehen und Wenden der Bücher.

Es gibt einen Mann in einem verglasten Büro im Souterrain, dessen kluge Vorschläge und neugierige Nachfragen sich gegenseitig übertrumpfen.

Es gibt das Augenzwinkern des Rektors.

Es gibt offene Türen.

Es gibt keine offenen Rechnungen.

Es gibt ein Ende.

Es gibt kein Ende.



WIKO-PAIDEIA/WIKO-PEDIA  
GALIN TIHANOV

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Galin Tihanov is Professor of Comparative Literature and Intellectual History and Co-Director of the Research Institute for Cosmopolitan Cultures (RICC) at The University of Manchester. His publications include three authored and five (co-)edited books, as well as articles on German, Russian, and Eastern European intellectual and cultural history. He is Honorary President of the ICLA Committee on Literary Theory and member of the Editorial Committee of Manchester University Press and of the editorial/advisory boards of several journals (*Arcadia*; *Comparative Critical Studies*; *Journal of Literature and Trauma Studies*; *Slavonica*; *Primerjalna književnost*) and publication series (*Brill Balkan Studies Library*; *The Real Twentieth Century* and *Durham Modern Languages Series*). In 2007 he was Visiting Professor of Comparative Literature at Yale University. He is member of the Advisory Board of the Centre for Advanced Studies, Sofia, and of the ERC Starting Grants Evaluation Panel. – Address: 31 Crofters Fold, Galgate, Lancaster, LA2 0RB, Great Britain. E-mail: galin.tihanov@manchester.ac.uk

The Wissenschaftskolleg zu Berlin has been an extraordinary place: hospitable, stimulating, and very generous in supporting its Fellows' academic work. I feel enormously privileged to have been able to spend time in an environment marked by such deep and unconditional respect for the freedom of individual intellectual pursuits.

The principal outcome of my stay here was the completion (minus a chapter) of a draft which will in due course become a book on post-Romanticism as a complex discursive and ideological formation that outlived Romanticism proper and helped shape the twentieth century – culturally, intellectually, and politically. For my Tuesday colloquium I

presented a portion of this draft. I also continued reading and thinking towards a book as a bundle of cultural and political discourses that have been subject to transformation and various mobilizations in modern European societies since the 18th century.

As I arrived here in October, I was still completing an edited collection on Gustav Shpet, the Russian phenomenologist who had studied with Husserl in Göttingen and upon his return wrote in a number of fields: hermeneutics, social psychology, aesthetics, and theater theory. The proofs were done in early November, and the volume appeared in mid-December 2009.

I was also engaged in the writing and editing, with Evgeny Dobrenko, of a *History of Russian Literary Theory and Criticism since 1917*, now completed and scheduled to be published in 2011. For this authoritative account of Russian literary theory and criticism, I wrote at Wiko the chapter on émigré theory and criticism of the “first wave” (1917–39) and, with Katerina Clark, the chapter on Soviet literary theory in the 1930s.

This brings me to one of the most pleasurable ongoing commitments this year: the working group on the 1930s, initiated by Boris Gasparov, also a Wiko Fellow, and convened by the two of us. The group met once a month to discuss texts and presentations engaged in rethinking the balance between ideological coercion, national myth, and various contradictory practices of the self during the 1930s. A conference emerging from our work, co-organized by Boris Gasparov, Georg Witte, and myself, and co-hosted by Wiko and the Freie Universität Berlin, took place on 25 and 26 June 2010.

My other – equally motivating – regular commitment was the working group on university curriculum reform led by Yehuda Elkana. We would meet twice a week, discussing issues germane to the current state and the future of the university as an institution, drawing on expertise from Europe, the US, and India. As our conversation progressed and matured, we were able to conclude our proceedings with a manifesto on curricular reform, to be published in two different versions (longer and shorter), with the purpose of stimulating public debate and concentrating the minds of policy makers – in the universities and beyond – on the need for change.

When I came to Berlin, I did so determined not to give in to invitations for conferences and lectures. I did on the whole stick to this promise, with a few exceptions that partly reflect prior commitments: a paper on the study of folklore at GAKhN for a conference at the Freie Universität, a paper on Tönnies and Plessner for a workshop at the Centre Marc Bloch, Berlin, and invited lectures on cosmopolitanism; semantic paleontology; Leftist Eastern European exiles in Stalin’s Moscow; and émigré literary theory and

criticism at the Philosophy Forum of the City of Vienna; the Department of Slavic Studies, University of Vienna; the Peter Szondi Institute and the Programme for Area Studies, Freie Universität Berlin; and the Slavic Departments in Göttingen, Oldenburg, Hamburg, and the Humboldt-Universität zu Berlin.

I was also very glad to attend two conferences organized by colleagues and friends at Wiko: on theater and performance theory, organized by Dieter Thomä and Martin Puchner; and on music in World War II, organized by Annegret Fauser. I should also mention the workshop on modern Indian political thought, convened by Sunil Khilnani, Rajeev Bhargava, and Yogendra Yadav; I attended some of the sessions and learned a lot.

So much for the tangible benefits and measurable outcomes. Equally important, if not more so, have been the many conversations with my hosts, colleagues, and new friends here at Wiko. The truly interdisciplinary ethos of the place makes it a marvelous environment in which to explore and question the boundaries of knowledge. The exciting discussion on 30 April 2010 (sciences and/vs. humanities) is just one example; our Tuesday colloquia have been a source of inspiration and kept my curiosity and skepticism alive throughout the year. I say “skepticism”, for I realized during my time here that fostering a productive dialogue between the (social) sciences and the humanities is an immensely difficult task that requires concerted effort and hard work over several years. Wiko has graciously planted the seeds; it is for us to persevere in this endeavor in the time to come.

Perusing early on the reports of former Fellows in Wiko’s Yearbook, I was struck by how many of them spoke of their time here as a life-changing experience. By the time I began to collect my thoughts for this report I had come to see why they might indeed have had a point. The many questions we have been asking this year – about the future of the humanities and of our universities, about the responsibilities of the educated elites, about the accommodation and transformation of knowledge in the new information society – will stay with me, urging me to remember the need to translate ideals, however imperfectly, into practice.

Let me conclude by saying that I immensely enjoyed my time here, profiting from the special brand of Wiko-paideia that envelops and nurtures the Fellows, and – equally important – from the encyclopedic curiosity and breadth of scholarship at Wallotstraße. Year after year, a true Wiko-pedia emerges in Berlin; it has been a great pleasure to be able to contribute to this live event.



CONSTRAINTS OF LOCOMOTION  
CONTROL IN EVOLUTIONARY ROBOTICS  
AND NEUROSCIENCE  
ARNDT VON TWICKEL

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Born in 1978 in Berlin; studied Biology and Neuroinformatics at the University Freiburg, at the École Normale Supérieure de Lyon, and at the University Bonn; Research Assistant at the Fraunhofer Institute IAIS, Sankt Augustin and the Group of Theoretical Biology, University Bonn; currently graduate student at the University Cologne with Professor Ansgar Büschges and Research Associate at the University Osnabrück with Professor Frank Pasemann. – Address: Institut für Kognitionswissenschaft, Universität Osnabrück, Albrechtstraße 28, 49076 Osnabrück. E-mail: arndt.von.twickel@uos.de

Being invited as a Short-Term Fellow of the Wiko, I was extremely excited to return to the city of my birth. A previous visit had shown me how productive and inspiring one week at the Wiko can be. I was determined not to miss a chance to return. But now that I had the chance I had two doubts: Firstly my wife was expecting to give birth to our first child just shortly after my planned return from the Wiko. Could I leave my wife during this exciting, yet burdensome period of time? What if birth started earlier than expected? Secondly I realized that I was going to be the least experienced and least renowned Fellow and asking myself if I could live up to the expectations of being a Fellow at the Wiko.

#### Field of Research

Seemingly “simple” motor behaviors like walking result from multiple non-linear interactions between local neural networks, muscles and sensors distributed across multiple

appendages, and more centralized “higher” neural systems and the environment. On the one hand, reductionist approaches fail to explain emergent behaviors, e.g. gait patterns cannot be explained by investigating just a single leg. On the other hand whole-system approaches pose non-trivial challenges, e.g. it is extremely difficult or even impossible to experimentally obtain sufficient data, due to the complexity of the systems under study. Therefore synthetic approaches, i.e., numerical simulations and robotic models, have become invaluable tools in motor control research. These approaches integrate data from neuroscientific, biomechanical, and behavioral experiments. Partly missing data are either given by the experimenter to test specific hypotheses or are systematically varied to derive new hypotheses.

In my research I focus on the neural control of walking in insects and humans. To this end, I employ physical simulations and robotic models driven by artificial neural networks. Neural networks are derived from biological data, designed by hand, or derived via artificial evolution. Artificial evolution repeatedly varies the structure and parameters of a neural system and on average selects those changes that improve the performance of the system with regard to a fitness function and a given context. A fitness function could reward high walking speeds in a rough environment, for example. Resulting controllers are analyzed and compared to learn about their mechanisms. In order to compare them with biological systems, it is crucial to recognize the functional constraints of body and environment, e.g. the role of muscles and how they differ in the natural and artificial system. The role of some of these constraints was the focus of my research at the Wiko.

#### Work at the Wiko

Without any institutional duties, I set myself ambitious goals for my three-month stay. Underestimating the dynamics at the Wiko, I only partly succeeded in reaching these goals. Since I was invited as a member of the focus group that had the goal of learning about structure-function relationships in motor control systems, I was enthusiastic about employing computational tools to contribute to the group’s project. First of all I had to learn that the group members’ views and backgrounds were so diverse that we could not quickly agree on specific questions that could be transferred to simulation experiments. But over time this mild disappointment turned into appreciation of the fact that less time was spent on technical details and more time on discussions, clarifying and broadening our viewpoints. To summarize our discussion, we are preparing a joint review article.

More specific ideas about meaningful simulation experiments emerged at the end of my stay and I am optimistic that at least some of us will tie in with some of these ideas in the future. I am greatly indebted to all group members, i.e., Harald Wolf, Binyamin Hochner, Frank Pasemann, Volker Dürri, and Sergiy Yakovenko, for sharing their expertise not only during group meetings but also during Grunewald walks, pub visits, and other joint activities. Especially valuable were the times that I spent with Sergiy Yakovenko, discussing until late at night about simulation techniques, the roles of central pattern generators, sensory feedback, and muscles in motor control. A jointly held Thursday colloquium taught me how to prepare presentations for an extremely mixed audience.

Apart from the interaction with the focus group, I worked mainly on two projects. First I took steps toward the integration of the approaches of two former Fellows, namely Ansgar Büschges and Holk Cruse, to shed light on the mechanisms of stick insect walking. Both of them visited the Wiko during my stay, allowing plenty of time for discussions and giving valuable advice. In a simulation study I was able to demonstrate the constraints of neural networks derived via a reductionist neurobiology approach when put into diverse behavioral contexts as used in a systems-oriented behavioral approach. The resulting paper was submitted during my stay and is currently under review. Second, I took advantage of the outstanding service of the library to review the literature about scaling constraints in locomotion control. In this context I built a detailed parameterized stick insect simulator in addition to a previously built, scaled-up robotic simulator to allow a comparison of different neural controllers in the two systems. A third project about the constraints of natural and artificial actuators in motor control I was not able to advance beyond a literature review due to time constraints.

### Life at the Wiko

Initially I planned to withdraw from social events as much as possible to concentrate on my own work. Once I arrived at the Wiko, I quickly realized that I would miss something valuable, namely the chance to broaden my view of my own research and related fields as well as of more distant fields, e.g. from the humanities. The Tuesday colloquia taught me not only how differently from the natural sciences the humanities approach research, but also how valuable a seemingly basic question can be: Asking e.g. “Why do you do this kind of research?” started heated discussions, often lasting much longer than the colloquium and the following lunch. Discussions during various meals and after

evening events (concerts, lectures ...) with Co-Fellows, former Fellows, and other guests allowed me to put my own work into different contexts and to learn about completely different research areas. Additionally, living so closely together with the other Fellows led to valuable friendships: Sharing a kitchen with Marie Farge had the consequence not only of sharing dinners, but also of frequent, hours-long discussions about science and almost anything else. On a frequent basis, Kiran Nagarkar got me out of the world of research, not only by means of his wonderful books but also with our conversations during meals. Finally, the outstanding atmosphere was not only due to the Fellows and the Grunewald environment, but also heavily supported by the fantastic Wiko staff and administration. Most wishes were almost fulfilled before I could ask.

Overall the three months that I spent at the Wiko were not only productive, but also gave me new ideas for years to come and strengthened my enthusiasm for science. I am deeply grateful to the Wiko for this extraordinary opportunity. I was sad to leave two weeks prior to my planned departure, but less sad than I would have been under different circumstances: I am greatly indebted to Kiran and Marie for convincing me to return home early – I did so just in time to attend the birth of my daughter Helene.





MY YEAR AT THE WIKO:  
A YEAR OF EXPLORATION  
AND WONDERFUL SURPRISES  
ADAM S. WILKINS

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Adam Wilkins was born in 1945 in Columbus, Ohio, USA but grew up in New York City. He graduated from Reed College, Portland (1965) and received his Ph.D. from the University of Washington, Seattle (1969), in the field of genetics. His principal current professional interest is in evolutionary biology, but since evolution touches on everything in biology, an interest in evolution is a license for thinking about many biological subjects. He has published a moderate (not huge) number of articles, including original hypotheses, in areas ranging from bacterial physiology and bacteriophage molecular genetics to eukaryotic cell biology, eukaryotic developmental biology, and multiple subjects within evolutionary biology. His books include two advanced texts, the first in developmental genetics, the second in developmental evolutionary biology. In 1990, he became the Editor of the general biology review journal *BioEssays* and served in that capacity until 2008. Since then, he has become a wandering scholar, with his year at the Wiko (2009–10) being his second year of academic vagabondage. – Address: 12 Bramley Way, Hardwick, Cambridge, CB23 7XE, Great Britain. E-mail: wilkins316@btinternet.com

Confession may be good for the soul but it can be hard on the ego. A physical parallel would be taking cod liver oil, which is good for one's health but not a pleasant experience. Nevertheless, whatever the benefit/cost ratio of the exercise, here comes Confession no. 1: I have dithered terribly in writing my "Arbeitsbericht" and it is now two months past the initial deadline. One of the reasons is that – Confession no. 2 – I am somewhat embarrassed that there is not more tangible evidence of the fruits of my efforts. The main reason for the delay, however, is that I am still not sure exactly what is wanted. "Arbeits-

bericht” translates as “work report”, which sounds sober and serious. One infers from the term that it should be an objective, fairly complete, balanced evaluation of what was achieved, along with some preliminary evaluation of its significance. On the other hand, we are told that it should be a “personal” account, with some description of what the whole experience meant to us as sentient individuals. Putting the two things together, one gathers that, on the one hand, it should be detached, factual, objective, and complete and, on the other, subjective, perhaps even a bit light-hearted, and concentrate on the things that mattered most personally. Hmmm ...

Perhaps, I thought, one can seek guidance from past reports as to what the report should be. Alas, the styles and content of last year’s compilation vary all over the place, from the totally whimsical to the academically austere. One that particularly struck me was a meditation focussed on how difficult it was to write the Arbeitsbericht. While I suspect that kind of essay was not *quite* what the Rector and governing board had in mind with their request for a report, I was deeply sympathetic.

And then there is the subterranean question: who are the intended audience? The governing body of the Wiko – to help reassure them that they had not wasted their money on this group of Fellows?; the staff – to reassure them that they had not wasted their time or been underappreciated?; future Fellows – as either encouragement to do their best or, perhaps more importantly, as a set of cautionary tales on what not to do?; or, perhaps, even ourselves, at least in part – to help us consolidate and understand the whole remarkable experience? Probably all of the above, but since the intended readership heavily influences what you write, an article for different audiences is, inherently, a difficult proposition.

But it would be cowardly to shrink from the task just because I am not sure what is wanted, what the format should be or, indeed, who the primary target audience is. I will, therefore, stop dithering, just get on with it and hope for the best. I will start by describing the work that I intended to do and what was actually accomplished and then give a few more personal words on what the whole Wiko experience meant to me.

I came to the institute intending to write a book on the evolution of the human face. I am an evolutionary biologist who is particularly interested in the ways that animal forms and individual anatomical features have evolved over time, with my last big book being on the special genetic foundations of developmental evolutionary change. And, in this regard, the human face is a particularly interesting anatomical feature of a particularly interesting animal species (us). While all complex animals have faces, that is, concentrated

anterior areas of sensory perception (specifically the senses of vision, olfaction, taste, and hearing, if you count the outer organs of hearing as part of the face), human faces are exceptional in two properties. First, we have probably the most physically diverse set of faces of any animal species (though our nearest cousins, the Great Apes, also have highly individual, hence diverse, faces). Second, we use our faces to an unprecedented degree to communicate states of feeling and intention, often in conjunction with speech. Since no other species has true language, though several have some of the rudiments thereof, the use of our faces in connection with speech is undeniably unique and a late evolutionary development, since the Great Apes have a large facial expressional repertoire.

Now, there is a large and growing literature on facial expressions, and a great deal of popular interest in this. There is also an even bigger literature on human evolution. Yet there is, as far as I know, no serious general treatment of the evolution of the human face specifically. How did the human face evolve its special properties? What were the foundations in earlier primate evolution and how did the unique features arise? It is clear, of course, that you cannot treat the evolution of the face in isolation from that of the human head as an integrated entity or from the evolution of our species in its general features. Hence, an account of the evolution of the human face would have to be embedded within the larger context of human evolution, one that explains (or attempts to explain) the special features of the face in terms of the general evolutionary trajectory of humans over the past six million years, the point when the hominid branch split off from the Great Apes lineage. Given the centrality of the face to our social interactions, its evolution, in my opinion, is a fascinating subject and could make an excellent book for the educated and curious general reader.

But, as the word “intending” two paragraphs above indicates, things did not go quite according to my initial plans. I estimate that I spent only about a third of my working time at the Wiko on this project and in the end did very little writing for it. What I did do for this project was a lot of reading and thinking, all of which was valuable, indeed essential, for getting my thoughts in order. Two things, in particular, stand out. The first is that the current evidence indicates that the lack of a muzzle in humans (a genuine distinguishing feature from most mammals and many primates) reflects quantitative alterations in various so-called molecular “signalling pathways” that have been well characterized. The shorter the period of operation of these pathways, mostly following birth, the shorter the muzzle will be. This simple conclusion will certainly require some modification, but as a first step it has value for understanding one of the two key physical features

that distinguish our face. (The other is the verticality of our face, compared to most other mammals, which reflects our larger brains, causing a rounding of the head and a pushing forward of the neurocranium.) As far as I know, however, this explanation of muzzlelessness has not been previously elaborated in the literature. Its significance? Our lack of a muzzle plays a crucial role in what and how we eat, how we speak, and not least, how we use our faces for expression. Hence, one of the new goals of the book will be to develop this idea with molecular/genetic/developmental specifics and in a fashion that will be clear for the general reader. The second area that opened up for me – though I started with some awareness of its importance – is how much one has to think about certain aspects of brain evolution, in particular certain evolved kinds of “rewiring”, in order to account for the expressive capacities of the face. What I will try to do in this part of the book is to frame the questions about the evolution of brain regional connectivity clearly while making some tentative suggestions.

In effect, I laid the foundation for actually writing the book and I hope to do that in the year ahead, which I will do at STIAS (the Stellenbosch Institute for Advanced Study) in South Africa. But how could I neglect a subject that I find so fascinating during my time at the Wiko? The answer is simple: a second project caught hold of me and would not let me go or, more accurately, I refused to let it go because of its interest and potential significance. This involved the development of a new hypothesis on the first steps in the development of cancer cells.

This is wholly different from my first project, hence perhaps a word of explanation is needed. I spent 19 years as Editor of a very broad-ranging, general biology journal (*BioEssays*). During this time, I was not only exposed to virtually all areas of biology but, of course, also had to understand what I was being exposed to. One of the many subject areas that were, at first, new to me but which I found intensely interesting was that of cancer biology. In June, 2009, two months before coming to the Wiko, I heard a talk at a conference in Israel on some work in yeast genetics that I found fascinating and that started me thinking about how cells can radically alter the regulation of their genes under certain conditions. Further discussions and reading led me to connect the yeast findings with the biology of cancer cells. By late August, 2009, just before arriving at the Wiko, I had the germ of the idea.

That idea itself is fairly simple. It is based on the fact that there are certain “selfish” genetic elements in our genetic material, our “genome”, that are termed “retrotransposons” (RTNs). These actually comprise a very large part of the genome, about 45 %

(while long-term descendant sequences of such elements, no longer recognizable as such, might comprise another substantial fraction). A key fact is that many RTNs are induced by various forms of cellular physiological stress, ranging from various kinds of (chemical or radiation) poisoning to viral infection to senescence. When induced by such treatments, RTNs often alter the activities of contiguous genes, either activating or repressing their expression. From this fact, it is easy to construct a fairly straightforward hypothesis as to how RTN activation might be the first step in the creation of cancer cells. In particular, it would help explain how various carcinogens that do *not* induce DNA damage – a fact that is not comfortably handled by the reigning paradigm in the field (the somatic mutation theory of cancer) – might act.

Initially, I felt that it would take no more than two months to work the idea up into a hypothesis paper, at which point I would submit the article for publication and switch back to my main project. In fact, it took vastly more time to do this paper and, in the end, it went through two rounds of heavy revision after submission before being accepted. Why, one might ask, did it take so much time and work? The reason is that any statement you make about cancer has to contend, immediately, with a host of related facts and ideas, either in support or in apparent contradiction. All this literature had to be explored, absorbed, and dealt with. In the end, I produced what I think is a coherent, logically argued hypothesis paper of 4000 words on the initial step(s) in cancer cell formation. That paper was published a few weeks ago (September, 2010) and constitutes the main visible output (so far) of my time at the Wiko. (The other article written and published during my Wiko year was a short, enjoyable-to-write piece on the nature of Darwin's creativity and intelligence.)

So, what exactly is the significance of what I did during my Wiko fellowship period? Sadly, it is far too soon to tell. My book on the evolution of the human face is still in the realm of potential; it is mostly yet to be written. On the other hand, the ideas have already had some public exposure through two newspaper interviews, the second of which was published in three of the major Berlin papers, and through a television interview with Alexander Kluge. Hence, even without the book as a physical fact, the project has had some use in expanding public awareness of the interest of the human face in evolutionary terms.

And the cancer hypothesis? Well, something may be logical and coherent and even seem compelling while being completely wrong. Only time, and experimental investigation, will reveal what degree of validity the idea has. My guess is that it will account for

some percentage of cancers – there is too much supporting evidence for it to be totally wrong, in my view – but the question is what percentage? If, say, it is 1–2 %, it will be at most an interesting curiosity, a sideshow to the main story of cancer. If, however, it pertains to say 30–50 % of all cancers, it will be important. And if the figure is 80–90 % or more, it will be very important, to the point of revolutionizing how we think about the disease. But, I repeat, it is too soon to tell. Even if it proves to be totally false, however – that RTN induction has nothing to do with cancer – against my intuition, the hypothesis will still have value if it stimulates a line of experimentation. Any results from such experiments would be bound to be informative. Indeed, incorrect hypotheses are often extremely valuable.

So much for the *Arbeit* side of my Bericht. Beyond the satisfaction and excitement of exploring two intriguing subjects that the Wiko year greatly facilitated, what about the human and personal side of my Wiko experience? Briefly, it was superb. If I had to characterize it as a whole, I would say that it was a year of wonderful, pleasurable surprises. First, while I certainly had looked forward to the year and expected to enjoy it, the reality exceeded all expectations. This was due, in part, to the sheer interest of the variety of different projects and the diverse set of personalities amongst the Fellows. Of course, the very structure of the activities, in particular the regular meals in which we all participated and the Colloquia, guarantee a high level of exposure to the diverse ideas that occupy the Fellows, while all sorts of interesting unexpected things invariably come into conversations. It would be an unusual meal where one had not been exposed to something new and interesting. But, equally, I would credit the staff with what makes the Wiko a special place. The staff are not only super-efficient in helping the Fellows, they also do so with warmth, friendliness, and, often, a very nice sense of humour. This was all above and beyond the call of duty. The Wiko, as a result, is a great institution without feeling at all “institutional” in the usual way.

Another surprise: how much I enjoyed learning German even as I struggled with it. This included real pleasure in just listening to the language. While I had grown up hearing my mother’s mellifluous Viennese-accented German in conversation with her sister (sadly, she never tried to teach the language to her sons), my feeling about “real” German had been shaped by exposure to too many WWII movies. As I discovered this year, the real language is actually beautiful in its tonal quality. In my post-Wiko life, I continue to study and struggle with German, but the sense of enjoyment remains. I feel deeply in-

debted to my two teachers at the Wiko, both of whom patiently endured my inadequate efforts but never failed to instruct and encourage.

A small surprise: that there was the office of Fellows' Spokesperson, with a man and a woman chosen to play this role. The job is that of a sort of shop steward, someone to handle any grievances of the Fellows by dealing with the "management". Why, I wondered, would a place as wonderful as the Wiko need someone to mediate with the institution itself? What sort of problems might require this? Well, my surprise increased when I was elected the male Fellows' Spokesperson and soon discovered that there were indeed some problems, where some mediation was needed. I did not enjoy all of this work but, for the most part, it was rather fun, helping to sort out various matters. It helped give me the feeling of contributing, in a small way, to the Wiko beyond the academic side.

Then there were the multiple surprising pleasures of discovering Berlin: the excellent (and relatively inexpensive) restaurants, the music scene (both the Philharmonie and some great jazz clubs), the art scene, the zoo, the museums, and, not least, the interesting and pleasurable simple experience of walking around different parts of the city, getting a feel for the character and history of the place. Again, I had expected to enjoy this side of things; it was just that the reality was even better than my rather pale prior imaginings. Of course, it might be said that the pleasures of Berlin are totally ancillary to and unrelated to the Wiko *per se*. But I am not so sure: somehow the city both complemented and enhanced the direct pleasures of being at the Wiko. Particularly because I was studying German, excursions into Berlin felt like a continuation of the marvellous learning experience that my year at the Wiko proved to be.

One could go on but the above is probably sufficient to convey the feeling of the experience. Briefly, I had a truly exceptional year and I am, and will always remain, deeply grateful to the staff, my fellow Fellows, and Berlin itself, for making it so.



THE WIKO – FIT FOR THE FUTURE?  
HARALD WOLF

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I studied Biology and Chemistry at the Technical University in Darmstadt and finished my Ph.D. in Zoology at the University of Erlangen, Germany, working on acoustic communication in grasshoppers. Postdoctoral training, diverse scholarships and fascinating research projects saw me working in several places afterwards, including the University of Alberta in Edmonton, Canada, the University of Konstanz, Germany, the California Institute of Technology in Pasadena, USA, and the University of Zurich in Switzerland. Since 1997 I am full Professor for Neurobiology at the University of Ulm, Germany. I studied the control of limb movement in insects and other invertebrates and navigation in desert ants, among several other topics. My interests span all of neurobiology, from the cellular to network and behavioural levels, including systems analysis and cybernetics. A common theme is the quest for general control principles. My project at the Wiko was concerned with constraints in the evolution of sensorimotor networks. Networks for motor control need to be flexible and provide adequate control on the one hand, but they should not waste expensive neural tissue on the other. – Address: Institut für Neurobiologie, Universität Ulm, Albert-Einstein-Allee 11, 89081 Ulm.  
E-mail: harald.wolf@uni-ulm.de

I hate the term “fit for the future”. It implies restlessness, produced by the constant demand to scrutinise and adjust to changes in the working environment. And restlessness is exactly what the “Wiko” strives to avoid, the Institute for Advanced Study in Berlin, or “Wissenschaftskolleg”. It rather fosters concentrated work on projects and co-operations, combined with interdisciplinary interactions and international stimulation at one’s own



pace and liberty. And that is exactly what is needed for productive and creative work, scientific or otherwise. It is also the reason why the Wiko is perhaps more necessary today than at any previous time of its existence. Today's preoccupation with competition, financial tightness, speed and fast success has often all but eliminated basic research and sustainability. The Wiko is an essential antidote here that may serve as a growing point for future changes towards more sustainable modes of scientific endeavour. This does not mean that a healthy dose of competition and a need to get things done are not essentials for successful work – rather, the correct dose and appropriate balance is the point here.

### Sustainability in a Changing Environment

Nonetheless, the Wiko is not independent of the developments in its surroundings. These impinge on it directly through questions of accountability, financial, scientific or otherwise, and through the expectations of Fellows who come from and are used to the changing requirements of scientific work all over the world. And several arrangements at the Wiko are certainly exposed to scrutiny by modern attitudes. Wiko needs to address these matters to maintain its positive function and achieve a stable existence, even in times of financial tightness and political change. I therefore take this opportunity to make a few suggestions how, in my view, lasting stability could be achieved by implementing timely ideas and organizational principles without sacrificing the essential ideas outlined above. As a Fellow, my perspective on the Wiko is necessarily limited and somewhat biased. The Fellow perspective may also be highly significant, however, since it provides the most direct view of the Institute's tangible results and achievements. I shall collate into this report not just my personal impressions, therefore, but also an overview of discussions among this year's Fellows and a few former Fellows.

Still, many points will be addressed from a natural scientist's perspective that values scientific cooperation across all generations. A more monadic approach to science is probably closer to the original concept of the Wiko, but both modes of scientific work easily coexist. And the monadic scientist – more often a humanist, I believe – will certainly enjoy the opportunity for discussion at her or his liberty. And my suggestions are explicitly intended as positive and constructive input towards sustainable future development of the Wiko. In this way, I hope it is more productive than the expressions of gratefulness and thanks that constitute much of the yearly report volumes, producing a certain redundancy – however justified and appropriate these praises are, including my vivid personal

agreement. After all, my own stay at the Wiko was most productive and enjoyable, owing to the excellent working conditions and atmosphere. Here are my suggestions, loosely arranged from Fellow-oriented to more general matters.

### Fellow Presentations

It is good practice at the Wiko not to interfere with Fellow presentations, in particular during the Tuesday colloquia. Nonetheless, a small but significant number of Fellows, and not just the younger and less experienced ones, are simply unable to provide concise and intelligible presentations. And while the other Fellows certainly provide scientific feedback during the discussion period, the mode of presentation is rarely questioned. Rather, participants in the discussions may seize the opportunity to make small co-presentations, instead of asking concise questions. In view of this unsatisfactory situation, it would appear useful to spend the first Tuesday colloquium not with a normal presentation but rather with a discussion centred on the question of how this year's Fellows want to deal with each other in the seminars. Is their primary objective to present themselves as distinguished scientists? The Fellows' mere presence at the Wiko would appear to be acceptable proof of scientific achievement and international recognition, though, would it not? Or is it the Fellow's preference to attend presentations that address them as interested non-specialists in each other's respective realm, enjoying an entertaining introduction to their respective fields and lively and unprejudiced discussions? Since the new year's Fellows will usually be innocent regarding these topics, it may be supportive for such discussion to invite a former Fellow who has been dedicated in this topic during her or his own tenure.

Some junior, and maybe even not-so-junior, Fellows might even enjoy an organized opportunity for training and practice in oral presentation. This opportunity needs to be purely optional, of course, considering that the Fellows are all grown and experienced scientists. Presentation seminars may be organized along the lines of the well-accepted German language courses. Examples of successful offers in this area are nowadays common in many universities, in Germany and abroad.

## Age Structure

There are two major aspects with regard to age structure. First, the composition of Fellows is perhaps just about right with an average age of about 55, and the extremes ranging from the early thirties to the early seventies. Intense exchange among different age groups appears highly desirable for Wiko Fellows, not least because such opportunities are rare elsewhere in academia and usually not actively supported. And I consider the transfer of the modes of scientific approach across disciplines, and of methods and attitudes across the generations, a major task of the scientific community. With the concentrated and often quite isolated work modes in modern science, this task may be all but forgotten. This lends particular importance to institutions such as the Wiko. It thus appears important that a class of Wiko Fellows not be composed of Fellows mostly within their last decade before retirement. Although such individuals are normally highly experienced and productive, the tendency to be reclusive is also more pronounced in such an age group, and, as noted above, exchange with young scientists is stimulating and serves the continuity of scientific endeavour across generations.

A second aspect regarding age structure is actually problematical. It concerns the audience of public lectures at the Wiko. The audience is sometimes dominated by persons who are not within a decade *before* but within a decade *past* their retirement, or beyond. And while I have not the slightest caveat against that age group *per se*, there are two aspects that make this situation indeed regrettable. First, the above-mentioned exchange with younger scientists and perhaps students might have an excellent forum in such public lectures and presentations. This chance is lost with today's average audience, whatever the reasons for the age structure may be in detail. This is all the more unfortunate in view of the restricted public outreach of the Wiko, see below.

Second, while interesting and fruitful discussions may indeed occur after public lectures, there is equally often a notable insistence, stubbornness and sometimes even a lack of realism in participants in public discussions. This is a situation I have never encountered before, and which I am inclined to attribute to the complacency of a small but insistent minority among participants, clinging to perceived entitlements in dominating discussions. From this perspective, it would be highly desirable to make a serious attempt at rejuvenating the audience of public lectures at the Wiko. More directly and easily, a friendly but determined chairperson would be able to supervise and steer discussions into productive realms.

## Fellow Selection

Among the Fellows at large, as well as among persons outside the Wiko who are familiar with the institution, the criteria for and processes of Fellow selection are unknown to obscure. Naturally, this may give rise to questions and doubts in cases where individual Fellows are perceived as being below average in their performance, their publication record or whatever aspects may have incited a particular scrutiny. Instances of scrutiny may appear among the Fellows of a year's class and from previous Fellows, but they are more common among colleagues outside the Wiko. What is clearly needed to avoid such ominous scrutiny, be it based on envy or fact, is more transparency of the Wiko proceedings in Fellow selection. While a lack of transparency and the resulting questions regarding the quality of Fellow selection jeopardise the reputation of the Institute for Advanced Study, transparency based on a clear set of rules, proceedings and criteria that guarantee quality will certainly strengthen international standing. A comprehensible mode of input control based on quality and transparency is essential for an institution where output control is virtually impossible, or may actually be counterproductive (see initial notes on restlessness). Quite apart from the fact that output control is pervasive nowadays and has more often than not proved rather unsuccessful.

I have no doubt that the procedures employed by the Wiko for Fellow selection are based on quality and are basically objective. What is needed is primarily an effort to make procedures and responsibilities explicit. And nobody would reasonably expect 100 % success in selecting excellence anyway. It is well established in other organizations dealing with excellence, in Germany particularly the "Studienstiftung des Deutschen Volkes", the "Alexander von Humboldt-Stiftung" or the "Junge Akademie", that an error margin of close to 20 % is almost impossible to undercut. Of course, this is true only for organizations that have a veritable interest in promoting excellence, in contrast to the inflationary and pervasive use of the term in present-day education and research policy, which in reality refers to larger clusters of upper mediocrity. In fact, the occasional failure may, and should, be taken to evaluate, to learn and to keep selection procedures flexible. Failures cannot be avoided, and realizing this fact allows the leeway and freedom necessary for creativity, an asset that outweighs any minor mistakes. From this perspective, the above-mentioned transparency does not imply that, within a given set of procedures, there is no allowance for criteria that are inevitably subjective. Many important personality traits that are essential for successful tenure at the Wiko fall into this category.

## Interdisciplinary Projects

While the international and interdisciplinary composition of the Fellow classes is an important requirement of the Wiko, actually integrating different disciplines and building interdisciplinary work groups is not easy. When putting together 40 Fellows from different disciplines for a year, interdisciplinarity will not normally emerge spontaneously. The Fellows will certainly enjoy social interaction; and within disciplines and particularly within focus groups, there is normally good to intense exchange and cooperation. True intellectual and interdisciplinary scientific interaction is more difficult to achieve, though. The interactions within disciplines and focus groups may be considered to suffice in this situation, particularly when supplemented by the fortuitous contact between disciplines, as is brought about by the occasional personality fit and overlap in interests outside the scientific speciality.

A more organised support of interdisciplinary exchange and cooperation may appear desirable, however. A possible means of achieving such a goal may be the advance advertisement and solicitation of possible interdisciplinary discussion groups or even projects. While the eventual outcome of such ideas will have to remain open until the class commences, the very presence of advance alerts should put the frame of mind of the future Fellows in desirable directions. More concentrated support for *ad hoc* initiatives by the Fellows is an avenue that may be fruitful during the academic year, dependent of course on the emergence of such initiatives. The “human uniqueness” group initiated by Steven Lukes in 2009/10 is a good example of such an initiative, including philosophers, linguists, biologists and physicists, to name just the regular participants. This initiative may have thrived even better with “online” support from the Wiko. Another option is in Fellow selection, where individuals may be preferred who possess proven interest in interdisciplinary work.

## Focus Groups Across Several Years

In my view, it was a major advance in Wiko policy to establish focus groups that allow several scientists to work together on a common theme. This not only strengthens interdisciplinary research, depending on the composition of a given focus group, but also allows intensive interactions on an everyday basis that is not possible in other settings. This should significantly increase productivity, too, as it has done in the past, since the Fellows

of a focus group feel bound by their membership to that group and tend to invest a steady and reliable contribution over the academic year. I propose to use these advantages of the focus group setting by extending the tenure of a given topic across several years.

This does not mean that the individual Fellow should stay longer than the 10 months of normal Wiko tenure. Such extension of individual time slots is probably neither productive nor possible to arrange with the home institution of the respective Fellow. Rather, I envisage the topic of the focus group continuing and the Fellows of subsequent years interacting before and after their respective tenures at the Wiko. Such extension of focus group topics may be particularly useful in the case of current “hot spots” in the natural sciences, and in lucky cases it may allow the early identification of important emerging research fields. Such topics would be suitable to raise Wiko’s reputation in the realm of natural sciences, the extended time schedule would allow continued and significant progress that is noticed in the scientific community, and more visible foci would increase the incentive for prospective Fellows to participate. The latter aspect is particularly important in the natural sciences, since here Fellows are notoriously difficult to recruit. Younger scientists in their earlier career stages in particular have “more important” things to do than join the Wiko for an academic year. To do this, they would have to abandon their labs, their work groups and the scientific connections they have worked hard to establish and possibly their families. Enhancing Wiko’s reputation in the natural sciences and taking measures to increase visible progress would thus appear to be important parameters that may facilitate the recruitment of promising young scientists. The selection of “hot spots” would also make it easy to abandon the particular topic after three to five years. After such a time period, former “hot spots” are usually firmly established elsewhere or have gone cold.

Thus, while the Fellows should stay no longer than their normal academic year, exchange with the Fellows of the same focus group from the other years’ classes needs to be fostered, not just by e-mail contact but also by the occasional seminar or talk invitation.

What is further needed to achieve continuity of extended focus group topics is supervision regarding organization and perhaps content by a mentor Fellow. Such a mentor would be the person who organizes the focus group, contacts potential Fellows and keeps track of developments over the years. The mentor would thus need some administrative support from the Wiko and additional benefits that would make her or his efforts worthwhile. Possible remuneration, which would also help the extended focus group idea *per se*, would be the status of permanent (mentor) Fellow during the tenure of the focus group

topic. This would allow the mentor Fellow to join the Wiko for one academic year completely and otherwise provide contributions through regular visits. These latter visits may even be used to provide further functions and responsibilities at the Wiko.

I could imagine such extended focus groups concentrating on junior scientists, which may indeed be essential if foci are on current topics or even emerging “hot spots” of research. To make the Wiko setting attractive for these people, additional efforts are necessary, for instance, timely computer hardware and software, and the software tools necessary for the respective research focus. Further, common computer rooms and work rooms may be highly desirable to enable discussion and joined work on computer models. After all, one has to realize that natural scientists in particular have to leave their labs to join the Wiko, unless the focus is on theoretically oriented topics and computer modelling.

What must not be forgotten in all these focussing efforts, though, is that focus group Fellows need to be normal participants of the Wiko community. And there may be a problem because the Fellow group should not increase beyond 40 people, otherwise the productive social and scientific atmosphere is in jeopardy.

#### Funding of Fellow Activities

There appears to be too little funding for activities of the Fellows in any given year. Whatever the reason for the perceived financial tightness, there will always be limits to the funds that may be invested in the organization of workshops and seminars and the invitation of speakers from Germany and abroad. In this situation, activities should be limited in number and size to an extent that each individual activity can be supported appropriately. There is nothing more awkward for the Wiko or for the Fellows working at the Wiko in a particular year than the organization of seminars and similar activities where invited speakers, perhaps even keynote speakers, have to pay their own travel expenses, their meals in the course of final farewell gatherings or the like. Any stinginess at this point may harm Wiko’s reputation in Germany and abroad. And after taking all the effort of selecting, inviting and accommodating the Fellows, some additional funds would appear well invested to further their work through the invitation of external contacts. Of course, healthy competition for funds is necessary (not least since there is always some limitation). But the conditions for fund applications, the criteria for fund distribution and the possible amount of support that may be provided need to be clear right from the beginning. Only in this way are the appropriate planning and execution of events possible

that will satisfy both participants and Wiko Fellows. For any given event, grants should be large enough to cover all essentials and a few not so essential expenses, rather than spreading insufficient grant money across too many events.

### External Contacts and Outreach

Contact between the Wiko and other Berlin institutions, ranging from the three universities to the Max Planck Institutes and other organizations, is somewhat unsatisfactory. Developing and perhaps slightly formalizing interactions with these institutions might increase the attractiveness of the Wiko for natural scientists, as well as for topical humanities researchers. Fellows newly arriving at the Wiko are often quite innocent about the research areas and specialities present at other Berlin institutions. Had they known in advance which possibilities exist, they might well have established fruitful and lasting contacts. Thus, an individualized listing of potential contacts, including researchers' names and institutions, might be provided for new Fellows well before their arrival, enabling advance contacts. Of course, Fellows differ in their attitudes, and many may prefer not to be bothered with such things and rather concentrate on their isolated projects. But this effort is certainly worthwhile for Fellows who are interactive and relish co-operations but just do not have the time to gather the necessary information beforehand.

Contacts with Berlin institutions may further be fostered by establishing a schedule of external talks and seminars by Wiko Fellows, at the particular Fellow's discretion, of course. I would expect that such activities will be welcomed by many Berlin institutions, provided they are well-organized, well-advertised and touch on a nerve of current research interests. I would consider such activities particularly worthwhile where younger scientists and students become involved. After all, this age group contains the people who will in the future participate in scientific and political decisions concerning the Wiko, from its scientific activities to its financial endowment. Such external presentations need not put undue extra stress on the Fellows (and as with other activities and distractions, they need to be optional, although early planning will be essential). Just one presentation per Fellow would already provide a weekly presence of the Wiko at Berlin institutions. And some of the topics that have no major audience at Wiko events may be relocated to places where more people will attend.



## Sustainable Use of Wiko Assets

The Wiko has many assets, a number of which appear not to be used fully and some not at all. These assets include the literature and other works provided by former Fellows and stored in the library and the main building. These resources are accessible by the former Fellows' names and years of residence. To my knowledge, though, there is no catalogue that would allow access by subject area or key words for use in scientific context, except the monographs in the Fellow library.

More important assets are the expertises and personalities represented by the body of former Fellows. Except for the "Fellow Club", I am not aware of any Fellow or alumni network that might utilize these resources. And these are important resources indeed. For instance, counselling may be welcome with regard to possible future directions of Wiko activities or even in the selection of future Fellows. The Wiko might further, and perhaps more importantly, provide a database for other purposes, ranging from requests from political entities for counselling and expert judgement to the review of initiatives in science policy. After all, the former Fellow database will contain internationally recognised specialists in most areas of science and the humanities. A tightly knit alumni network and the data base for its maintenance would make such resources available to past and present Fellows and to the scientific and political community at large. It could further outreach to Berlin science and younger scientists. A brilliant example in this context is the Former Fellow Network of the Humboldt Foundation, which may well serve as a template for future activities of the Wiko in that direction. The Humboldt Foundation is able to keep its former Fellows in truly productive contact, certainly for a particular research area and its surroundings, but in many cases actually in an interdisciplinary, international context.

## Evaluation and Accountability

Evaluation procedures are a common and inevitable element of contemporary science, research and education. And while such evaluation efforts often proved counterproductive as far as scientific creativity and student education are concerned, for example, by misuse for the implementation of fiscal policies and economisation efforts, they are inevitable elements of academia. It is thus surprising that many of the parameters used for current evaluation procedures and benchmarking are unavailable for the Wiko. First, this

situation cannot last anyway. Second, and despite the above reservations, some of these data may actually be quite useful for an analysis of the current situation by the Wiko and its Fellows, as well as by future Fellows and external science organizations. It would appear desirable, thus, that some key parameters are publicly and easily available, for instance, funds spent per year and per capita, and publications per year and per capita emerging from the Wiko over the years. Even more important are organizational structure, decision levels and responsibilities at the Wiko and, more significantly, of Berlin and federal German science policy levels concerned with funding and steering the Wiko (although the latter are at least formally known, of course). Lack of such information is all the more surprising, as it appears certain that the Wiko would fare well indeed, based on the information available. For example, the number of publications produced by a Fellow from the natural sciences during her or his tenure at the Wiko, including the publications that appear during the following years if they were instigated during the Wiko stay, will certainly exceed the average number of publications of scientists in related fields at universities or even at Max Planck and comparable institutes. I imagine, therefore, that publication of at least the standard evaluation parameters would indeed increase Wiko reputation and its national and international visibility.

### Management Issues

One of the primary assets of the Wiko is the staff members, who are competent and extremely supportive; and they all feeling responsible if approached with a query, even if it is not within her or his field of work. This atmosphere is certainly one of the main factors for productivity at the Wiko, next to the opportunity for unrestrained work. No improvement is desirable here, or possible. This very positive overall impression notwithstanding, some Fellows and staff feel the need for adjustments to present-day standards where organization and infrastructure are concerned.

Just a few examples: With the advent of computers and digital databases, the use of scientific literature has changed considerably. Historians often, though by no means exclusively, still depend on the availability of historic or even ancient books and handwritings, which need to be accessed through library services. Modern natural sciences, by contrast, will soon depend entirely on electronic resources that are available through the Internet, usually again via library services. Accordingly, work in libraries, and in offices in general, has changed dramatically over the past years. While the classical librarian is still

necessary, as are transport services, book scanning and cataloguing resources, even though on a reduced level, new challenges have arisen. For example, the modern electronic resources in natural sciences require personnel who are not just familiar with electronic book catalogues, but also possess software and programming skills to extract relevant and possibly personalised information from the internet and assorted library services. What would appear highly desirable for Wiko Fellows, for example, is a regular, and preferentially automatically updated, table of contents (TOC) of those scientific journals that are of interest to that particular Fellow. Such a service has recently been implemented at the Wiko, very much to my personal satisfaction. Its continued maintenance and adaptation to future developments remains open, as far as I know, partly due to the lack of appropriately trained personnel.

A similar situation exists with regard to computer services. While the computer service staff are extremely dedicated and helpful, the available software and hardware are often dated. Naturally, this is of marginal importance for scientists whose work involves mainly word processing, but it may be pressing for natural scientists who work with computer modelling.

Of course, managing changing resources and requirements with a given number of staff who have been trained in the past is a common problem for many organizations. This also means that there are common and tested solutions, some of which may be applicable to the Wiko, such as training schemes and external consulting. This is particularly true when considering the benign, supportive and interactive atmosphere among the Wiko staff. Nonetheless, the administrative heads of the Wiko have to initiate, instigate and accompany necessary changes.

In summary, the above observations and ideas are intended as suggestions for organisational updates and other potential improvements. Further improvement may be difficult in some instances, though, considering that the starting point is already excellent. Above all, the suggestions are made from a deep affection for the Institute for Advanced Study in Berlin and a genuine interest in its continued prosperity.

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Just for the record, and having commented on accountability above, here is a list of how I spent my time at the Wiko in terms of science productions.

## Publications

- completed, prepared, or initiated at the Wissenschaftskolleg zu Berlin
- Eberhard, M. J. B., D. Lang, G. Metscher, G. Pass, M. D. Picker, and H. Wolf (2010). “Structure and sensory physiology of the leg scoplopidial organs in Mantophasmatodea, and their role in vibrational communication.” *Arthropod Structure & Development* 39: 230–241; doi 10.1016/j.asd.2010.02.002
- Wittlinger, M. and H. Wolf (2010). “Distance estimation in desert ants, *Cataglyphis fortis* – the optic flow factor.” Abstracts of the 9th International Congress of Neuroethology, International Society for Neuroethology, Salamanca, Spain, P140.
- Wolf, H. and N. Schmid (2010). “(Re-)Adjustment of foraging site approach by desert ants, *Cataglyphis fortis*.” Abstracts of the 9th International Congress of Neuroethology, International Society for Neuroethology, Salamanca, Spain, P139.
- Wolf, H. “The Wiko – fit for the future?” In *Wissenschaftskolleg zu Berlin – Institute for Advanced Study Berlin. Jahrbuch 2009/2010*. Eigenverlag. ISBN 978-3-934045-12-5.
- Bußhardt, P., S. Gorb, and H. Wolf (submitted). “Using muscle while hanging around: How stick insects employ their claws for adherence.” *J Exp Biol*.
- Bußhardt, P., H. Wolf, and S. Gorb (submitted). “Adhesive and frictional properties of tarsal attachment pads in two species of stick insects (Phasmatodea): Comparison of smooth and nubby euplantulae.” *Zoology*.
- Wolf, H. (submitted). “Odometry and insect navigation.” *J Exp Biol*.
- Wolf, H. and S. Harzsch (manuscript finished). “Serotonin-immunoreactive neurons in the scorpions’ pectine neuropils: similarities to insect and crustacean olfactory centers?” *Zoology*.
- Dürr, V., B. Hochner, F. Pasemann, A. von Twickel, H. Wolf, and S. Yakovenko (in preparation). Working title: “Neuromuscular organisation, control hierarchy and mapping strategies in animals and animats.”
- Wolf, H., M. Wittlinger (in preparation). “Orientation and navigation experiments in (desert) ants – a field manual.”

## Research projects

– initiated during the time at the Wissenschaftskolleg zu Berlin

In cooperation with Dr. Frieder Mayer, Museum für Naturkunde Berlin: “The hexokinase enzyme – temperature sensitivity in sibling grasshopper species; a possible metabolic drive for speciation?” (working title).

In cooperation with Prof. Dr. Frank Pasemann, University Osnabrück: “Modelling the locust flight oscillator – evolution of segmental versus monolithic network structures” (working title).

In cooperation with Prof. Dr. Frank Pasemann, University Osnabrück: “Modelling the locust flight oscillator – disagreement with physiological experiments, interruption of connective and commissural pathways, as a source of network information” (working title).

Grant proposal “The use of environmental cues in biological and perceptual synchronisation” with the HFSP (human science frontier program) LIP000512/2011 (declined in July 2010; alternate funding opportunities shall be considered).

## Oral presentations

– at German Universities and the Wissenschaftskolleg zu Berlin

“Insect science, movement control, and navigation.” Fellow presentation, Wissenschaftskolleg zu Berlin, Institute for Advanced Study Berlin.

“Motor control in insects – the example of locust flight.” Humboldt-University Berlin, Institute of Biology.

“How do desert ants navigate? Strategies to find a goal without external orientation marks by combining idiothetic, anemotactic and olfactory clues.” Christian-Albrechts-University Kiel, Department of Zoology: Functional Morphology and Biomechanics.

“The scorpion pectine neuropils – centres for olfactory processing with intriguing similarities to insect and crustacean olfactory lobes.” University Greifswald, Institute of Zoology and Museum.

“Animal Migration: physiology, evolution, performance – a brief overview.” Fellow presentation, Wissenschaftskolleg zu Berlin, Institute for Advanced Study Berlin



## CROSSING THRESHOLDS TOGETHER YOGENDRA SINGH YADAV

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Yogendra Yadav is a Senior Fellow at the Centre for the Study of Developing Societies (CSDS), Delhi since 2004. He is Founder Convenor (1995–2002) of the Lokniti network and the founder Director (1997–2003) of Lokniti, a research programme on comparative democracy of the CSDS. Educated in Sriganganar (BA, Rajasthan University), Delhi (MA, JNU) and Chandigarh (M.Phil., Panjab University), he taught at Panjab University Chandigarh (1985–93) before joining the CSDS. Professor Yadav's areas of interests include democratic theory, election studies, survey research, political theory, modern Indian political thought and Indian socialism. He has co-authored *State of Democracy in South Asia* (OUP, 2008) and co-edited (with S. Shastri and K. C. Suri) *Electoral Politics in Indian States* (OUP, 2009). He has also co-authored (with A. Stepan and J. Linz) *Crafting State Nations: India and Other Multinational Democracies*. John Hopkins University Press, 2011. He has been involved in designing and coordinating the National Election Studies, the most comprehensive series of academic surveys of the Indian electorate, from 1996 to 2009. He is one of the General Editors of *Loḳchhintan* and *Loḳchintak Granthamala*, and is on the International Advisory Board of the *European Journal of Political Research*. He is the Editor of *Samayik Varta*, a monthly journal published in Hindi. – Address: Centre for the Study of Developing Societies, 29 Rajpur Road, 110054 Delhi, India.  
E-mail: yogendra.yadav@gmail.com.

As Wiko's ever-so-gentle reminder prodded me into writing my much-delayed report, I found Sufi, our 11-year-old daughter, working on her school assignment. Asked to write an essay on crossing "thresholds", she was reflecting on her experience in Berlin. Sufi

writes about her fears of “going to a foreign and unknown land” and how she decided to face the challenge, for “what was life without difficulties and adventures?” (Her decision? I thought Madhulika and I took the decision! But then parents know so little about how children negotiate the world laid out for them.) She found that negotiating a new country was only one of the thresholds, that “there were millions of thresholds yet to be crossed, some of them might have been ordinary for adults ...”

This set me thinking. Were some of these thresholds as “ordinary” for her parents as our daughter imagined these to be? I had travelled in many parts of the world, but then there is a world of a difference between the airport-hotel-conference-airport routine and setting up a home outside your small world. Madhulika was more experienced than I was. She had spent a year in the UK and was in any case the more catholic and socially wiser of the two of us. I was hopeless. A year in the “first world” was as much of a challenge for me as the thresholds my daughter had to cross. The prospect of social encounters in an alien cultural code was as threatening as the academic exchange exciting. Negotiating alien food with forks and knives (all my life I had made fun of Indians who use knives and forks to eat their *dosa* or *rice and daal*), while making polite conversation, was not my idea of a good meal. I love to shop for vegetables and fruits, but had never done it anywhere but in an “open market”. We needed at least one Indian meal every day and wondered if we could find all the ingredients in Berlin. Besides, none of us had experienced serious snow.

I was not that nervous on the work front, but there were some anxieties nevertheless. I had earlier been to Wiko for a week and had heard a lot about its wonderful environs. Sunil Khilnani and Katherine Boo had convinced us that a stint at Wiko would give us the kind of break we desperately needed. I had been working non-stop on Indian elections for nearly two decades. I was involved in setting up a data bank, a research programme and a network of scholars working on Indian politics. The very success of this effort was threatening to consume my intellectual life. My resolutions of going back to my earlier work on political theory were beginning to sound false to my friends. An invitation to do what I pleased is exactly what I needed. I wanted someone to give me time not for more of what I had already done, but for something that was no more than a promise. Yet I was not sure if I would be able to live up to my own promise.

Madhulika had done more teaching than was good for her intellect and had finally been granted sabbatical by her university. Having published her first book amidst a heavy teaching load and against all odds, she needed time to reflect upon her future line of

research. She was assured by how warmly Wiko related to the academic spouse (she had already fallen to Wiko charms during a one-day visit to Berlin the year before). This was indeed the consideration that tipped the scale for Wiko over any other place. But she was not sure how this welcome would translate into time, space and support for her own academic work.

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Sufi's story ends on a very positive note, of someone who managed to cross the threshold on her own. Indeed she did. She not only learnt to travel to school easily with her younger friend Zofia, but also learnt to use her cell phone to ask whether she could pick up groceries on the way back! She used the year to not only pick up *Deutsch* quite well, but also to nurture her English and a love of reading with Ms. Wood, her teacher at Nelson Mandela School, who might well prove to be the most influential teacher in her life. She had difficulty making friends though – the cultural barriers proved real there. But the love and appreciation she received from the adults at Wiko and Villa Walther were a great source of succour for her. Probably the most wonderful moment for her was when Wiko so warmly enabled a celebration of her birthday at the Wiko restaurant, which she had so come to like through the Thursday *Familienabend* there. In a way, it did turn things around for her friendships, too, so all was well that ended well.

Sahaj, our 6-year old son, does not write yet, but if he did, his story would have been as positive. He learnt to speak *Deutsch* fluently, initially when little Max practically adopted and helped him with the language; later he was indulged as much by all the German speakers at Wiko. He made a host of new friends and learnt for the first time what it was to part from them. Being and travelling in Europe created a real curiosity about the world and he became best friends with the atlas. This friendship came to fruition during the World Cup, when he learnt of each of the participating countries. Germany had proved to be the perfect place for him to nurture his love for football, but best of all was his experience of watching the matches at the Wiko. His ability to pronounce Schweinsteiger's name correctly even won him a reprieve for supporting Spain against Germany!

The children crossed their thresholds memorably, but what of their parents? Some obstacles were overcome thanks to Wiko. The most daunting, that of the choice of school, was wonderfully taken care of by Andrea Bergmann. She knew that the bi-lingual Nelson Mandela School would be perfect for Sufi and constantly reassured us that Sahaj would



settle in very nicely at the *Vorschule* in no time. Everyday matters at Villa Walther were taken care of admirably by Daniela and Dennis. Michael was unbelievably responsive to all requests, down to the last day of packing. At the Wiko, we will remember the unfailingly pleasant Vera, who made a routine wander into the Wiko a pleasurable one and Frau Klöhn and Frau Speder who innovated endlessly to feed an Indian vegetarian. The entire IT-department cheerfully responded to every request, from recovering and converting files on the computers to setting up Indian DVDs for the children. Wiko even arranged early snowfall, frozen lakes and the coldest winter in a long time to make all our stereotypes of white European winters come true! And we loved it.

At Villa Walther we discovered a real international community. Wiko had recognised that it was important for the academic to be clearly linked to the social. The Villa, where most Fellows resided with their families, was a great space that enabled this. Fairly early on we were able to share the delights of our festival of lights, Diwali, with everyone. Soon thereafter, we learnt of how some of the fervour of Christmas was built on the baking of cookies and the plurality of European cultures around Christmas! Maria Lange's ability to organise activities around Christmas time that involved many of the children along with her little ones was particularly valuable for us, because that is where we understood many of these niceties. The space the children shared their play in helped them learn about each other and especially ours discovered "American" Indians! The mutual support and concern that people gave easily, on the basis of each other's requirements rather than shared cultural norms, was a discovery too. So Jenny, Kate, Martin, Maria, Tani, all formed a part of the "spouses" support group we could call upon at a moment's notice.

We had been warned by one of our friends, that Berlin might not be quite the "Weltstadt" we were more used to travelling to and the anxiety most of all was about finding Indian stores. While we found enough of those to keep us going happily, we crossed another wonderful threshold here – that German bread had such variety and was so delicious and the Turkish open markets offered options aplenty!

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On the academic front, it took me time to discover how best to use my freedom. More time was spent than I wanted in clearing the pending work that I brought with me. This included a paper with Suhas Palshikar on the parliamentary elections in 2009, which was instantly published in the *Economic and Political Weekly*. Then I spent a few weeks on a

book manuscript with Juan Linz and Alfred Stepan. This took longer than I had anticipated, but the book, *Crafting State-Nations*, had gone to the publisher by the time I left Wiko. I had started making some progress on my main project at the Wiko, a book on Indian elections/democracy. I collected material and held long meetings with my collaborator, Dr. Alistair McMillan from the University of Sheffield, thanks to Wiko's willingness to host him twice. I could have done more on this long-term project, but gradually something else took priority.

In my proposal to the Wiko I had mentioned a minor project, an article on an Indian socialist thinker, Rammanohar Lohia, who had studied in Berlin during 1929–32. As I plunged into Lohia, I got more and more involved in his ideas. I accepted an offer to guest-edit a special number of the *Economic and Political Weekly* on Lohia. As I started hunting for some of his early works, I found a real partner in the Wiko library staff. They brought me actual copies of the *Congress Socialist*, a journal brought out by Lohia and his comrades in the 1930s. They dug out some of his articles, some in British libraries that no one had found so far. Above all, Frau Buck found the crucial file on him in the archives of the Humboldt University and accompanied me to access and to translate it. This encouraged me to plan his Selected Works, now in an advanced stage of preparation. Thus Lohia became my pretext to return to political theory.

I must confess that I approached the Tuesday colloquia as an institutional have-to. Soon it grew on me. I looked forward especially to the talks (and those enviable Power-Points) of my colleagues working in the natural sciences, especially biology. A sense of how scholars from different disciplines treated their "evidence", how they argued their case and what they took for granted was an invaluable instruction for me. Arguments with my "grand-teacher" Steven Lukes (he taught Rajeev Bhargava, who was my teacher) were illuminating, if sharp. The Curricula group opened a fresh window for me. It enabled me to connect my polemical views on the politics of knowledge with the challenge of constructive thinking about curricula for higher education. What I learned at both these fora I may not write about. I suppose Yehuda Elkana would call it "tacit knowledge" that clears the way for further thinking and will influence work back at home. Joachim Nettelbeck's private tutorial, arranged at my request, on academic institution building would also fall in the same category of invaluable though invisible lessons.

Madhulika too was overwhelmed by the manner in which Wiko included spouses in its social *and* academic life. While she was lucky to be offered an honorary Visiting Fellowship at the Max-Planck-Institut für Bildungsforschung, she learnt a great deal from

the many conversations and seminars at the Wiko, not to speak of the support from the library. She managed to write up her field notes and prepare a paper for presentation and publication, as well as read at leisure both for courses she planned to teach on return and much craved-for fiction.

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It's four months since we returned to Delhi. Berlin is inevitably in our conversations. We regret that we didn't take more walks in the Grunewald and didn't see more museums in Berlin. But we remember with fondness the early morning dappled sunshine that lit up our living room and the calm of the lakes that our house looked out to. While we crave sometimes for a return to these, we realize that we have come closer as a family, having crossed many a threshold together.

For me, in some ways it is back to the same old madness – elections, surveys, non-stop phone calls, media appearances, engagements with activism and policy work. But something has changed. I have rediscovered my old passion for intellectual history and political theory. I find myself trying to put every piece of data into a larger framework. I approach activism and policy work with a surer sense of purpose. Is it the Wiko effect that helped in crossing the thresholds I was waiting to?



DOES THE NERVOUS SYSTEM  
NEED A “DRIVER”?  
SERGIY YAKOVENKO

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I was brought up in the totalitarian regime of the Soviet Union. As a teenager I was an eyewitness to the collapse of the Berlin Wall while staying with my parents, engineers on a Soviet army base in Prenzlau, during the GDR’s transition to FRG, and was sent back to the USSR to witness the failed *coup d’état* of the old Communist guard and the consequent *de facto* independence of the Ukraine in 1991. I did my undergraduate studies in biophysics at Kharkiv State University, famous for technical and theoretical achievements in Physics and Mathematics, with several Nobel laureates among its alumni. From the very beginning of my scientific career in Neuroscience at the University of Alberta, I was attracted by the order presented by a mechanistic view of nature and learnt to explore it with the help of computational tools. After defending my Ph.D. in Neuroscience, I moved to the Université de Montréal and focused my post-doctoral research on the organization and function of the neural pathways that descend to the spinal cord and interact with multiple neural and mechanical components responsible for the *emergent* organization of movement control. – Address: Département de Physiologie, Université de Montréal, Pavillon Paul-G. Desmarais, C.P. 6128, Succursale Centre-ville, Montréal Québec H3C 3J7, Canada. E-mail: [sergiy.yakovenko@umontreal.ca](mailto:sergiy.yakovenko@umontreal.ca)

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## Prologue

It was a busy day at Montreal's Pierre Elliott Trudeau International Airport as the holiday season triggered crowds of people to rush to families dispersed in multiple destinations around the globe. This year the holiday travel was not the only purpose of my trip to Europe, as I was eager to join the ranks of Fellows at Wissenschaftskolleg zu Berlin (Wiko) for three months of interdisciplinary collaboration and intellectual adventure as a member of the research group *Functional and Structural Constraints in the Evolution of Sensorimotor Networks*. The snowstorm typical of Quebec this time of year came to an equilibrium with the effort and the will of snow-removal crews rushing down runways on oversized snow tractors. In addition to the predicted weather conditions, an unforeseen factor caused overcrowding and delayed flights across the departure boards of all major airports that day, as an ill-conceived attempt to blow up a transatlantic flight from Amsterdam failed that morning. Some 23-year-old Nigerian man sent shivers down the air traffic system, causing delays, long waiting lines and frustration, due to the heightened security and meticulous searches of all suspicious travellers, myself included. Each arrival and departure was a fight against multiple forces that included external parameters of nature and intrinsic constraints of human society. As I was waiting for my flight, I did wonder what the factors were that influenced the young man's decision to attempt a terrorist act on Christmas Day. Was it a "conscious" choice, a choice free from constraints and a choice that creates the potential for multiple future outcomes – "free will" by one of its definitions – or a result of multiple measurable causes, some of which were perhaps peer pressure or brainwashing based on the dogmatic view of the world? Whatever the reasons, my flight was not going to beat the odds that day as the complex dynamic air traffic system buckled once again during a holiday season, sending thousands of travellers and their eagerly awaiting families into customary holiday blues.

### "Free Will" or Error Correction Mechanism?

My interest in the topics of decision-making, voluntary, involuntary and reflex actions, which are thought to constitute self and free will in philosophical terms, has been cultivated by multiple informal discussions with my peers since the beginning of my materialist career in neurophysiology; it has been further refined by interactions with professional philosophers, writers and other scientists during my term at Wiko. While a decision-making ac-

tion can be readily defined as a process of choosing between multiple alternatives, the definition of the terms “voluntary”, “involuntary” and “reflex” has proven to be challenging for both philosophers and neurophysiologists alike; although still widely used, many neurophysiologists now consider these terms to be prescientific (Prochazka et al. 2000). Instead of wrestling with the concepts idiomatic to philosophers, I will contribute to the ongoing discussion, which emerges spontaneously at Wiko year after year, by outlining the neuro-mechanical hierarchy responsible for decision-making, movement selection and its execution as described by modern mathematical models in neuroscience. We will sequentially assemble the general hierarchy by describing i) the mechanisms responsible for movement execution built-in or embedded in our musculoskeletal system; ii) neural control mechanisms distributed throughout the spinal cord, brainstem and motor cortex; and iii) neural decision-making mechanisms in cortical areas that project to motor cortex. I will then use this framework as a basis for a conjecture about the representation of “self” and its actions within the nervous system.

### Musculoskeletal Mechanisms

One way of describing the properties of a complex hierarchical system like the neuro-musculo-skeletal system (NMS) is to start with the essential elements at the bottom of the hierarchy and make our way up to the source. The bottom level of the NMS is the mechanics of our body, that is the arrangement of multiple mechanical segments hinged together by joints. Newtonian physics explains in deterministic terms the mechanical coupling between body parts and their interactions with the environment. Simple limbed mechanical “toys” – dynamic models – can generate a human-like bipedal gait completely passively, without the contribution of muscles or any neural control (McGeer 1990, Kuo 1999, Collins et al. 2005, Geng et al. 2006). Shown in Figure 1 is one such passive walker, a biped that can run down a gentle slope in a way similar to human running. Stable locomotion of these passive walkers is possible due to the dynamic stability of the mechanical system within a limited parameter space. This property can be illustrated by the behaviour of a ball dropped or nudged into a bowl. As long as the ball is not given a push sufficient to leave the bowl, it will gradually settle to the equilibrium position at the bottom of the bowl. Similarly, a passive walker reaches a dynamic equilibrium when it performs stereotypical stepping movements. However, this simple mechanism cannot change speed or direction of locomotion and it is

relatively unstable; it is susceptible to disruption, for example, by uneven terrain. Muscles and tendons help to solve these problems.



Fig. 1: A general passive dynamic walker model of locomotion.

Essentially, muscles and tendons can be modelled as a collection of springs and dashpots with tuneable stiffness and viscosity elements controlled by inputs coming from the spinal cord (Hogan 1985, Zajac 1989). Consequently, muscle function in the presence of some static tone provided by the spinal cord can be described as having reflex action, which is more appropriately called a negative feedback action. If stretched, the muscle resists this positive length change and tries to come back to its previous length by producing force that would then cause a negative length change or feedback action. Such negative feedback is a ubiquitous stabilizing or homeostatic mechanism that returns the system to its set or desired state. This concept is central to the ideas discussed below and it warrants some detailed explanation. Consider a room-temperature regulating system in Figure 2 that uses desired or “set point” temperature and a sensor to calculate error between them, a negative value in the illustration. This error propagates via a relay to a regulator that either heats or cools the room, based on the negative or positive value of the error. In the example, the relatively cold temperature causes the heating of the room, which minimizes the error. The equivalent

description of the system is also shown in an engineering schematic of Figure 2. It should be clear why the feedback pathway is often called a feedback loop. As an exercise, it is easy to imagine two dramatic outcomes of the temperature-regulating system operating on the positive feedback principle, generally leading to instability. Other natural phenomena in dynamic systems with positive feedback properties include the formation of hurricanes, the nuclear chain reaction and stock market crashes. Thus, by adding muscles to a passive walker, the neural system has a way of adding or reducing the amount of kinetic energy of the skeleton and stabilizing it in the presence of perturbations (Yakovenko et al. 2004).

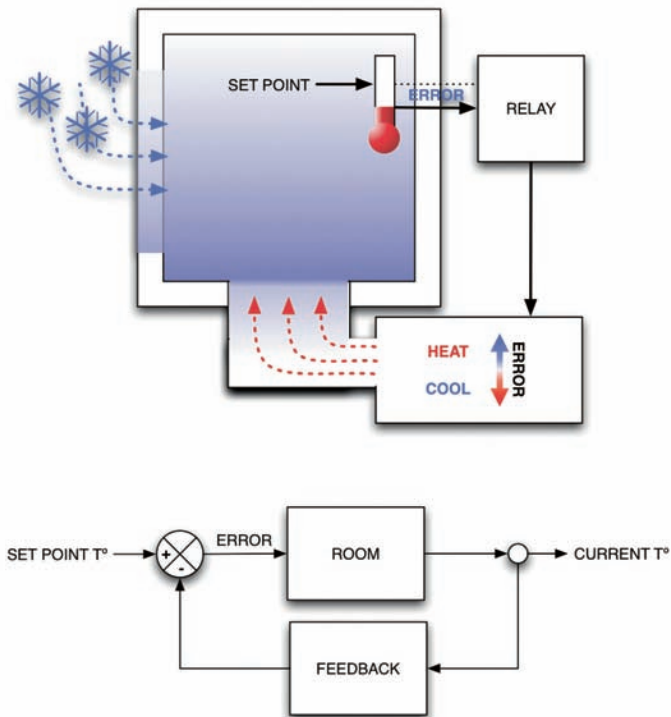


Fig. 2: Schematic representation of the feedback loop.



## Sensorimotor Pathways

In view of the previous paragraph, it may not be surprising that the fastest sensory response from muscles, the stretch reflex, is a negative feedback mechanism. It operates on top of the functionally similar built-in muscle property and offers an additional level of stabilization. When a load stretches muscles, the contribution of the stretch reflex loop is greatly potentiated because it adds multiplicatively to the spring-like resistance of the stretched muscle (Prochazka et al. 1997, Yakovenko et al. 2004). Thus, control of locomotion can be reduced to an oscillator-like switching of muscles on and off in appropriate phases and delivering or dissipating mechanical energy to modify or maintain desired speed, while the peripheral stabilizing mechanisms take care of minor deviations and perturbations of the desired state. One of the early and still influential theoretical descriptions of motor control explains the action of the nervous system in terms of setting desired threshold or equilibrium positions of muscles by changing the excitability of the stretch reflexes (Asatryan and Feldman 1965). According to this schema, all that the control mechanism has to do is to set a number of equilibrium points for different muscles and the body will settle in that position, given sufficient time. While this conceptually attractive theory is still practiced in its pure form, it has also generated a number of offshoot theories that rely on the principles of nonlinear dynamics and optimal control theory (Scholz and Schönner 1999, Todorov 2004).

The early insight into the organization of the sensory feedback pathways in vertebrates led Sir Charles Sherrington to conclude that the role of the nervous system is to integrate actions of body segments and that the simple reflex actions are the language of the integration (Sherrington 1906). He described behaviourally complex actions as a sequence of reflex components such that each preceding action evokes the next. This idea was first clearly outlined by another physiologist, Ivan Sechenov, who stated that any human action is the result of chains of reflexes (Sechenov 1863). It is noteworthy that the conceptual foundation of the reflex chain hypothesis has been developed by a number of experimental physiologists in the 18th to 19th centuries, but the origin could be traced back as far as the treatises of Descartes and Willis in 1664 (Clower 1998, Prochazka et al. 2000).

To a large extent, the idea of the automatism of the neuromechanical body was based on the observations of animals with complete spinal cord transections that can walk even without commands descending from the brainstem and cortex. To explain such observations, T. Graham Brown, a student of Sherrington, tested the hypothesis of his mentor that sensory feedback is essential and sufficient for locomotion. In his 1911 publication, he reported that

rhythmic activity of motor nerves persists even in the absence of motion-related sensory feedback and added a phenomenological description of the additional spinal component involved in the control of locomotion, which he called “the intrinsic factor” (Brown 1911). This controversial finding was not fully accepted until the experimental and theoretical efforts of neurophysiologists in the 1960s who coined the term “central pattern generator” (CPG) to recognize the central role of this spinal element in the generation of the locomotor pattern in vertebrates. However, as early as a decade after Brown’s original publication, a young physiologist Fritz Verzár implemented the principles of CPG organization and studied its properties in the first dynamic model and reported the results of the mechanical simulations (Verzár 1923). This revolutionary study was conducted before the development of the theoretical framework to describe the interaction dynamics of pairs of coupled antagonistic integrators thought to comprise the CPG and before the invention of computers necessary to solve the resulting equations. Nowadays, while simulating the CPG *in silico* at Wiko, we have also constructed a simplified Verzár model to gain in several experiments immediate insight into the operation of this tangible mechanism.

The focus of my computational studies at Wiko was the question of how the nervous system controls the mechanisms and pathways of the spinal cord and their interactions with the musculoskeletal system. The complexity of the system summarized above is increased by the dynamics of interactions of spinal segmental pathways and multiple supraspinal motor pathways that project to the CPG to regulate its operation. Using the mathematical description of the CPG and experimental recordings of its output, it was intriguing to solve the system of equations in reverse to find what the inputs to CPG must be reporting. It turns out that, although the result could have been potentially complex, the computed inputs are consistent with the forward speed of locomotion (Yakovenko 2011). All that the hierarchically high neural networks of the brainstem and motor cortex have to compute is the speed of locomotion; the low levels of hierarchy, which include the CPG, transform this command into the language of muscle activations sequences and commands the fine-tuning of the sensitivity of sensory feedback pathways. This finding is consistent with the observation of gait transitions from slow walking to fast trot and gallop – the locomotor behaviours that require different coordinations of limbs in quadrupeds – evoked by stimulation of the mesencephalic locomotor region in the brainstem with gradually increasing current delivered through a single electrode (Shik et al. 1966). In addition, it supports the idea that the CPG is itself a model of the body’s passive dynamics of limbs interacting with the environment. Since the passive walker output is largely described by its velocity, it is not surprising

that the internal model of this mechanism embedded in neural connections of the spinal cord is controlled by the desired velocity. Finally, this example points out the ability of the nervous system to construct models of the musculoskeletal body and the environment.

### Decision-Making and Strategy Selection

A great deal is known about the functions of the execution pathways, but the neural mechanisms of sensory evaluation, selection of actions and adaptation of the selection strategies have become accessible to direct investigation only recently with the development of implantable arrays for microelectrode recordings and stimulations of multiple cortical areas. We can tap into the cortical and spinal neural circuitry with electrical stimulation to influence not only motor execution, but also perceptual decision making and target selection. One particularly important and influential example is the study of the cortical cascade of neural processing from the sensory evaluation to the execution of reaching in monkeys recorded from several contributing cortical areas (Cisek and Kalaska 2005). This information can be used further to identify individual functions of multiple areas and their emergent ensemble role. For example, the stimulation of the primary somatosensory cortex of monkeys can influence their perceptual decisions about tactile stimuli (Romo et al. 1998), and the stimulation of the cortical frontal eye fields in monkeys influences their selection of targets (Gardner and Lisberger 2002). Thus, it is experimentally possible to change the perception of the environment and to influence the decisions.

The models of the decision-making process are generally based on the sequential integration of stimuli until reaching a threshold when the decision is made (Stone 1960). The evidence for the temporal integration of sensory inputs has since been shown in multiple cortical areas in tasks of selecting between targets (Cisek and Kalaska 2010). A general model of action selection is shown in Figure 3, where sensory information about the desired target (zebras), e.g. their caloric value and health, is integrated and sequentially evaluated. However, both the rate of this integration process and the threshold are influenced by other factors, such as motivation, risk, previous experience and the urgency of making a decision. Once the decision is made, the associated policy of how to make it happen propagates to circuitry responsible for the details of motor planning and execution (described above). However, even a simple decision emerges from the interactions of signals associated with multiple external environmental states and the internal cognitive and motor states. The computational complexity of this problem, also called “the curse of dimensionality”, grows

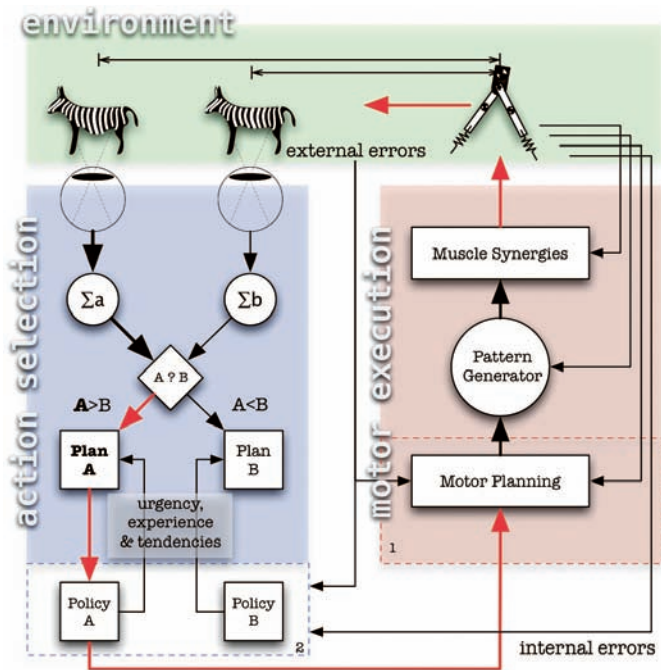


Fig. 3: A general schematic of the sensorimotor pathways responsible for the chain of processing from perception to selection of action and its execution.

exponentially with the number of state variables. How does the nervous system resolve this obviously complex problem of finding the best or optimal choice?

The remaining link for Sechenov's "chain", which would close the loop of the perception to action cascade of neural processing, is a mechanism that selects from the number of actions presented by the environment when the outcomes of these actions are often unpredictable and state-dependent. This question does not often arise in neurophysiological studies, but it has puzzled researchers in other applied fields of science, such as engineering and artificial intelligence. The most active research is done using the theory of reinforcement learning, which includes computational tools similar to the control theory and describes the

mapping of actions to a particular situation while maximizing a reward or minimizing a cost (Sutton and Barto 1998). The tools of this theory rely on the description of sets of policies or actions, their immediate and future rewards and the contribution of the environment. All of these variables have physiological meaning and representation within the neural substrate. While we do not know whether reinforcement learning is implemented within the neural circuitry responsible for the decision-making, this question has recently become accessible to experimental and computational examination in neuroscience. For example, some of the best models of the dopaminergic pathways of basal ganglia involved in reward and motor execution are expressed with the reinforcement learning methods (Rivest et al. 2010).

### Where is the “Driver”?

Sherrington wrote in 1921 that “with the progress of natural knowledge, biology has passed beyond the confines of the study of merely visible form, and is turning more and more to the subtler and deeper sciences that are branches of energetics.” With the invention of the computer, the pragmatic movement of neuroscience towards quantitative descriptions of applied mathematics is a fact of modern mechanistic research methods; this is evidenced by the growing representation of the computational fields in what used to be qualitative or at best phenomenological (or “best-fit”) biology. The goal of computational neuroscience is to create a systematic theoretical framework or models of every observed phenomenon, which could then be tested, refined and used further to identify remaining gaps in the understanding of how animals (human and otherwise) work and why. The hypothesis that I would like to posit in regard to the philosophical nature of these questions is that the more we answer the pedestrian “how” questions of neuroscience, the more we will automatically attain answers to the “why” questions.

To return to the question of this chapter, which focused so far on the description of the perception-to-action processing, the “driver” who is a whole or a part of “free will” has been posited to take part in this process. Since it can only be either outside or a part of this mechanistically described sensorimotor hierarchy, we can further examine consequences of both cases. If the contribution of “free will” to behaviour is not captured by the current mechanistic models, then it is confined to the part of the behaviour that is not explained by the model; therefore, the future models with higher precision will be able to either include it or reduce it to an insignificantly small factor. Note that the latter outcome negates mathemati-

cally the existence of “free will” and surrenders to the deterministic view of the system. The other more interesting alternative is that some part of “free will” is already included within the holistic assembly of models, admittedly derived with predominantly reductionist methods. Where in Figure 3 would “free will” then be? The answer can only start with the definition that sets the constraints on the phenomenon. Since the most prominent attribute of “free will” is “self”, the mechanisms that make a distinction between “self” and “external” signals are likely candidates. Then, if we redefine the question as a search for the elements of the perception-to-action process that are concerned with the distinction between external (or environmental) vs. internal (or “self”) actions, three pathways in the schematic are the plausible candidates for “free will”.

The first and most intriguing pathway is the mechanism of error correction and planning within the execution pathways (Figure 3, 1). The success of this mechanism depends on its ability to make a distinction between internal or “self” errors that originate within the sensorimotor pathways and, thus, need to be intrinsically adjusted; or external errors due to the movement of the desired target. For example, if the dissociation between errors is not made at this level, then the external errors used to adjust the execution pathways could lead to the increase in the overall error. The second candidate pathway is the policy-selecting mechanism that projects to the execution planning pathways; assuming it is not fully overlapping with it, this mechanism also experiences both types of errors (Figure 3, 2). For example, in bow hunting, the decision to shoot would depend on both parameters: the distance to a target (the external error) and the skill and precision of the hunter (both related to the internal error). The third possibility is that the neural processing responsible for the “free will” is distributed between several mechanisms of the pyramidal hierarchy. This type of processing is common to the nested hierarchies that allow signals to flow bidirectionally, for example by using the feedback loops to the higher levels and combining low-order features as a part of a nested structure of high-order features (Feinberg and Keenan 2005). In this case, all the mechanisms that are required to make the distinction between the two types of errors would constitute the last candidate for the seat of “free will”. It is worth noting that this implies that the complex behaviour termed “free will” only emerges out of the interactions between the multiple elements of this composite mechanism and cannot be explained by the description of each of the interacting elements in isolation. To summarize, the signal related to “self” within decision- and motion-generating neural pathways constitutes the error correction mechanism for adjusting ongoing and planned movements. Thus, further experimental, clinical and computational studies that examine the participation of

these pathways in decision-making will eventually be able to answer the intriguing question of what “free will” is by giving the term a specific mathematical definition.

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OF RATS AND APES  
KLAUS ZUBERBÜHLER

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I probably owe my life as a scientist to rats. The details are not so important, apart from the fact that, because of them, it became obvious to me what I wanted to do: to understand how the mind works, preferably the non-human one. During an animal behaviour practical at the University of Zurich, one of us had the idea to teach a lab rat a new skill to see whether other cage mates appreciated this. We found some effects, I don't remember the details, but I finally knew I was on the right track. For my diploma thesis, I was able to study wild monkeys in the Ivory Coast and then one thing led to another. I graduated in Zoology and Anthropology from Zurich in 1993, obtained a Ph.D. from the University of Pennsylvania in 1998, followed by a postdoctoral position at the Max Planck Institute for Evolutionary Anthropology. In 2001, I got my first job as a lecturer at the University of St. Andrews, where I still am. – Address: School of Psychology, University of St. Andrews, South Street, St. Andrews, Fife, KY16 9JP, Great Britain.

E-mail: [kz3@st-andrews.ac.uk](mailto:kz3@st-andrews.ac.uk)

I came to Berlin as part of a focus group on animal communication, joined by another St. Andrews researcher, Vincent Janik, an expert on marine mammals. Originally from Berlin, Vincent knew the Wissenschaftskolleg and all its virtues, and I was easily convinced to put in a joint application. We wrote a proposal and obtained an invitation; it all seemed very easy. As the departure date approached, however, matters became remarkably more complex. How can one morally justify uprooting five other lives, four of which were under the age of 9, for the simple benefit of not having to teach or going to meetings for one year? How could we handle so much uncertainty with so little extra capacity and so few language

skills? In the end we did travel; we exited the Autobahn into the Grunewald in a bouncing car with a broken suspension, and arrived in a Berlin with summer in full swing: heat, bicycling, the “naked lake”, the Floh restaurant, the Flohmarkts, history at every doorstep, creative ambition and city sidewalk cafes all over. I lived in Berlin more than 10 years ago, but now it was different. It was great to be in the centre of all this past and blossoming presence. Yet, the slightly bitter discovery was that, as parents, the priorities lie elsewhere. Settling our four little minds was unexpectedly much harder, in every way, and this went on for some long months.

Things finally began to improve around New Year. The city had been frozen for weeks, including all its nearby lakes. We finally had built up enough courage and walked across the Hertsee with a bunch of little children in tow, a terrifying responsibility. The ice did not break, and we made it. And the days got longer, slowly and steadily. As predicted by theory, finally, everyone became increasingly fluent in German, made friends at school, gained confidence, and began to take possession of the park behind Koenigsallee 20 – that silent, colossal and circumspect monument, built by Berliners who no longer exist, who left behind a commanding expression of their aspirations for style and grandeur, and (I suspect) hunger for power. Unaffected by all, the children spread their belongings and activities far and wide in this old lot; Schlecker balls, plastic shovels, jumpers, single socks, downed bicycles, guns and hoses, the sandpit, everything hidden and strewn. This bustling activity was a source of joy for me, perhaps not for all other Fellows living in the same building, although there were few complaints. With spring arriving, life finally became what it should have been. The bicycles, lakes, beer gardens, metropolis and all the rest were now a natural part of us. We finally were Berliners. Simultaneously, some personal relationships changed, generally by replacing functional properties with emotions, in some cases intensely: affection and agonism grew, unexpected, unplanned and incomprehensible. And suddenly there was the goodbye party, packing, planning, moving away.

For my work, the Wissenschaftskolleg easily lived up to its promises. Never before have I encountered such an approving and supporting environment, to the point of making me feel guilty (my wife maintains this is a cultural problem: growing up under too much social control). But how did the people of Berlin, whose tax money I was using, benefit from my work? Giving talks provided some assistance in balancing this perception, particularly the ones at the nearby Grunewald-Grundschule, to the people who educated our children and to their friends and classmates. It is never easy to assess one’s own work, but I think it has been a very productive year, by all accounts. My students and I managed to crack several

difficult problems in great ape communication, which (I hope) will lead to significant theoretical progress in the field. The true luxury was all that extra time, not just to read, think and write, but also to interact with the other Fellows, no matter how remote their areas were from my own research. I thoroughly enjoyed the Dienstagskolloquium, the weekly 120-minute marathon of floundering in another field of academic inquiry, learning about its priorities, understanding its methods, pondering its products and comparing all this with others' perspectives in the subsequent discussions. The only contact with the wider academic world I had had before was my solitary weekly readings of the *New Scientist*. Never before have I had such intimate contact with the forefronts of art history, philosophy, physics or robotics. It was eye-opening to see that the world's knowledge, all its cultural and intellectual achievements, are nothing but a distributed network of people who administer it in the quiet of their studies, without knowing much about each other. A particular merit of Wissenschaftskolleg is the conversation it fosters between all these solitary processes; it bestows "Wissenschaft" with a consciousness.

Although our specific interests were all very divergent, some of us were guided by the same central question: what does it mean to be human? A particularly rewarding product from this shared curiosity was a reading group, the best I have ever attended so far. We read and made much progress on topics such as the nature of morality, language and social cognition with inputs from experts in sociology, linguistics, psychology, philosophy, biology and other fields. It amounted to an interdisciplinary experience that one could only have at places like the Wissenschaftskolleg. I still am very grateful for this. Another personal highlight was two workshops born out of our focus group, one on complexity in animal communication and another on the problem of reference. Particularly the second was of notable quality, attended by an international select group of expert empirical workers and theoreticians, including two Max Planck directors. In my opinion, we made much progress on an age-old problem, and this has generated important new material for publication.

It is not easy to sum this all up: hardship, challenge and growth at a personal level; inspiration, integration and progress at the professional level. And none of this would not have happened without a few albino laboratory rats.

*Vorträge*

PLURALISM IN CONSTITUTIONAL LAW:  
NATIONAL, SUPRANATIONAL, AND GLOBAL GOVERNANCE  
DANIEL HALBERSTAM

I. Introduction

The emergence of the European Union and the increasing density of global governance regimes raise questions about the nature of legal authority within and across these systems, as well as between any one of these systems and the traditional unit of modern governance: the state. A key debate concerns the relevance of constitutional law as a paradigm for understanding how any one of these systems works or how these systems interact with each other and with the state. Simply put, these questions ask whether the EU, the UN, or the WTO are (or should become) “constitutional” in the sense of privileging central legal actors and norms over local law and politics, or whether these systems are (and should remain) loose regimes in which the relationship among the various legal actors and systems remains less ordered and in which law and politics stand on a more equal footing.

There have been two principal answers to this question: one local and one global. The local answer grounds all legal authority in the state. In this view, “law” beyond the state exists only because it serves the political interests of states and, to the extent it does not, such law will either be changed or not heeded. These arguments can be put forward rather plainly by constitutional law scholars such as Eric Posner and Jack Goldsmith or in a more sophisticated way by those grounded in international relations theory such as Andrew Moravcsik. But the basic idea is the same: all constitutionalism is local. The other response has been to ground legal authority on the global level. Beginning from Kantian premises

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Contact: dhalber@umich.edu

(e.g. Pogge, Tomuschat, Habermas), the idea (put crudely) is to understand states as operating within a globally ordered system to realize universal human rights as defined by the “international community.” Others, such as British political theorist David Held, are more catholic in their philosophical foundations, but similarly envision a global hierarchy in which national, regional, and local “sovereignties” are “subordinate[ed] ... to an overarching legal framework.” In short, in this view, the only true constitutionalism is global.

As you may have guessed by now, I set this up to make room for a third view, that of pluralism in constitutional law. And indeed, a small band of scholars has begun to explore the possibilities of a pluralist approach to what otherwise appears as the dilemma of local versus global constitutionalism. This approach emphasizes the lack of hierarchy among the various actors and systems and does not argue for settling this situation in favor of either local or global authority.

My own project builds on these efforts by integrating the idea of pluralism into our core understanding of constitutional law – even into traditional state-based systems. The project examines elements of pluralism in, for example, the United States, and compares these elements of pluralism to those we find, say, within the EU, in the relationship among the UN and human rights regimes, or in the relationship between the UN, the EU, and a Member State. The idea is that, more often than we generally appreciate, we lack a final arbiter of legal authority or, put differently, we find multiple conflicting claims to final legal authority and no overarching hierarchy for settling these claims. I will try to show that this multiplicity of claims takes on two principal forms – the first systemic and the second institutional – and that neither of these has led to chaos. Instead, both types of multiplicity of claims of authority have led to decentralized mutual accommodation that draws on the values of constitutionalism. This is, perhaps, as it should be. In its most radical form, I will float the claim that pluralism is inherent in the idea of constitutionalism itself.

## II. A Comparative Analysis of Pluralism

Let us begin by comparing the European Union and the United States. If you start with the ordinary comparison, you might say the European Union and the United States are both federal-type systems. This comparison can be useful, as many comparative studies have illustrated, but it has its limits as far as pluralism is concerned. Here’s why:

In the European Union, we have a primary conflict between the European level, which claims to be superior and foundational over the member state legal orders, and the rival claim of the member states, which insist that the member state legal orders are the true foundation of the European legal order. We find a profound *systems conflict* that leads to a standoff between the European Court of Justice and member state constitutional courts. This conflict among legal systems lies at the heart of the famous *Maastricht* and *Lisbon* decisions of the *Bundesverfassungsgericht*, as well as that court's earlier rulings in *Solange I* and *Solange II*. We shall discuss these decisions in greater detail later on. But for now all we need to note is that these are fundamental conflicts between the different legal systems operating on the various levels of governance.

In the United States, by contrast, we no longer witness this kind of systems conflict, at least not since the Civil War. Instead, the vertical relationship between the federal government and the states in the United States is, today, hierarchically ordered. No state today would suggest that a federal law that everyone agreed was valid under the United States Constitution could be invalid or inapplicable within a certain state simply because of a conflict with state constitutional law. To do so would, today, amount to a misunderstanding of the law, an act of legal or civil disobedience, or both.

Given that the modern comparison between the federalism of the European Union and that of the United States does not serve to analyze the issue of pluralism, where else might we look? Here I suggest we can look to the separation of powers at the federal level of governance, that is, between the President, the Congress, and the Supreme Court.

### III. Institutional Pluralism and the Problem of Interpretation in the United States

A simple view of the United States might be that the Supreme Court interprets the Constitution and the laws, the Congress makes the laws, and the President applies them. And the simple view might be that Congress and the President accept the Supreme Court's interpretation of the law. But, as we shall see, things are a bit more complicated than that.

### A. *Marbury, Stuart*, and the Birth of Interpretive Pluralism

As is well known, the US Supreme Court began its practice of “judicial review” in *Marbury vs. Madison*. What that concretely meant, as every first-year law student learns in the United States, is that the US Supreme Court reviewed a federal statute and refused to apply it because the statute violated the Constitution. In Chief Justice Marshall’s famous words, the Court declared: “It is emphatically the province and duty of the judicial department to say what the law is.” Now this seemed to put the Court in charge of telling us what the Constitution means. And so *Marbury* is often taken as establishing the claim on the part of the highest court to be the final arbiter of the meaning of the Constitution.

The simple version of the story ends here and ignores a second case from the founding era, a case called *Stuart vs. Laird*, which was decided only a week after *Marbury*. Like Sherlock Holmes’ dog that didn’t bark, this is a very important decision, even though it did not do very much and spans only two pages of written text.

For the non-lawyers in the room, I will give you some background. Both *Marbury* and *Stuart* grew out of a pitched battle between President John Adams’ Federalists and the party of Thomas Jefferson. When Thomas Jefferson won the election of 1800 in a landslide, the outgoing Federalists – who were more enamored with central power than the Jeffersonians were – tried to entrench themselves in the judiciary. Before President Adams left office, the Federalists created a set of new judicial positions to which they appointed political allies right up until the day Thomas Jefferson took over. One such ally was William Marbury, a Georgetown businessman whose commission to be Justice of the Peace in the District of Columbia was signed and sealed in the final days of the outgoing Adams administration but, by mistake, never delivered. When the new administration of President Jefferson took over, it predictably refused to deliver Marbury’s commission. And so William Marbury came to the Supreme Court to sue the new Secretary of State, James Madison, for delivery of Marbury’s commission. The Court cleverly rejected the plea. The Chief Justice held that Marbury had a right to the commission but that the Court could not order delivery of the commission because the congressional statute providing the Court with jurisdiction over the case was unconstitutional. This was a shrewd way of telling the Jeffersonians that the Federalist judiciary would be there to watch over the Constitution while, in that particular case, not having to order anyone to do anything. It was, in short, a self-enforcing judgment that claimed to put the judiciary in charge of constitutional meaning.



*Stuart vs. Laird* grew out of the same pitched battle between these two factions. In addition to refusing delivery of Marbury's Commission, the incoming Jeffersonians also abolished a set of judicial offices that the Federalists had created and to which the Federalists had successfully appointed their political allies. *Stuart* raised the question whether the elimination of these positions was constitutional. There were two aspects to this question. The first was whether the Jeffersonians could remove judges simply by eliminating the underlying office instead of impeaching the judges in those offices. The second involved the consequences of that elimination. By eliminating the offices of circuit judges, the Supreme Court Justices had to take up the practice of "riding circuit," that is, to travel around the country in a horse drawn carriage to decide cases in courts of appeals. This might be seen as appointing existing judges to a new judicial office without following the proper appointment procedures. Even more important, it meant that the justices would now have far less time to do Supreme Court business. To insulate this assault on the judiciary, the Jeffersonians also abolished the June 1802 Term of the Supreme Court to delay the Court's ability to hear constitutional challenges to their actions until after the next election. All this was, in one form or another, before the Court in *Stuart vs. Laird*.

Now in *Marbury vs. Madison* Chief Justice John Marshall resists the Jeffersonian assault and writes a magisterial opinion. In *Stuart vs. Laird*, by contrast, Marshall tries in vain behind the scenes to assemble a majority to resist the Jeffersonians again. But after failing to get the votes to strike down the elimination of the circuit judges, Marshall gives in. But here again, he does so cleverly. He recuses himself from that case and thereby condemns the opinion to obscurity.

Marshall recused himself in *Stuart* because he was supposedly an interested party, that is, because the case was an appeal from a decision that Marshall had made when riding circuit. What is interesting, however, is that Marshall was also an interested party in *Marbury vs. Madison* and yet felt no reason to recuse himself in that case. As the well-known story goes, the person who failed to deliver William Marbury's commission was John Marshall's brother, James. And the person who sealed the commissions and was responsible for their delivery was none other than John Marshall himself, still acting in his capacity as Secretary of State during the final days of the Adams Administration (even though the outgoing President had already appointed Marshall Chief Justice of the Supreme Court). John Marshall was therefore as personally involved in *Marbury vs. Madison* as he was in *Stuart vs. Laird*, making his (non)recusal decisions seem rather strategically motivated. They allowed him to

announce the great principle of judicial review in *Marbury* while letting his Associate Justice write a small and quickly forgotten opinion in *Stuart* that gave in to the Jeffersonians.

Reading the two cases together, we see that in the very moment judicial review is founded in the United States, we witness a capitulation of the judiciary to the political branches. The assertion of judicial authority and the accommodation of political power come in the same breath. So it isn't just that the Court decides what the law is; there is, from the beginning, a political dimension to constitutional construction as well.

## B. Interpretive Pluralism since the Founding

We can trace this practice of conflict and accommodation throughout American history. Some of these episodes are well known, like the interpretive changes that took place during the New Deal period. Going into the New Deal, the Supreme Court's interpretation of the Commerce Clause, which gives the central government the power to regulate "Commerce ... among the several States", was very narrow. The Court had held that the Commerce Clause allowed Congress to regulate only things that moved across state lines, that the clause did not allow Congress to prohibit commerce, that it only allowed Congress to enhance commerce, and that it did not allow Congress to regulate matters that were internal to a state or states. After the Court had struck down several pieces of New Deal legislation, President Franklin D. Roosevelt threatened to "pack the Court", i.e., to create a new judicial position on the Supreme Court for every Supreme Court justice over the age of 70. That, of course, would have given him the power to control a new majority on the Supreme Court. In a famous "switch in time that saves nine", however, the Court subsequently changed its interpretation of the Commerce Clause, and took a position more in line with FDR's legislative program. (There is some question whether the Court was reacting to the court-packing plan but, in any event, the Court changed its reading of the Commerce Clause and the plan was dropped.)

American constitutional scholars have struggled with how to interpret this dynamic of political pressure and judicial interpretation. Was the President's pressure on the Court unconstitutional? Was the Court's change in interpretation a political cop-out? Or should we understand the change in interpretation and the political pressure as an informal constitutional amendment, as Bruce Ackerman has famously argued? In Ackerman's view, a very specific choreographed interaction between the Supreme Court, the political branches, and the American public can create a legitimate change in constitutional meaning – via a "con-

stitutional moment” – that does not undergo all the formal requirements of an amendment. FDR, in this view, took on the Court’s narrow interpretation of the Commerce Clause and won repeated confirmation from the American people in elections that highlighted the disputed elements of constitutional understanding.

If we take a step back from the particular interpretation of the New Deal shift, we see that in the United States we have, in any event, a contest between multiple interpreters of the Constitution. Taking a look at the text of the Constitution alone already suggests this. Nowhere does it say that the Supreme Court’s interpretation of the Constitution should bind all the other actors in the system. And according to Article 6 of the US Constitution, the President takes an oath of office (as does every legislative, executive, and judicial officer on the federal and state levels of governance) to uphold the Constitution – not an oath to follow what the Supreme Court says the Constitution is.

And so we in the United States may ask who the final arbiter of constitutional meaning is. This is an issue that has stayed with us since the Founding. President George W. Bush, for instance, was much criticized in the press for signing bills into law and including so-called “signing statements”, in which he declared that he would not execute the parts of the law he deemed unconstitutional. To be sure, the frequency with which President Bush issued such statements was comparatively high and became the proper focus of concern. But in the view of many constitutional law scholars, regardless of political persuasion, the basic decision to sign a bill but not carry out aspects of the bill that are unconstitutional is an action a President can – and sometimes even should – take to live up to his oath to uphold the Constitution.

The principle that the President has the power to make up his own mind about what the Constitution means is not outlandish. The idea goes back to at least President Andrew Jackson, who famously refused to sign a bill because he thought the object of the bill was unconstitutional. The idea that the President has independent power to interpret the Constitution also animated President Lincoln’s refusal to comply with Chief Justice Robert Taney’s order to produce a prisoner in a *habeas corpus* proceeding during the Civil War. Lincoln refused, believing that he had done nothing unconstitutional and that the Court was improperly trying to infringe on the President’s powers. This, then, is the kind of *institutional pluralism* or multiplicity of institutions claiming final authority to interpret the Constitution that we have in the United States.

Let me give you one more just point of comparison before we proceed. Consider the case of a Kelsenian constitutional court as you have in Germany and Austria. Here, the basic

idea was to create an institution that determines the meaning of the constitution for everyone else within the system. We can imagine them as special tribunals sitting almost outside and above the system, watching over everybody within the system. Although Hans Kelsen suggested that such tribunals would just interpret and apply the law as any other judge would, he nonetheless recognized the special role of these judges and proposed that they be chosen in a special way. For example, some of the judges were to be former politicians, others judges, etc. Once chosen, however, Kelsen proposed to give the constitutional court the final (and exclusive) power to determine the meaning of the constitution for everybody within the system. The US Supreme Court, in short, is in a very different position from this kind of classic constitutional court.

#### IV. Systems Pluralism, Institutional Pluralism, and the Grammar of Legitimacy

My project, then, is to work through the lack of settlement of final legal authority in the United States and compare it with the lack of settlement of final legal authority in the European Union and elsewhere. Put another way, the comparison is between the vertical competition among systems in the European Union and the horizontal competition among interpretive institutions within a single system in the United States. We can call one kind of competition *systems pluralism* and the other *institutional pluralism* (or, more precisely, *interpretive pluralism*). And the question is, can we learn anything from the comparison beyond the fact that there is pluralism in both of these situations, despite the analytical difference between the two phenomena? I suggest: yes.

First, even though legal hierarchy in the European Union is unsettled and legal hierarchy among the institutions in the United States is unsettled, neither situation creates chaos. Both the European Union and the United States are functioning legal systems. So, the lack of settlement does not produce disorder. Second, the lack of settlement in both situations is an essential characteristic of the legal system. In neither system is the lack of settlement a mistake that we must fix or overcome. In both systems it is a central feature of the system that is here to stay.

Third, and most important, I investigate how this lack of settlement is managed. What I find is that the lack of settlement is not managed by resort to any normative hierarchy that lies beyond the actors. It is managed, instead, in a decentralized way by the actors them-

selves, each appealing to the values of the system(s) of which they form a part. The battles between these different organs are carried out from what you might call an internal perspective. Nobody is trying to turn this into a revolution. On the contrary, every interpreter claims to be the best interpreter of the system we currently have. This was true for Franklin D. Roosevelt, who did not want a new constitution, but a “proper” interpretation of the one we had. Similarly, in the Maastricht decision, the *Bundesverfassungsgericht* did not seek to engineer a revolution. The German judges, too, were trying to make the best of the system – or combination of systems – that they inhabit.

The values that provide the foundation for this competition among multiple actors are those of constitutionalism, by which I mean the idea of *limited collective self-governance*. Put another way, to win accommodation on the part of their rivals, the various actors in this pluralist constellation must present their claim of legal authority as vindicating the idea of limited collective self-governance.

I propose that we can further break this idea down into three constitutive values, which I have called *voice, rights, and expertise*. In brief, voice is the idea of the relevant political will; rights the idea of individual (or, better, counter-majoritarian) rights; and expertise the idea of knowledge-based governance and instrumental capacity. The first two are rather plausible ingredients of constitutional legitimacy, so let me say a brief word about the third. The idea of expertise captures two things. First, that governance must respond to the world as we understand it. That is, modern liberal governance is the idea of governance based on what you might call “proper knowledge” of the world (as opposed to some fanciful mystical construct of the world). Second, the idea of expertise is that self-governance is not simply about expressing our will or protecting rights but also about getting something done. For example, Fritz Scharpf has talked about this in terms of “output legitimacy”; Ralf Dahrendorf has talked about this when noting that a government that doesn’t deliver a certain form of a social stability and economic safety will wind up de-legitimized; and Seymour Lipset suggested a similar focus on satisfying the population’s needs long ago as well. The idea of “expertise” in the trilogy of constitutional values seeks to capture these ideas.

These three values – voice, rights, and expertise – constitute what I call a kind of *grammar of legitimacy*. The various institutions locked in battles of pluralism must appeal to a combination of these three values whenever making their claim to authority within a system of modern liberal governance.

This means that the various actors do not simply appeal to power. To be sure, power considerations may not be entirely absent. And sometimes actors are unprincipled. But to

the extent that this is a legal practice – and certainly to the extent that this is presented as a principled contest – the various actors resort to this grammar of legitimacy as a way to make their claims. Perhaps there is an element of hypocrisy in this, but, as Jon Elster said, it is hypocrisy with a “civilizing effect.” So if you are a constitutional court, you have to make an argument about why your position is the correct position and why it realizes the values of constitutionalism better than the alternatives you want to reject. Your claim is that your legal position – and your claim to legal authority – somehow vindicates voice, rights, and expertise better than the alternatives proposed by others. Either you represent the more relevant political will or are better at representing the political will that others seek to represent, or you are protecting rights better than the others, or you actually know something about this problem that others do not. And that is why they should listen to you.

Without getting into the taxonomy too much, let me note just briefly that the centrality of these three ideas to the legitimacy of authority is suggested also by the fact that these three values are mutually constitutive. Put another way, you cannot have a functioning claim of rights without some understanding of voice; you cannot have a functioning understanding of voice without drawing on an implicit understanding of expertise and rights; and you cannot make a respectable claim of expertise without having some implicit understanding of rights and voice. One way or another, you need all three to make a legitimate claim to public power.

## V. The Practice of Pluralism: Contest and Accommodation

As an empirical matter, I suggest that in looking at systems conflicts and institutional conflicts within systems we see appeals to voice, rights, and expertise. I will give you some examples, although I will limit these to cases in which a voice claim is pitted against a voice claim, an expertise claim is pitted against an expertise claim, and a rights claim is pitted against a rights claim. To be sure, any combination of these three may be pitted against any other combination, but the following should be sufficient to illustrate the basic idea I want to get across. The important point to see is that no single institution of government – in the United States, for example, neither the President nor the Congress nor the Supreme Court – has an exclusive claim to any one of these.

In this sense, the idea of voice, expertise, and rights differs from Montesquieu’s functional separation of powers, which assigns each of these claims to a distinct branch of gov-

ernment. Following Montesquieu, then, one might think that the courts protect rights, the Congress vindicates voice, and the President administers based on expertise. Pluralism rejects this idea of neat functional separation of powers. Instead, the idea is that, in principle, each of these institutions can lay claim to vindicating any one of these values. To be sure, one institution might frequently be better at laying claim to one or another of these values, but no institution has an exclusive claim to any one of them. Moreover, a claim of authority can – and often is – based on more than one of these values.

### A. Conflict and Accommodation Based in Voice

#### 1. Institutional Pluralism in the United States

Let me give you just a taste of voice-based conflict and accommodation in the United States. You might think that in the United States the Congress always has a superior claim to voice. In a rather simple way, the Congress represents the national political will. The President does too, since he is indirectly elected by the people. But do the federal courts or the Supreme Court? The judiciary has only a remote connection to the electorate and so would not be thought of as representing the political will. (Indeed, that, in a nutshell, is the core of Alexander Bickel's well-worn "counter-majoritarian" difficulty, i.e., the problem that an unelected Court has the power to strike down decisions reached through the majoritarian process in Congress.) But think again. As scholars from Hans Kelsen to Bruce Ackerman have argued, the Supreme Court often – if not indeed always – grounds its claim to authority in voice. The argument is simple. The Court claims to vindicate the more considered will of the people as against the less considered transitory will of the currently constituted political branches. The counter-majoritarian difficulty, then, is really an inter-temporal difficulty with democracy on both sides of the ledger.

You can often see this kind of reasoning at work in the judiciary. For example, a court may narrow down a statute because it may violate, say, international law or limit executive action by reading a statute broadly to incorporate international law. The question is not whether Congress could violate international law if it so chose, but whether Congress's decision to violate international law represents the considered choice of the American people in light of the more general commitment not to be an international outlaw. A court may suggest that Congress in such cases must speak clearly before the Court will read Congress as having intended to violate international law.

Now, of course, sometimes a voice-based claim to authority can actually work against the Court, as it may have done when President Roosevelt threatened to pack the Court. The President claimed to have a mandate from the American people by virtue of having been elected three times and in landslide elections. The President threatened to appoint one new Justice for every Justice over the age of 70, which would have allowed the President to control the political makeup of a majority on the Court. In addition to claiming a popular mandate – i.e., the political backing of the people – for his vision of the Constitution, the President also invoked the idea of “expertise” to support his vision of federal power. The court-packing plan was justified not only by electoral politics, but also by the idea that modern experience and a modern understanding of the needs of governance were lacking on the Court. The Court, so FDR, was in need of younger Justices who were more familiar with the demands of modern governance. His claim, then, was based in voice and expertise. Whether the court-packing plan itself led to the famous “switch in time that saved nine,” that is, to the change in Supreme Court interpretation that allowed FDR’s New Deal to go forward, is in doubt. Less in doubt, however, is that the Court did change its interpretation at a time when a highly popular President who was invoking the necessities of the day was pushing hard for the Court to change its views.

## 2. Systems Pluralism in the European Union

Turning to the European Union, you might think that the superior voice-based claim of legitimacy inevitably lies with the member states. After all, they are the ones who have functioning democracies, whereas the European Union still labors under the notorious democratic deficit. And indeed, there is some truth to this description of the state of affairs. When the question concerns voice-based claim of legitimacy, the Union does face a real struggle.

But the idea of voice-based legitimacy need not always cut against the authority of Union. Sometimes, the European Union has a superior claim because it actually represents interests that are left out of the member-state political process. Certain interests, such as those of consumers (as opposed to producers) may be better represented on the EU level than on the Member State level. This is a point that may have general force in the sense that the EU level of politics can at times counteract a certain kind of political capture of the state political process.



Moreover, the EU can also trace a voice-based claim to legitimacy back to the foundational treaties among the Member States. This means that a calculus of voice – i.e., determining whether a particular EU measure or a conflicting Member State measure has the better claim of representing the relevant political will – may sometimes cut in favor of the EU, based on the prior commitment of the Member State to join the EU.

Think, for example, of the European Communities Act of 1972 in the United Kingdom, which basically provides that EU law will be given effect within the United Kingdom. Properly understood, this creates a presumption that the political will to join the European Union in 1972 was formed on a deeper level than any decision in the course of ordinary legislation that winds up creating a conflict with EU law after that. As a result, the strong presumption is that current law is not to be taken as a considered rejection of European Union law. Nonetheless, the British Parliament could tomorrow abolish the European Communities Act of 1972. What is more, the UK Parliament might even enact a particular substantive law (say, about selling goods only in imperial measurements) that directly conflicts with EU law and potentially prevail in a British court, as long as the law explicitly sought to contradict EU law. To be sure, such a law would be difficult to maintain alongside continued UK membership, but the considerations that would govern the applicability of such a law in a UK court would, at least in part, depend on an account of the proper domestic voice. To oversimplify, the Parliament is deemed to have accepted EU law unless it raises a rather specific and express objection and that objection is either compatible with continued membership in the European Union or itself amounts to a considered rejection of European Union law altogether.

An interesting example in this regard is the European Arrest Warrant. It was passed hastily in the wake of 9/11 after years of general resistance to the idea. Soon after being passed, it ran into difficulties with Member States resisting the implementation of the EAW. Poland's Constitutional Court held that certain aspects of the European Arrest Warrant – especially those pertaining to the arrest of Polish citizens – were unconstitutional under Poland's constitution as then written. The constitutional court gave Parliament 18 months to amend the constitution. The Polish parliament did so, but did not entirely eliminate all barriers to the implementation of the EAW. Incompatibilities between Polish constitutional law and the EAW remain. But now, the implementation of the EAW faces a considered choice on the part of the Polish constitutional legislature to resist the mandates of EU law. This now presents a real problem for the European Union. And it would be surprising if the European Commission, which recently was given the power to bring enforcement ac-

tions in this area, would pursue Poland's infringement. At this point in time, the conflict between the EAW and Poland's Constitution is not accidental, but has the force of a considered political decision on the part of Poland's parliament. In such a case, the European Union has a very thin basis in voice to support European law as against national law. To be sure, from the perspective of Union law taken in isolation, the EAW is as valid as it ever was. But the time may be ripe for inter-systemic accommodation.

## B. Conflict and Accommodation Based in Expertise

Expertise-based conflict and accommodation are more frequently hidden than the conflict and accommodation in the other domains are. And I shall only sketch the idea out briefly here. Fleshing this out more will be one of the tasks ahead in carrying this project further to its conclusion. But let me nonetheless give you an idea of what I mean.

### 1. Systems Pluralism in the European Union

In Europe the basic argument from expertise is an old one that indeed demands little elaboration. The original vision of European authority was almost entirely based in expertise. Jean Monnet's idea was that of an expert bureaucracy in charge of technocratic decisions that would enhance the welfare of all Europeans. To be sure, there was some idea that the "output" of European integration would be appreciated (and one might even say, ratified) *ex post* by the public. But the legitimacy of the action as conceived of, and presented, for example, in the Schumann declaration, was independently legitimate because of the actual output it would deliver. There was little voice-based input into the plan or its initial execution. Jean Monnet's dirigiste vision, remember, originally left out any sort of parliament. Monnet was not a supporter of the Assembly, which only much later turned into the European Parliament and today is a co-equal legislative body. Although it has become increasingly problematic as time goes on, it was an expertise-based claim to legitimacy that originally supported much of the European claim to authority.

### 2. Institutional Pluralism in the United States

In the United States, we also see expertise-based claims to constitutional authority in the standoff between the various institutions and branches. Presidential claims of authority in

matters of foreign defense and security have often been based in expertise. This does not mean that the executive branch always wins on these issues, as some of the recent Supreme Court decisions surrounding the detention and trial of enemy combatants have shown. Sometimes the Judiciary (and Congress) will defer to the President and sometimes they will not. But the terms of the deferral, where it occurs, is often that in foreign affairs the courts lack the expertise of the President and the political branches – even in questions that have constitutional implications.

Even in more mundane areas, such as commercial regulation, the Court will often defer to the political branches in part because it does not believe that it, the Court, has the tools to answer the constitutional question with any precision. In this vein, the Court will hold, for example, that as long as a particular piece of economic legislation is within the ballpark of acceptability, judges will not closely examine the degree of the law's necessity for the regulation of interstate commerce. The Court will leave this more precise judgment up to the political branches. This means the political branches may well conclude that a given Act is not within the federal government's constitutional power (as President Jackson did in the case of the Bank), even though the Court would uphold the Act if it were passed, signed, and enforced.

Regardless whether the President, the Congress, or the Court wins the battle of authority based in expertise, it is important to see that nobody directs these institutions from above in what to do. They reach these accommodations on their own. And they base these accommodations not on sheer power considerations, but on considerations of constitutional governance. That is, they base these accommodations – or at least they justify them publicly as having been reached – on a relative assessment of voice and, in this case, expertise as well.

### C. Conflict and Accommodation Based in Rights

Courts are traditionally conceived of as playing a special role in the protection of rights. This means that any type of accommodation of competing claims to rights protection seems to strike at the very heart of the judicial enterprise. And yet, we witness interesting elements of rights accommodation in both the United States and the European Union.

## 1. Institutional Pluralism in the United States

In the United States and in many other systems you might think that rights mean courts. You might think that courts enforce rights against the expression of an overbearing majority in parliament. Think again. The Supreme Court of the United States gave us the *Dred Scott* decision that said a freed slave could never be a citizen of the United States. The Supreme Court of the United States upheld racial segregation during the Reconstruction era. And the Supreme Court of the United States – in an opinion written by the great Justice Oliver Wendell Holmes – told black citizens of Alabama long after the end of the Civil War that even though the state prohibited African-Americans from voting, there was nothing the judiciary could do about it.

When did the Court begin enforcing rights? Judicial enforcement of equal protection rights of minorities was but a trickle in the early 20th century. When the judiciary stepped up in earnest to protect racial minorities, the executive branch had already desegregated the armed forces, and Congress was not long behind. This is not to suggest that the Court did not push ahead of the political branches when it struck down segregation in public schools in *Brown vs. Board of Education* in 1954. But the Court's leadership in racial equality had been sorely lacking for nearly 75 years.

Congress knew better than to rely on the Courts alone. The Civil War Amendments ending slavery and providing guarantees of citizenship, equal protection, due process, and voting rights granted specific enforcement powers to Congress – not the Courts. The final clause in each of the 13th, 14th, and 15th Amendments says, “The Congress shall have power to enforce this article by appropriate legislation.” This was, in part, a reaction to the *Dred Scott* decision, which the 14th Amendment was, among other things, designed to overturn. And, indeed, the distrust of the Supreme Court implicit in these amendments was initially born out. When Congress passed civil rights legislation shortly after the Civil War, the Court struck down most of it, arguing that Congress had overstepped its powers.

It was only after Congress again passed historic measures in 1964 (the Civil Rights Act) and 1965 (the Voting Rights Act) in the wake of the national civil rights movement that the Court let the measures stand. And here, the Court indeed began to grant to Congress a wide berth. In a series of cases beginning in the mid-1960s, the Supreme Court expressly recognized the power of Congress to protect rights more expansively than the Supreme Court itself did. For example, the Supreme Court upheld provisions of the Voting Rights Act of 1965 that prohibited the use of literacy tests for voters. Even though the Court had previ-

ously said that literacy tests did not themselves violate the Constitution, the Court said that Congress could, in its judgment, prohibit literacy tests in an effort to protect constitutional rights.

More recently – in the past 15 years – the Court has sought to cut down Congress' discretion. In more recent cases, said it has ruled that the Congress' enforcement power under the Civil Rights Amendments only allows Congress to protect those rights that the Court itself has found to exist. More specifically, the Court has said it will examine whether Congress' legislation is congruent and proportional to protecting or remedying a constitutional violation as determined by the Court. In short, Congress today – at least according to the Court – has the power only to protect those rights that the Court says are rights. No more and no less.

There is a highly relevant twist to this latest doctrinal development. The Court has not (yet) touched the Voting Rights Act of 1965 or the Civil Rights Act of 1964, even though both of these laws have provisions that may be questionable under the Court's current doctrine. It seems that the Court has been exceptionally cautious in approaching the constitutionality of these two statutes, in part, because these statutes express deep national commitments to civil rights. Indeed, last year, when the question of the continued constitutionality of a particular section of the Voting Rights Act came before the Court, the judges expressed their concern about the law but made the case go away by interpreting the statute in an unusually inventive manner.

What we see here, then, is a dialogue between the judiciary and the Congress. In this most recent episode, the Court has hesitated to strike down a law protecting rights in part because the law seems to have the full backing of Congress. And yet, the Court has not simply given in. It has put Congress on the spot by signaling that the law better be fixed (or, perhaps, reaffirmed in a more considered judgment than has happened in the past) or else it will be struck down next time around. This, then, is not judicial supremacy but hard, inter-institutional dialogue as voice- and rights-based claims come together in a conflict over constitutional interpretation.

## 2. Systems Pluralism in the European Union

Let us turn to rights in the European Union. The authority of the European Union has been challenged by the Member States not only based on voice, not only based on expertise, but also based on rights. Indeed, rights have figured most prominently in the battle of authority

between the European Union and the Member States. As many of you know, in the 1974 *Solange I* decision, the German *Bundesverfassungsgericht* told the ECJ that the German court would protect German constitutional rights against European infringement as long as there was no rights protection on the European level of governance. In response, the European Court of Justice “found” rights guarantees in the European legal order itself and began enforcing these rights against European law. Twelve years later, the *Bundesverfassungsgericht* acknowledged this development in *Solange II* and stepped back, allowing the European Court of Justice to enforce rights as long as the general level of rights protection on the European level remained acceptable.

Notice, however, that in a rights-based clash of authority between legal systems, both sides can invoke rights. This means that at some future point in time, the European Court of Justice might say that the Member States are insufficiently rights-protective. Given that the scope of European Union law is rather broad today, the supervisory reach of the European Court of Justice can be vast. And perhaps the European Court of Justice will announce that it, too, will hold back on exploiting its full reach only “as long as” the Member States do an adequate job of rights protection generally. This kind of “reverse-Solange” move can be seen in some of the decisions of Advocate General Miguel Maduro, for example. So here, too, we come across rights as the last element of this grammar of legitimacy within which these various actors argue about their various claims to authority.

## VI. Caveat and Conclusion

Before closing, let me add one other point about the comparison I have drawn here today. I have juxtaposed two situations. On the one hand, I have provided an idealized description of the US federal system in which there is no pluralism vertically. And I have provided an idealized description of the German situation of separation of powers in which there seems to be no pluralism horizontally. I then contrasted each of these with a situation in which there is vertical *systems pluralism* (the relationship between the European Union and its Member States) and horizontal *institutional pluralism* (the relationship between the President, the Congress, and the Supreme Court in the United States). Before closing let me just acknowledge that hierarchy between central and component state legal systems might not always be (or have been) as settled as I made it out to be today. And, perhaps more interesting, I would like to suggest that the constitutional monopoly of the German *Bundesverfas-*

*sungsgericht* over constitutional interpretation in Germany might also be less well established than is generally taken to be the case. On the latter point, consider only the authority of the *BVG* to bind all other actors within the system to its vision of the *Grundgesetz*. Where do we find this provision? As most of you will know, that provision is not in the *Grundgesetz* itself, but in an ordinary law, the *Bundesverfassungsgerichtsgesetz* paragraph 31. So it is ultimately the German parliament that elevates the *Bundesverfassungsgericht* to the position of binding all other actors within the system. The parliament could, as a formal matter, revoke this provision, and indeed during the Adenauer era the government and its parliamentary majority threatened to make serious inroads into the German high court's jurisdiction because the government was displeased with that court's legal interpretation. My point in this closing qualification is simply to say that things are perhaps even more complicated than I suggested with my background assumption that in the United States we have a complete vertical hierarchy and that in Germany there is a complete hierarchy among the various branches of government when it comes to constitutional interpretation. In short, there may be more pluralism to constitutional law than initially meets the eye, here as well. Indeed, some form of pluralism might even be essential to all constitutional systems. But that is a much broader claim than even I am willing to defend right here right now.

So let me summarize. If we compare the European Union to the United States, we learn something about pluralism. We learn that pluralism is an essential feature of these various systems. We learn that it does not lead to chaos but represents a system of order. We learn that the system of order is managed in a decentralized manner. And that it is managed by appeal to the fundamental values of constitutionalism. If we want to return to talking about global governance in the register of constitutionalism, we might imagine this not in a rigidly hierarchical way. Instead, we might begin by imagining here, too, a plural decentralized construct in which multiple actors make competing claims to legal authority and that these competing claims will be managed by contest and accommodation among the various actors claiming to vindicate the values of voice, expertise, and rights.

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This lecture presented ideas that are discussed in a more formal manner and with appropriate references in the following publications:

- Halberstam, Daniel. "Local, Global, and Plural Constitutionalism: Europe Meets the World." In *The Worlds of European Constitutionalism*, edited by Grainne de Burca and Joseph Weiler. Cambridge Univ. Press, forthcoming 2010, available at: <http://ssrn.com/abstract=1521016>
- "The United Nations, the European Union, and the King of Sweden: Economic Sanctions and Individual Rights in a Plural World Order." (with Eric Stein). *Common Market Law Review* 46 (2009), available at: <http://ssrn.com/abstract=1312082>
  - "Constitutional Heterarchy: The Centrality of Conflict in the United States and Europe." In *Ruling the World? Constitutionalism, International Law, and Global Government*, edited by Jeff Dunoff and Joel Trachtman. Cambridge Univ. Press, 2009, available at: <http://ssrn.com/abstract=1147769>



WER EINEN ROMAN SCHREIBT – SOLLTE DER WISSEN,  
WAS EIN ROMAN IST?  
MARTIN MOSEBACH

Ich war dreißig Jahre alt, und hatte soeben meine juristischen Studien mehr schlecht als recht abgeschlossen und noch keine der kleinen Erzählungen und Stilexperimente aus meiner Referendarzeit veröffentlicht, als mich die Lektorin eines Verlages, die die Manuskripte gelesen hatte, fragte, ob ich nicht auch einen Roman schreiben könne. Ich hatte bisher noch keinen Gedanken auf einen eigenen Roman verwandt und zögerte dennoch keinen Augenblick, ja zu sagen, wie ich mehr oder weniger zu allen Zumutungen oder Versuchen in meinem Leben ja gesagt habe. Ich hatte trotz meiner Neigung zur Literatur Jura studiert, weil ich einen ausgeprägten Widerwillen gegen jede Art von literarischer Theorie verspürte, und das ohne sie näher zu kennen als alles, was sonst so an einen heran gespült wird. Es war meine grundsätzliche Überzeugung, es sei besser, ein Gegenstand der Philosophie zu sein als selbst zu philosophieren. So begann ich denn recht bedenkenlos drauflos zu erzählen, mit großer Handschrift, wie d'Annunzio Berge von Papier verbrauchend, bis ich nach etwa einem Jahr ins Stocken geriet; die Planlosigkeit rächte sich, alles war möglich, und diese Unbeschränktheit erzeugte unüberwindliche Blockaden. Damals lernte ich eine Wienerin kennen, die Förster-Streffleur hieß; ich schrieb ihr einen Brief und betrachtete auf dem Umschlag eine Weile unverwandt ihren Namen, bis ich plötzlich feststellte, dass der zweite Teil dieses Namens beinah ein Anagramm des ersten Teils war – nur das L war überzählig. So kam ich zur Lösung meines Problems: Ich würde den zweiten Teil meines Romans einfach mit denselben Figuren wie im ersten erzählen, nur in anderer Anordnung, unter Hinzufügung von ein oder zwei neuen Elementen. Ich kann nicht behaupten, dass dieser Roman mit dem Titel „Das Bett“ mir aus den Händen gerissen worden wäre, aber ich blicke immer noch freundlich auf ihn.

Der zweite Roman wurde durch eine Goethe-Maxime inspiriert: „Wir sind naturforschend Pantheisten, episch Polytheisten, moralisch Monotheisten.“ Ich nahm mir Tsche-

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Abendvortrag am Wissenschaftskolleg zu Berlin am 19. Mai 2010.

chows Kirschgarten-Stoff und stellte mir vor, seine Protagonisten seien bürgerlich-modern kostümierte griechische Götter. Götter haben die Eigenschaft, in ihren Ressorts einander feindselig gegenüberzustehen, zugleich aber allesamt recht zu haben und in ihren Kämpfen und Göttermählern ewig zu leben. Die Verkleidung meiner Götter ist mir offenbar allzu gut gelungen; die wenigen Leser von „Ruppertshain“ glaubten, es sei ein Roman über Immobilienspekulation und fanden, dass ich mit diesem ernsten Thema zu leichtfertig umgegangen sei. Danach begann ich den Roman „Westend“, drohte nach munterem Anfang bald schon in ihm zu versinken und stellte nach drei oder vier Jahren fest, dass es nun an der Zeit sei, mich zu entscheiden, ob ich wirklich Schriftsteller werden wollte.

Das Bild selig-theorielosen Produzierens, das ich hier entworfen habe, entbehrt nicht einer gewissen Unwahrhaftigkeit, denn es war selbstverständlich keinen Augenblick so, als sei mir oder einem meiner Zeitgenossen ein voraussetzungsloses Erzählen auch nur im Traum möglich gewesen. So begeisternd für den jungen Autor die Vorstellung auch sein mag, er schreibe den ersten Roman – nicht den ersten eigenen wohlgemerkt, sondern den ersten überhaupt –, sie wird sich nur in den flüchtigen Augenblicken der Berauschtigkeit durchhalten lassen. Das Reich der Romane ist überbevölkert; es wird von einem Riesengeschlecht toter Schriftsteller bewohnt, die mit der Zeit immer noch weiter wachsen, wie der Prophet Samuel, der in seinem Sarkophag zu Samarkand beständig größer wird und inzwischen schon über sechs Meter misst. Aber auch die neueren, kleineren Autoren haben eindringliche Stimmen, die verführerisch dissonant klingen. Da hatte die Warnung meines Vaters viel für sich, es sei ein sinnloses Unterfangen, dem Romankosmos noch eigene Bücher hinzuzufügen, wenn meine Lebenszeit ohnehin nicht ausreiche, dem bereits Geleisteten auch nur annähernd gerecht zu werden. Schon nach oberflächlicher Würdigung auch nur einiger der großen Romane musste mir klar sein, dass es Gesetze des Erzählens gab, die sich in Jahrhunderten herausgebildet hatten, ja, dass es einen großen, manchmal unhörbaren, aber immer gegenwärtigen Rhythmus gab, nach dem die europäischen Erzähler hüpfen, tanzen oder würdig voranschritten, je nach Temperament, aber bei aller Verschiedenheit eben doch einer grundsätzlichen gemeinschaftlichen Ordnung verpflichtet. Diese gemeinsame Tradition und ihre allmähliche Verwandlung oder besser Entfaltung, so wie sich ein großer Organismus beim Altern und Reifen entwickelt, nehmen die Leser als unterirdische Strömung unter dem äußeren Gang der Handlung wahr. Auf die Frage, was ein Roman sei, gibt es unzählige Antworten, aber die Leser wissen es besser, auch ohne Definition; so ungreifbar, so proteushaft, wie die Legende tut, ist der Roman gar nicht. Seine kühnsten Formsprengungen und Gattungsüberwindungen waren von Beginn an in

ihm angelegt. Als Horaz an der Ilias rühmte, dass Homer nicht pedantisch „ab ovo“ erzähle, sondern den zehnjährigen Krieg in ein paar Wochen zusammendränge – ohne sich im Übrigen das spektakuläre Ende, das er einfach unter den Tisch fallen ließ, als Schmankerl aufzusparen –, da war dies Werk schon sechs- oder achthundert Jahre alt; die gegenwärtige Forschung neigt wohl eher zur Spätdatierung. Und wenn dies Mittel der Zeitverdichtung heute angewandt wird, kann es immer noch so frisch wirken, als sei es eine originelle Erfindung, die alle überrascht. Also nichts da von Unschuld und Naivität des theorieunkundigen Neophyten: Wer Romane liest – und das habe ich, bevor ich welche zu schreiben begann, in reichlichem Maße getan –, in den ist genug Modellhaftes, Erzähltechnisches, Typologisches eingesickert, auch wenn er sich darüber noch keine Rechenschaft abgelegt hat. Und die Pseudounschuld des sich mit seiner Theorielosigkeit brüstenden Autors, im besten Fall einer novellistischen Demi-Vierge, birgt auch Gefahren. Dalí's Wort, wer die Tradition nicht kenne, könne nur Plagiate hervorbringen, spricht von der Neigung des Originalgenies, bei sich für neuartig zu halten, was lange vor ihm schon meisterhaft bewältigt worden ist.

Auch ich habe aber schließlich, nachdem ich die mir wichtigsten Bücher schon geschrieben hatte, einen Romantheoretiker gefunden, den ich dankbar als *meinen* Romantheoretiker annehmen konnte, der beim Namen nannte, was ich nur geahnt hatte, und den ich mit der Liebe gelesen habe, die nur ein Buch in uns wecken kann, das uns in unseren Anschauungen bestätigt – dieser Satz gilt natürlich nicht für Wissenschaftler, die sich bekanntlich gern und vorbehaltlos in ihren vorgefassten Meinungen erschüttern und revidieren lassen. Erich Auerbachs Werk „Mimesis“ ist nun über sechzig Jahre alt, und ich bedaure unendlich, dass ich nicht zu Füßen dieses großen Lehrers sitzen konnte, dessen Lebenszeit sich mit der meinen um wenige Jahre überschneidet. Er hat die Gründungssätze des nachantiken, des europäischen und damit auch des modernen Romans benannt; jeder kennt sie, sie stehen im zweiten Kapitel des Lukas-Evangeliums: „Es begab sich aber zu jener Zeit, dass ein Gebot von dem Kaiser Augustus ausging, dass alle Welt geschätzt würde, ein jeglicher in seiner Stadt; da machte sich auch auf Joseph aus Galilea aus der Stadt Nazareth nach der Stadt Davids, die da heißt Bethlehem in dem jüdischen Land, dass er sich schätzen ließe mit Maria seinem angetrauten Weibe, die war schwanger.“ Mit diesen Zeilen eröffnet sich die Möglichkeit eines neuen Blicks auf die Welt: Die große Geschichte, die Weltpolitik, der Gründer des römischen Kaisertums, dessen Wirken bis in die Gegenwart reicht, werden darin mit einer armen Handwerkerfamilie aus einer vernachlässigten Kolonie des Römerreichs zusammengespannt, und so etwas ist bis dahin undenkbar gewesen. Von nun

an können Werke entstehen, die die Gattungsbegriffe der Antike aufheben. Bis zu diesem historischen Moment waren in der Literatur das Erhabene und das Alltägliche, die Sphären der Heroen und der kleinen Leute, die großen Zeremonien und die formlose Banalität streng voneinander geschieden. Aber nun verschmolzen *sermo sublimis* und *sermo humilis* zu einer Prosa, die die Sprache des europäischen Romans werden sollte. Auerbach hat sein Werk während des Kriegs in Istanbul geschrieben; der Istanbul der Universität müssen die Deutschen ewig dankbar sein, dass sie den Flüchtling auf einen Lehrstuhl berief, doch eine dieser Arbeit genügende Bibliothek gab es am Bosphorus damals nicht. So hat Auerbach die „Mimesis“, wie er berichtet, weitgehend ohne Bücher geschrieben – er bekennt sogar, dass sein Buch anders wahrscheinlich nie entstanden wäre. Liegt in dieser Entstehungsweise auch der Grund, warum ich es mit solcher Freude gelesen habe?

Wenn ich nun beginne, einige Gedanken über den Roman auszusprechen, geschieht dies gleichsam im Gespräch mit Erich Auerbach, durch ihn angeregt, ihn gelegentlich weiterspinnend und mit Eigenem vermischt. Die Frage, was diese Überlegungen für meine Romane bedeuten könnten, stelle ich mir nicht, aber da mein Denken und mein Tun nicht mehr als üblich auseinanderklaffen, wird sich ein gewisser Zusammenhang nicht leugnen lassen.

### Ist Realismus etwas Wirkliches?

Es war ein alter Verfassungsrechtler, der mich mit seinem Missvergnügen und seinen Bedenken gegen die literarische Form des Romans in Verlegenheit brachte: „Ich verstehe nicht, weshalb man Romane liest“, sagte er. „Da heißt es dann: ‚Der Baron stand auf den Zinnen seiner Burg und blickte über die Felder, die in der Abendsonne lagen‘ – wenn er das in Wahrheit doch gar nicht getan hat, ja, wenn es diesen Baron doch überhaupt nicht gab.“ Man sieht, welchen Typus Roman der Jurist im Auge hatte, aber er hätte seine Bedenken auch äußern dürfen, wenn der Roman mit den Worten begonnen hätte: „Der Junkie Kevin öffnete den Eisschrank und blickte auf eine angebohrte, verschimmelte Velvet-Ecke.“ Wann das Interesse der Menschheit an fiktionalen Erzählungen erwacht ist und welche Gründe es dafür gegeben haben mag, wann aus Mythen, die keinesfalls Fiktionen sein wollten, wann aus Epen, die sich als Geschichtswerke begriffen, Mythologien wurden, deren sich die individuelle künstlerische Phantasie bemächtigte, wann Märchen, die in ihrem Kern historische Ereignisse aufbewahrten, sich in Unterhaltungsstoff verwandelten, der zur literarischen Disposition der Erzähler stand – das soll hier nicht weiter erörtert

werden. Und zwar nicht aus Geringschätzung für die Vielzahl der dazu angehäuften Erklärungen, sondern weil es für den Romancier unfruchtbar ist, sich die Welt ohne Romane vorzustellen, so wenig wie ein Pianist beim Einstudieren einer Haydn-Sonate von dem Gedanken profitieren kann, die Erfindung des Pianoforte sei im Grunde eine Absurdität. Es gibt ihn halt, den Roman, er erzählt, was sich niemals oder nicht in dieser Form ereignet hat, oder schlimmer: Er exzediert im heillosen Verdrehen, Verknüpfen und Durcheinanderwerfen von Erfundenem und Tatsächlichem auf moralisch bedenklichste Weise – das Durcheinanderwerfen ist bekanntlich das Metier des Diabolos. Und das wahrhaft Unbegreifliche, meinen würdigen Juristen Verstimmende liegt dabei doch in der Übung, den größten Teil der in den letzten Jahrhunderten geschriebenen Romane ganz selbstverständlich einem „Realismus“ zuzuordnen – was mag das wohl für ein Verhältnis zur Realität sein, das eine solche Verbindung des Unvereinbaren immer wieder erlaubt?

Es scheint da ein etwas fragwürdiges Spiel mit sehr feinen Kategorien zu geben: Da treten eine „Wahrheit“ und eine „Wirklichkeit“ und eine „Wahrscheinlichkeit“ gegeneinander an und versuchen zu beweisen, dass man ihren Ansprüchen auch genügen könne, wenn das im Roman Dargestellte nicht mit kriminalistischen Methoden zu sistieren sein sollte, wenn es sich vor den Schranken des Gerichts und unter Eid gar als schiere Lüge erweise.

Ich greife zum Anekdotischen, um zu illustrieren, wie der Begriff des Realismus im Roman vielleicht am besten verstanden werden könnte. Ein inzwischen verstorbener Pianist erzählte mir von den Verhältnissen im Hause Rubinstein, die er kannte, weil er dort so lange zu Gast gewesen war, bis Madame Rubinstein ihn auf die Straße setzte. Er bewahrte der Dame deshalb kein gutes Andenken. „Sie war eine fürchterliche Frau“, sagte er, „stellen Sie sich vor: sie hatte auf dem Klo einen Goya hängen.“ Ein Zuhörer protestierte: „Aber bitte – sie hatte doch keinen Goya auf dem Klo hängen!“ Der Pianist revidierte sich etwas gereizt: „Natürlich hatte sie keinen Goya auf dem Klo hängen – aber so war sie!“

Mein Jurist ist mit solchen Mätzchen nicht zu trösten, aber ich muss ihn seinem Gram überlassen, denn auch „der kreative Umgang mit der Wahrheit“ im Roman, um eine berüchtigte Formel zu gebrauchen, kann auf verschiedene Weise gehandhabt werden. Zwei Schulen sind es, die mich beschäftigt haben: der Naturalismus und der eigentliche Realismus. Das Bestreben, die Welt mit den Mitteln der Erfindung zu zeigen, wie sie ist, scheint dem Naturalismus und dem Realismus gemeinsam, aber der Naturalismus hat hier offenbar einen Vorsprung. Er sammelt bei seinen Recherchen unerschrocken alle Phänomene der Wirklichkeit, er blendet kein Wahrnehmungsorgan aus und weigert sich, den Ekel, die

Scham, den Takt, die Rücksicht als Grenzen seines Tuns zu akzeptieren. Er befürchtet, dass all dies von dem Interesse geleitet sein könnte, die geschilderten Verhältnisse irgendwie zu beschönigen, und dass solche Beschönigungsabsichten ein Zeugnis unwürdiger Ängste oder gar des handfesten Betrugs seien. Und diese Befürchtung trifft ja allzu oft ins Schwarze. Allzu oft werden unter dem Anschein realistischer Schilderung Verhältnisse idealisiert, harmonisiert, geschminkt und veredelt, und das nicht nur in der Absicht, eine angenehme Unterhaltung herzustellen, sondern auch mit durchaus politischen Nebengedanken, um die Verfälschung in den Dienst einer Propaganda zu stellen. Aber ist das Objektiv des Naturalismus mit der angestrebten eisigen, gnadenlosen Apperzeption denn wirklich so unbeteiligt, so unparteiisch gegenüber den Phänomenen, die es registriert? Könnte es nicht sein, dass der schonungslose Blick auf das Hässliche, das Abstoßende, das Übelriechende und Verfaulte in Wahrheit Symptom einer Gequältheit ist? Verbirgt sich hinter der Kälte des Naturalismus nicht vielleicht eine große Bitterkeit, eine tiefe Enttäuschung darüber, „dass nicht alle Blüenträume reifen“? Wird das Grausame und Abscheuerregende am Ende gar nicht deshalb ausgebreitet, weil es eben da ist, sondern weil es, ginge es mit rechten Dingen zu, gerade *nicht* da sein sollte? Wenn er auf die Eingeweide des Menschen zu sprechen kommt, ist da nicht eine geheime Verletztheit spürbar, dass wir innerlich nicht aus einem Röhrensystem aus Straßburger Fayence bestehen? Bis heute bewahren die Hervorbringungen des Naturalismus ihre Herkunft aus der barocken Vanitas-Mentalität, wenn auch zersprungene Lauten und elfenbeinpolierte Totenköpfe sich dekorativer ausnehmen als das Erbrochene neben der halbleeren O-Saft-Tüte, aber das sind Fragen des Zeitgeschmacks. So würde ich es für mich definieren: Der Naturalismus will, seinem tiefsten Antrieb entsprechend, darstellen, was nicht da sein sollte, empörenderweise aber dennoch da ist, um die Leser zum Aufstand gegen das existierende Böse zu ermutigen – und der Verdacht bleibt: Alles Daseiende ist böse. In seiner Darstellung der faktischen Verhältnisse ist er nicht zu übertreffen, aber dieser Gefühls- und Gedankenhintergrund schiebt sich während der Lektüre immer mehr nach vorn, bis sich in den Blut- und Urinlachen das verwundete Herz des Autors spiegelt, der sich für eine schönere Welt geboren glaubte.

Alles zu sagen, das ist freilich auch das Ziel des nicht- oder gar antinaturalistischen Realismus. Ein Ausweichen vor den tristen und schlimmen Aspekten der Welt will auch er sich nicht gestatten, obwohl er nicht davon überzeugt ist, dass gerade diese schlimmen Aspekte vor allem wahrheitsträchtig seien. Die Beschränkungen, die er sich auferlegt, entstammen aber nicht dem verhohlenen Wunsch, dem Unangenehmen ausweichen zu wollen, im Gegenteil. Aber zum Alles-Sagen des Realismus gehört oft genug auch das beredte

Schweigen, ja, das Schweigen ist für ihn ein so bezeichnendes Mittel, dass seine Liebhaber einen Autor oft nicht nur dafür rühmen, was und wie er spricht, sondern auch dafür, was alles er nicht gesagt hat. Bemerkenswert ist da zunächst seine Art zu sehen, nicht mit dem Mikroskop auf die Details gerichtet, sondern wie das menschliche Auge sieht, das die zahllosen Einzelheiten eines Bildes verbindet und blitzschnell zu einer Komposition zusammenfasst, in der Licht, Stimmung, Duft und Geräusch sich mit den Bildern unauflöslich vermählen. Realistisches Erzählen versucht unsere Erlebensweise nachzuahmen, die nicht analysiert, sondern das einzeln Wahrgenommene und unwillkürlich Ausgewählte mit einer Gesamtstimmung auflädt. In der Erinnerung kann diese Gesamtstimmung einer Situation durch die Evozierung eines einzelnen Details, in dem sie wie in einer verschlossenen Büchse gefangen gehalten wurde, wieder frei werden – sie ist wortlos, aber an ein Wort gebunden, sie überschreitet dies Wort, hätte sich ohne das Wort aber verflüchtigt. Man denke nur an die Häuser in Dostojewski-Romanen, die der Leser durchwandert zu haben glaubt, obwohl er beim Nachlesen zu seinem Verwundern feststellen muss, dass sie eigentlich kaum beschrieben worden sind.

Der Realismus kennt weiterhin ein Schweigen aus Scham. Während der Naturalismus den Leser auf Verhältnisse stoßen möchte, die ihm bis dahin fremd waren oder die er sich verborgen hat, rechnet der realistische Autor mit einem Leser, der viel oder gar alles weiß. Seine Scham ist keine Scheu, das Verborgene auszusprechen, sondern besteht in der Hemmung, das allen Gemeinsame und von allen gleichermaßen Erfahrene noch einmal auszustellen. „Sapienti sat – dem Wissenden genügt die Andeutung“, das ist die Devise der realistischen Literatur. Sie wendet sich an diese Wissenden, aber nicht im Sinne raunender Mitteilung an wenige Auserwählte, sondern in der Überzeugung, es gebe ein Wissen, das allen, die Herr ihrer Sinne sind und eine Weile gelebt haben, zugänglich ist. Hier zeigt sich der zutiefst soziale Zug realistischer Literatur, der die Lebenserfahrung der Leser einbezieht, auf sie angewiesen sein will und sie für die Vollendung des Werks sogar braucht.

Wenn hier von einer Haltung des Erzählers, von seinem Pakt mit dem Leser, der dem Erzählen Grenzen auferlegte, die Rede war, gibt es andererseits aber auch Stoffe, die sich dem realistischen Erzählen aus sich heraus verweigern. Sprache und Inhalt mögen im Roman noch so eng verwoben sein, es gibt Stoffe, die das kompositorische Ganze zerreißen lassen. Gefährlich sind der Romanprosa zum Beispiel Anekdoten, deren Pointen wie kleine Explosionen Löcher im Sprachgewebe hinterlassen. Was der Naturalismus wie ein scharfes Gewürz mühelos integriert, kann im realistischen Roman unverdaut wirken und zum peinlichen Makel werden. Ich habe dieses Problem einmal mit einer von mir bewunderten

Schriftstellerin besprochen, einer Meisterrealistin, die eine kleine Geschichte gehört hatte und beunruhigt war, weil sie sich nicht zutraute, sie in einem Roman unterzubringen. Ein Arzt erzählte ihr von seinem Liebesfiasco mit einer Krankenschwester nachts auf der Station, nachdem die Krankenschwester mitten in der leidenschaftlichsten Umarmung plötzlich in sein Ohr sagte: „Kollegin kommt gleich!“ Die Vulgarität dieser Bemerkung sei von einer Giftigkeit, die auf die Sprache, in die sie eingebettet werde, ausstrahle und sie zum Zerfall bringe, so dass in der Erinnerung des Lesers allein der fatale Satz hängen bleibe. Nein, sie war überzeugt, keine Kunst könne eine solche Bemerkung ins Lot bringen und mit dem übrigen Sprachmaterial fugenlos verbinden. Diese Frau hatte keine Angst vor grausamen und erschreckenden Stoffen; um so eindrucksvoller war mir ihre Ratlosigkeit angesichts einer blitzmädelhaften Frotzelei; sie fühlte sich außerstande, dergleichen in ihrer schmucklos-kühlen Prosa zu servieren.

Auch das Grauenhafte setzt der realistisch erzählenden Prosa eine Grenze, die oft schwer hinzunehmen ist und dennoch ein ernstes Hindernis bleibt. Das zwanzigste Jahrhundert ist das schwärzeste Jahrhundert in der Geschichte der Menschheit – dreist ist es von unserem Standpunkt aus, anderen Jahrhunderten das Fehlen von Humanität vorzuhalten – und so sollte man meinen, ein geborener Stoff des realistischen Romans seien die Schrecken dieser Epoche. Und doch waren sie das in viel geringerem Maße, als es die Fülle und Bedeutung der Ereignisse vermuten ließen. War das nur ein Ausweichen der Romaniers vor dem Unangenehmen? Oder gibt es Vorgänge, bei deren Darstellung sich die fiktionale Einkleidung und eine kunstvolle Dramaturgie verbieten? Wieso sollte die Technik des Romans, die aus Wirklichkeitsfragmenten ein neues Bild zusammensetzt, das gleichfalls Wirklichkeit für sich beansprucht, nicht in jedem Fall anwendbar sein? Ich möchte wieder versuchen, anhand eines Beispiels die Antwort zu finden. In den letzten Kriegstagen wurden in einem Lager bei Hamburg dort gefangen gehaltene Waisenkinder ermordet. Im Prozess gegen die Mörder schilderte einer der Angeklagten die Schwierigkeiten, die sich bei der Ausführung des Mordbefehls ergaben. Die Kinder sollten erhängt werden, aber das war nicht so einfach: „Sie waren zu leicht“, sagte der Angeklagte. Man stelle sich vor, ein Romanschreiber nähme sich dieses Stoffes an. Es müsste dann, so scheint mir, für den Leser zweifelsfrei klar werden, dass dieses „Sie waren zu leicht“ wirklich ausgesprochen wurde, dass es nicht etwa die Frucht schauriger Einfühlungsversuche des Autors ist. Würde es aber wirklich gesagt, muss dieser Satz dann nicht das Kunstgebäude des ihn bewahrenden oder besser: benutzenden Romans zum Einsturz bringen? Wird mit diesem „Sie waren zu leicht“ nicht vielmehr jener humane Konsensus angegriffen, der das Funda-



ment allen Zusammenlebens, damit aber auch alle Künste, einschließlich des Romanschreibens, darstellt? Auch wer die unbedingte Freiheit der Kunst fordert und sich über deren kleinste Einschränkung empört, müsste bei diesem Zitat doch erkennen, dass eine solche unbeschränkte Freiheit sich nur im Rahmen eben dieses Konsensus entfalten kann – auch wenn es inzwischen eine Tendenz gibt, mit dem Entsetzen nicht nur Spott, sondern auch Sport zu treiben: Welcher Roman schlägt den letzten Horror-Rekord? Welcher Leser hat so starke Nerven, dass er auch diesen Triumph noch konsumieren kann?

Auch für den realistischen Roman gilt das Gesetz, dass Gewinne stets mit Verlusten einhergehen. So hat der Roman für die Gewinne bei der Realitätsschilderung andere Gebiete aufgeben müssen, die gleichfalls zur Wirklichkeit gehören, mit den Mitteln des realistischen Romans aber nicht mehr erfasst werden können. Zu den schönsten Gedanken Erich Auerbachs gehört die Verbindung, die er zwischen dem nachantiken christlichen Roman und dem Sokrates im „Symposion“ stiftet. Er erinnert an den Ausklang des Gelages in den Morgenstunden, als schon die Hähne krächten und Sokrates inmitten der betrunkenen Schläfer ein Gespräch mit dem Tragödiendichter Agathon und dem Komödiendichter Aristophanes führte. Da „habe er sie genötigt zuzugeben, ein und derselbe Mann müsse es verstehen, eine Komödie und eine Tragödie zu schreiben, ein Tragödiendichter nach den Regeln der Kunst sei auch ein Komödiendichter“. Auerbach sieht in dieser Forderung einen Vorgriff auf das Christentum, das mit dem Roman ein neuartiges Genre hervorbringt: Keine Tragödie und keine Komödie, sondern beides untrennbar verflochten, eine Chronik komischen Unglücks und dunkel grundierten Glücks, scheiternder Helden, peinlicher Pechvögel, kümmerlicher Untergänge, fragwürdiger Siege, zwiespältiger Charaktere, unheilswangerer Albernheit. Wenn man genauer bestimmen wollte, was Platon hier vorhergesehen hat, käme man wohl zu der Erkenntnis, dass es sich weniger um eine neue Art von Werken handelt als um ein neues Bewusstsein des Künstlers, in dem sich tragische und komische Elemente gleichzeitig behaupten. Nach der christlichen Zeitenwende sind es eben nicht mehr nur Tragödien und Komödien, die er in bunter Abfolge aufs Papier wirft, sondern auch dies neuartige Gemisch aus beiden. Und damit wird sogleich auch der Verlust evident: Der Zugang zum prometheischen, tragischen Kampf mit den Göttern aber auch zur halbtierisch-destruktiv-anarchischen Lachlust des alten Satyrspiels ist auf dem Weg zu dieser neuen Kunst verlorengegangen. Der Roman wandelt nicht in den Höhen der Heroen und nicht in den Höllen teuflischer Verworfenheit, er bewegt sich in helleren und dunkleren Grauzonen. Das panegyrische Gedicht hat bis in die Moderne seinen Platz behauptet, ein panegyrischer Roman ist dagegen unvorstellbar. Die Heiligen und die Ver-

worfenen sind dem Roman gleichermaßen fremd, sein Filmmaterial verlangt nach einer gleichmäßigen guten Ausleuchtung und kann weder scharfes Sonnenlicht noch tiefe Finsternis dokumentieren.

Eine schöne islamische Legende erzählt von einem grausamen Kalifen, der sich nach seinem Tod zitternd dem Himmelstor nahte, vom Erzengel Gabriel zu seiner Überraschung aber ohne weiteres eingelassen wurde. „Erinnerst du dich nicht?“ fragt der Erzengel. „An jenem Freitag, als du auf dem Weg zur Moschee warst, lag an deinem Weg ein sterbender Hund in der prallen Sonne. Du hast ihn mit dem Pantoffel in den Schatten geschoben.“

Dieser Erzengel verkörpert die ästhetische Moral des Romanschreibers; sie gibt Hoffnung, aber ist vielleicht doch nicht das letzte Wort. Die Darstellungsweise des realistischen Romans war so bezwingend, dass sich die Mentalität der Leser verändert hat. Es verbreitete sich die Überzeugung, was der realistische Roman nicht darstellen könne, das gebe es auch nicht. Darin liegt die Verführung des Realismus: Dass man ihn mit der Wirklichkeit verwechseln kann.

#### Den Symbolen ist nicht zu entkommen

Einige der schönsten und kunstvollsten Romane könnten, betrachtet man sie kalt und unbeeindruckt, als Produkte von Aberglauben und Beziehungswahn erscheinen. Wer als Paranoiker von solchem Wahn geplagt wird, für den stellt sich die chaotische Welt überaus geordnet dar: Sie dreht sich mit allen ihren Gestalten und Ereignissen nur um den wahn-sinnigen Betrachter. Alle Leute haben nur ihn im Blick; jedes Wort wird nur in Bezug auf ihn gesprochen; die Vögel zwitschern sich Mitteilungen über ihn zu, was die Quellen murmeln, geht ihn persönlich an; die Wolken ziehen gegen ihn allein auf; alles was sich regt und bewegt, enthält eine ausdrücklich ihm bestimmte Botschaft. Aber auch der seelisch gesunde Abergläubische – und wer wollte von sich behaupten, immer und grundsätzlich gegen das Aufblitzen von Aberglauben gefeit zu sein? – entwickelt eine Aufmerksamkeit für alles, was ihm als gutes oder schlechtes Vorzeichen gelten könnte. Er fühlt, wie das Leben die Grenzen seiner Person überschreitet; die Atmosphäre ist von seinem höchstpersönlichen Schicksal erfüllt; Katzen, die seinen Weg kreuzen, und aufgespannte Regenschirme lassen ihn erschauern, ein Hut, der auf dem Bett liegt, erfüllt ihn mit Todesahnung – jedenfalls wenn er Italiener ist –, ein geschenktes Messer kündigt das Ende einer Freundschaft an. Ein Netz bedeutungsvoller Erscheinungen legt sich über die Vorgänge des All-

tags und macht sie selbst damit bedeutend in dem Sinn, wie Goethe das Wort verwendet: Auf etwas deutend, und zwar auf etwas Unheimliches, Zukünftiges, dem wie in einer Prozession ein Hofstaat unterer Chargen, ein Getümmel kichernder, flüsternder oder tückisch schweigender Akolythen voranzieht. Wer sich nur ein wenig im Beobachten übt, dem wachsen die beziehungsreichen Eindrücke von selbst zu: Jeder kennt die weit entfernt geglaubte Person, die ins Zimmer tritt, wenn von ihr gesprochen wird, die rätselhafte Verdoppelung von Ereignissen, das wiederholte Hören eines seltenen Wortes innerhalb eines kurzen Zeitraumes, Erlebnisse, die die Stimmung eines Tages dichter werden lassen und zum Grübeln verführen: Wir scheinen dann in einem Netz zu leben, das sich zuzieht, die Luft, die wir atmen, wird schwerer.

Als ich meinen Roman „Eine lange Nacht“ schrieb, war ich in einem französischen Benediktinerkloster zu Gast; eines Tages bekam ich Fieber, legte mich ins Bett und las in einer der anregendsten Geschichtensammlungen der französischen Literatur, den „Historiettes“ des Tallemant des Réaux, über den Dichter Malesherbes, der während einer Erkrankung von einem Doktor Thevenin behandelt wurde. In diesem Augenblick klopfte es; ein Mönch trat ein und sagte: „Ich bin Doktor Thevenin, der Arzt des Klosters.“ Er kannte die „Histörchen“ nicht, die ich ihm in meiner Verblüfftheit zeigte – sie sind strenggenommen auch keine Klosterlektüre –, und er ließ mich gerade dadurch in einer Stimmung zurück, als sei mir etwas Unerhörtes zugestoßen. Dass hier offenbar auf etwas gedeutet wurde, das zugleich ganz und gar undeutlich und undeutbar blieb, steigerte nur noch mein Glück.

Tableau! Hat man sie da nicht, die Denkungs- und Empfindungsart und vor allem die davon inspirierte Erzähltechnik der Romanschreiber? Sie tun, als seien sie Kriminalbeamte, die mit Lupe und Pinzette nach winzigen Indizien fahnden, nach der Wolke aus hundert aufgewirbelten Staubkörnern, die die Tat als *Sfumatura* umgeben. Doch in Wahrheit ahmen sie die Schicksalsgötter nach, die jedes Leben in eine Vielzahl von Zeichen und Symbolen hüllen und weit über sich hinauswachsen lassen. Wenn Vorzeichen und Parallelerscheinungen das einzelne Leben eines Menschen wie Saturnsatelliten umkreisen, muss es sich bei diesem Menschen wohl doch um einen Planeten, jedenfalls um einen Menschen von Belang gehandelt haben, des Erzählens wert. Auch der schwärzeste, von tiefster Hoffnungslosigkeit erfüllte Roman verzichtet nicht auf die Erzeugung solch bedeutungsvoller Ordnung. Er stellt seine Figuren in ein Beziehungsnetz, und bestehe es nur aus dem Klang von Wörtern, das ihren Ort sinnvoll erscheinen lässt. Falken steigen in die Lüfte, Wege führen in Sackgassen, Leitmotive sorgen für ein wohliges oder auch bedrohliches Wiedererkennen. Aber ist es nicht bemerkenswert, dass dem Leser durch solche Mittel das ein-

dringliche Gefühl einer Begegnung mit der Wirklichkeit verschafft wird? Schriftsteller, die echte Kontingenz, echte Sinnverweigerung wagen, ich denke etwa an Daniil Charms oder Ror Wolf, erregen Gelächter – Sinnlosigkeit ist komisch, ein Spiel, bezaubernd wie das Platzen von Seifenblasen, aber eben unreal, tröstlicherweise, denn sonst müsste sie Schreckenstarre auslösen.

Erich Auerbach hat diese Eigenart des nachantiken Erzählens auf den christlichen Umgang mit dem Alten und dem Neuen Testament zurückgeführt. Die Christen sahen in den Ereignissen der jüdischen Überlieferung nur Vorbedeutungen, Präfigurationen, Ankündigungen dessen, was sich beim Auftreten des Gottessohnes verwirklichen und erfüllen würde. Ein Beispiel: Die römische Kirche lässt am Osterfest einige Zeilen aus den Visionen des Propheten Ezechiel singen, in dem einzigartigen Vermögen des gregorianischen Chorals, aus Prosa Gedichte zu machen: „Vidi aquam/egredientem de templo/a latere dextro, alleluja./Et omnes, ad quos pervenit aqua ista/salvi facti sunt et dicent:/alleluja. – Ich sah Wasser aus dem Tempel dringen, auf seiner rechten Seite, alleluja. Und alle, zu denen dieses Wasser gelangte, wurden heil und sangen: Alleluja.“ Man sieht ein monumentales Panorama bei diesen Worten vor sich, es ist auch heute noch zu erleben: die weiße Kalksteinmauer des Tempels von Jerusalem über dem Kidron-Tal, das Gräberfeld auf der anderen Seite des Tales mit Grabsteinen wie eine versteinerte Schafherde, eine Mondwelt, in der das plötzliche Entspringen einer Quelle in der Quaderwand die einzige Bewegung darstellt. Und diese Szenerie brachten die Kirchenväter mit Jesu Tod am Kreuz in Verbindung, wie es im Johannes-Evangelium beschrieben wird: Mit dem Durchstoßen der Brust des qualvoll Verendeten, dem Herauslaufen von Plasma, das sich auf der Haut mit Blut und Todesschweiß mischt. Der gefolterte Körper ist der Tempel, das Plasma die Quelle, die Quelle die Vorahnung des Taufwassers, die Gräber im Kidron-Tal deuten auf die künftige Riesenschar der Getauften. Man halte die beiden Bilder in der Vorstellung nebeneinander: Das menschenleere Steingebirge und den geschundenen Leib – und dass sie geradezu austauschbar sein wollen, dass sie so sehr dasselbe zu sein beanspruchen, dass man sie gleichsam übereinander legen könnte. Den theologischen Aspekt dieses Verfahrens müssen wir hier nicht vertiefen. Aber wie dramatisch muss es sich auf die Phantasie auswirken, wenn sinnlich erfahrbare Gegenstände, die unterschiedlicher nicht zu denken sind, unversehens den Platz tauschen, wenn Fleisch zu Stein und Stein zu Fleisch werden kann und beides ein unsichtbares Drittes sein will. Die Mauern der Erfahrung werden durchlässig, jede Erscheinung wird vorläufig. Eine solcherart angestachelte Phantasie, die sich von jeder Erscheinung aus ins Grenzenlose assoziieren kann, erblickt später dann mühelos in einem jüdischen Anzei-

genakquisiteur aus Dublin den homerischen Odysseus und im bourgeoisen Häuschen der Tante Leonie in einer langweiligen französischen Provinzstadt das Paradies, aus dem die ersten Menschen vertrieben wurden. Beatrice in Florenz, Dulzinea von Toboso in den schmutzigen Bauerndörfern der Mancha und Gretchen in einer muffig-bösartigen deutschen Kleinstadt werden zu Hypostasen des platonischen Eros, der zur Gottesanschauung oder zur Ideenschau führt. Den Lauten der Sprache öffnen sich unermessliche Räume, ihr flüchtiger Klang flattert schmetterlingsgleich von Ding zu Ding, bis er sich vor lauter Bedeutungsfülle jeglicher Bedeutung zu entledigen vermag und die Zauberspruchregion der reinen Abstraktion erreicht.

Keine Bereicherung ohne Verlust. Derselbe Auerbach, der in dem Aufeinander-Beziehen und Durch-Einander-Deuten des Alten und Neuen Testaments eines der Gründungsmuster nachantiker europäischer Literatur erkannte, stellt auch fest, dass die Bilder in diesen Wechselbeziehungen eine Schwächung hinnehmen müssen. Ein Ding, das neben seinem Sosein zugleich auch auf ein anderes deutet oder gar an dessen Stelle treten kann, vermag den Schock der nackten stummen Wirklichkeit nicht mehr auszulösen. Der gequälte Leib verliert seine Krassheit, wird ferngerückt, ist jedenfalls kein Schlag in die Magenrube des Betrachters mehr, wenn er zugleich auch ein steinerner Tempel sein soll – und auch die titanisch abweisende Tempelmauer mit ihrer zermalmenden Schwere wird luftiger, wird geradezu von innen zerfressen, wenn sie eigentlich für einen Menschenkörper im Zustand größter Schwäche steht.

Dieser Gedanke oder vielmehr diese Beobachtung erklärte mir überraschend, worin das unvergessliche Erlebnis meiner ersten Lektüre des „Satyricon“ bestand, jenes dem Petronius Arbiter zugeschriebenen Romanfragments, des Urbilds aller Schelmenromane. Ich weiß es noch wie heute: Mir war beim Lesen, als hätte ich bisher immer durch eine beschlagene Fensterscheibe geblickt, die nun mit wenigen schnellen Handbewegungen klargewischt wurde. An der Geschichte des Petronius kann es nicht gelegen haben. Statt von Schelmen sollte man hier besser von Strolchen sprechen, alle, von den Protagonisten bis zu den Randfiguren sind entlaufene Sklaven, Gladiatoren, Strichjungen, Betrüger, menschliche Spreu. Ihre durchweg unrühmlichen Abenteuer bestehen sie in einer Magna Graecia, deren Schmutz und Verwilderung und zum Voodoo-Kult heruntergekommene Religion sie wie ein europäisches Haiti erscheinen lässt. Aber hier war sie zu finden: Jene Verzauberung durch eine Wirklichkeit, die nichts als sich selbst bedeutete, durch eine grundlose Freude, die den Lebensunrat des Satyricon gründierte. In diesem richtungslosen Chaos stehen Enkolpios und Eumolpos nicht für Ideen und nicht für Klassen, ihre Reise ist keine

Lebensreise, sie wird sie nicht besser und nicht klüger machen; der Leser erlebt den unerhörten Luxus der Natur, die unablässig schafft und wieder verwirft, und die inmitten von Gestank und Verwesung so viel Witz, kindliche Tränen, unschuldige Verdorbenheit, Ekstasen des Glücks, die Desaster auslösen, und Desaster, die sich vom allgemeinen Misthaufen der Welt nicht wesentlich abheben, entstehen lässt. Trostlos darf man diese Welt wohl nennen, aber im strengen Wortsinn trostfrei, weil trostunabhängig, weil in der Heftigkeit des Lebensvollzugs eines Trostes nicht bedürftig.

Es verwundert nicht, dass ein solcher Roman aus vorchristlicher Mentalität, der, in Klosterbibliotheken aufbewahrt, auch den christlichen Autoren als geheimes Gegenbild ihrer Kunst gegenwärtig war, weiterhin Einfluss ausüben musste. Ganz falsch wäre es ja, sich den Wechsel der Mentalitäten als chemisch reine, scharf geschiedene Ablösung von kulturellen Zuständen vorzustellen. C. F. Meyers vielzitiertes Vers aus „Huttens letzte Tage“ – „Wir Christen haben ein gewisses Licht/doch auch ein Heidensprüchlein schadet nicht“ – beschreibt sehr schön die Zweistimmigkeit der europäischen Kultur. Vielleicht ist sie erst sehr spät ausgesprochen worden, aber empfunden hat man sie schon früh: Die Sehnsucht, in der Literatur aus den kunstvollen Beziehungsnetzen, diesen Wirklichkeitsfallen, auszubrechen und zu der jäh, überwältigenden botschaftslosen Realitätserfahrung zurückzukehren, und sie mit den neuen Mitteln des Erzählens womöglich noch zu steigern. Als kollektive Leistung war das freilich nicht mehr möglich, für die Völker gibt es keinen Weg zurück zu früheren Zuständen, und seien sie noch so verlockend gedacht, aber dem Einzelnen ist es hin und wieder gelungen, und dann war der Effekt beträchtlich. Um nur ein Beispiel näher zu betrachten, in dem sich der Schock der Wirklichkeit mit höchster Kunstfertigkeit verbindet und das unser aller unwillkürlichen Symbolismus nicht nur nicht ausweicht, sondern ihn auf das Vollendetste bedient und gleichzeitig überwindet: Heimito von Doderers großer Roman „Die Dämonen“ spielt 1927 im Umfeld des Wiener Justizpalastbrands; dieser Brand figuriert als Vorahnung der kommenden feurigen Katastrophen, er ist real und symbolisch in einem, nichts Ungewöhnliches mithin in der europäischen Literatur. Aber diesem Brand geht ein kleines Feuer voraus, ein Küchenbrand, der in einer kurzen, beinahe in sich geschlossenen Erzählung in die Handlung eingeschoben ist; die Protagonistin dieser Episode, eine Marmelade kochende Hausfrau, hat auf den vielen hundert Seiten vorher nicht die geringste Rolle gespielt. Diese Passage ist aber wie ein Schacht in der Oberfläche des Romans, durch den man, an den Schichten neuzeitlicher Bewusstwerdung vorbei, zum Boden der reinen Erscheinung hinabsteigt. So wie plötzlich die Feuerwand vor der Marmelade kochenden Hausfrau steht, so berührt auch der Leser

– unvorbereitet, könnte man sagen, wenn man nicht den ganzen reichen Roman als Vorbereitung auf diesen Augenblick verstehen will – jene Grenze, die das Reich der Illusion von dem der noch nicht durch Benennung gezähmten Wirklichkeit oft unüberwindbar scheidet. Diese Wirklichkeit ist von einem stummen Leben erfüllt, das man dämonisch genannt hat, um sich die Erschütterung, die mit ihrer Berührung verbunden ist, verständlich zu machen. Einzigartig ist die Leichtigkeit, mit der Doderer von diesem Gang zu den Müttern wieder in die gewohnte, die vielfältig benannte Sphäre der Symbole und Bezüge zurückkehrt; das visionsähnliche Erlebnis fügt sich in den Gang der Erzählung ein, gibt ihr aber den originären Schrecken der Zimmerbrand-Erfahrung mit. Im schulbildenden Sinne wiederholbar ist solche Wiedereroberung gleichsam unmittelbaren Erzählens wohl nicht; sie muss in den seelischen Erfahrungen des Autors begründet sein, wie denn Doderers eigentliche Arbeit darin bestanden hat, seine Sinne für solche Erfahrungen zu schärfen.

### Der Roman und die Philosophie

Auch Schriftsteller nehmen mitunter an den philosophischen Diskussionen ihrer Zeit teil oder machen sich eine bestimmte philosophische Weltansicht zu eigen; daher kann es nicht verwundern, wenn sich in ihren Romanen philosophische Lesefrüchte wiederfinden und wenn manche Romane gar geschrieben wurden, um die Welt und was sich in ihr bewegt, durch die Brille einer bestimmten Philosophie zu betrachten, wenn Romane Philosophie gleichsam illustrieren und sie sich am praktischen Beispiel bewähren lassen wollten. So kam es zum kommunistischen Roman, zum geschichtsphilosophischen Roman, zum katholischen Roman, und ehe man diese Formen verurteilt, sollte man bedenken, dass es auch der ausgeglühtesten Objektivität nicht gegeben ist, sich von den geistigen Einflüssen der eigenen Zeit vollständig freizuhalten. Auch Autoren entstammen Milieus, sie werden nicht im Niemandsland geboren. Provozieren kann der weltanschauliche Roman ohnehin nur kurz, nur solange die politischen und philosophischen Streitfragen, in denen er Partei ergreift, auf der Tagesordnung stehen. Wenn der Streit erledigt ist und die öffentliche Erregung sich anderen Gegenständen zugewandt hat, wenn die Akten über die einst bewegenden Affären geschlossen sind, wenn also der Konflikt nur noch in der Erinnerung und eben auf den Seiten eines Romans fortlebt, dann haben solche Bücher die Chance, zu einem zweiten und vielleicht sogar längeren Leben aufzuerstehen. Ein Literaturwissenschaftler sagte mir einmal, nach dem Untergang des antiken Heidentums sei der Name „Aphrodite“ in einer Gedichtzeile nichts mehr als eine antiquarische Reminiszenz, ein Wort ohne Wirk-

lichkeit – ich antwortete ihm, der Wert eines solchen Gedichts erweise sich für mich daran, ob es möglich sei, zumindest während des Lesens an Aphrodite zu glauben. Und so bekenne ich denn, während der Lektüre von Zolas „Germinal“ zu meiner Verblüffung tatsächlich zwei oder drei Tage lang Kommunist gewesen zu sein. Natürlich wird es für die Lebensfähigkeit des philosophisch oder politisch oder religiös grundierten Romans von entscheidender Bedeutung sein, ob der Autor das Korsett der Meinung fest oder lose geschnürt hat, ob er das, was ihr entgegenstehen könnte, gewissenhaft oder fahrlässig ausgejätet hat, ob er achtsam oder unachtsam darüber gewacht hat, dass ihn kein Übermut und keine jähe Laune vom Pfad der Tugend weglockte. So sehr in der Romankunst Disziplin gefordert ist – den weltanschaulich inspirierten Roman wird nur eine gewisse Disziplinlosigkeit über die Zeiten retten.

Die Anwesenheit von Philosophie muss für den Roman freilich nicht unbedingt gefährlich sein, sie kann ihn auch befördern. Die größten Werke enthalten reichlich Spuren philosophischer Lektüren ihrer Schöpfer und verdanken ihnen oft entscheidende Anregungen. Nicht jeder Schriftsteller wird allerdings Goethes kühne Eleganz besitzen, der eines der ernstesten Theologeme des von ihm verehrten Spinoza auf die Lippen des leichtesten aller leichten Mädchen legte, Philines: „Und wenn ich dich lieb habe, was geht's dich an.“ Und nicht immer bekennt sich ein Autor so nachdrücklich zu seinem philosophischen Vorbild, wie es Tolstoi mit der Dramaturgie von „Krieg und Frieden“ gegenüber der Geschichtsphilosophie von Joseph de Maistres „Soirées de Saint-Petersbourg“ tat. Bergsons Einfluss auf Marcel Proust ist bekannt, weniger offensichtlich dürfte dem lesenden Publikum die enge Anlehnung des Dodererschen Riesenwerks an die psychologischen Theorien des Wiener Privatdozenten Swoboda sein, der schon damals von seiner Zunft als phantasievoller Obskurantist angesehen wurde. Swobodas These von den „frei steigenden Erinnerungen“, die angeblich bei Männern und Frauen in unterschiedlichen Zyklen auftreten, sind ein gutes Beispiel dafür, dass es keine noch so abwegige oder gar närrische wissenschaftliche oder philosophische Hypothese gibt, die sich im Roman nicht wunderbar bewähren könnte. Es ist, als pumpe der Roman frisches Blut ins trockenste Ideengeflecht – es dehnt sich, wird biegsam, pulsiert. Es ist wie mit Aphrodite in dem Sappho-Gedicht: Der verstiegenste Gedanke kann im Roman Wahrheit erlangen.

Ich formuliere diese Einsichten aus pädagogischen Gründen; es geht um meine eigene Erziehung, denn mein Widerwille gegen philosophische Fracht im Roman sitzt tief. Mein Lieblingssatz in der auf Schopenhauers Philosophie basierenden Wagnerschen Dichtung „Der Ring des Nibelungen“ lautet: „Der Welt melden Weise nichts mehr.“ Das heißt wahr-



lich nicht, dass die Weisen ihr nie etwas gemeldet hätten, aber in unserer Weltstunde, die für Wagner schon Mitte des neunzehnten Jahrhunderts begann, in dieser seit zwei Jahrhunderten sich unablässig beschleunigenden Umwälzung, vor der die vorangegangenen Jahrtausende wie in einem einzigen Dornröschenschlaf voller bunter Träume verlaufen zu sein scheinen, empfinde ich vor allem das Schweigen jener Weisen. Die gewaltigen denkerischen Anstrengungen, unseren Zustand und seine Entwicklungsmöglichkeiten zu erkennen, sind längst nicht mehr von Hoffnungen getragen, sondern offenbaren eine unter Wortkaskaden begrabene, von Furcht getönte Ratlosigkeit. Damit ist auch ein neues Kapitel in der Geschichte des Romans aufgeschlagen. Jakob Burckhardt hat auf das Problem der nachrevolutionären Historiographie hingewiesen, die die Wellen der historischen Bewegung zu beschreiben suche, aber erkennen müsse „Wir selbst sind die Welle.“

Hier wachsen dem Roman neue Aufgaben und eine neue Berechtigung zu, wenn sein Autor sich nur zu dem Nichtwissen, dem Nichterkennen, dem Nichtsahnen wirklich durchringen kann. Wenn wir selbst die Welle sind, dann heißt es, mit ganzer Kraft Welle sein zu wollen. Das Neue, das die „Weisen der Welt nicht mehr melden können“ – wir selbst sind es, obwohl wir doch ganz und gar aus dem Alten zusammengesetzt erscheinen. Und vielleicht ist das Neue ja doch nur eine bisher nicht ausprobierte Anordnung alter, aus allen Teilen der Menschheitsgeschichte stammender Mosaiksteine?

Im Roman, der nicht mehr beansprucht zu wissen, welches Gesetz die Welt beherrscht, der absichtslos erzählt, „sans intérêt“, wie es ein großer Mystiker des siebzehnten Jahrhunderts ausgedrückt hätte, wird das Neue, dies flüchtige, von niemandem Gesehene und doch beständig anwesende Wild, unversehens verweilen und sich betrachten lassen, ohne schon von den Zeitgenossen benannt werden zu können, als „heilig öffentlich Geheimnis“. Dies ist die Zeit von Büchern, die mehr geträumt als geschrieben werden, Bücher, die von ihren Autoren nicht gänzlich verstanden werden sollten.

Solche Werke hervorzubringen ist der europäische, nachantike-christliche Roman besonders befähigt. Erich Auerbach sieht ihn weniger als Übermittler und Transporteur denn als Frucht einer Philosophie, die eine bestimmte Art der Wirklichkeitsbetrachtung hervorgebracht hat: Sie widersetzt sich dem gleichfalls christlich motivierten Symbolismus und bestätigt damit den grundsätzlich paradoxalen Charakter des Christentums. Der christliche Aristotelismus sieht die Verbindung von Geist und Materie ja nicht so, als werde die Idee in die Materie eingetopft, wohne irgendwie in ihr, sei also immer noch von ihr zu scheiden. Mit der Vorstellung von der Inkarnation, diesem christlichen Schlüsselbegriff, ist verbunden, dass der sich inkarnierende Geist durch die Materie neue, ihn bereichernde

Eigenschaften erhält. Wahrheit ist Gestalt und nicht Doktrin – das ist die Antwort auf die Frage des Pilatus, und sie musste deshalb auch nicht ausgesprochen werden, sondern hätte dem römischen Prokurator vor Augen stehen müssen, wenn er Augen zu sehen besessen hätte.

Von der Pilatus-Szene fällt auch ein Strahl auf den Roman und befähigt ihn, jene Bezauberung seiner Leser zu bewirken, die nur das meditative Erleben der Wirklichkeit auslöst – gerade dann, wenn er sich jeder Reflexion enthält und sich auf das deutungslose Erzählen von allerlei Vorgängen beschränkt.

### Im Postskriptum kommt das Wichtigste

Diesen wenigen andeutenden Ausführungen über das Romanschreiben haftet etwas Unwirkliches an, weil über das Wichtigste noch gar kein Wort verloren worden ist und ich mich auch nicht wirklich in der Lage sehe, über dies Wichtigste Auskunft zu geben. Vom Roman zu sprechen, ohne über seine Sprache gesprochen zu haben, das heißt, nichts von Bedeutung über ihn gesagt zu haben. Alle Überlegungen über Realismus und Naturalismus, über die dem Roman zugänglichen Stoffe, über seine Philosophie, seine Vergangenheit und seine Zukunft sind leeres Stroh, solange nicht deutlich wird, dass es sich dabei nur um Akzidentien der Sprache handelt. Ganz gleichgültig, was uns in einem Buch, das wir zum ersten Mal aufschlagen, erzählt wird – nach wenigen Seiten wissen wir, ob wir einen lebenskräftig zappelnden oder einen toten, stinkenden Fisch vor uns haben. Nichts ist leichter zugänglich als die Sprache, so scheint es, sie umgibt uns wie die Luft und trägt jeden unserer flüchtigsten und unwillkürlichsten Gedanken, und deshalb ist es für den werdenden Schriftsteller, sowie er nur aus dem ersten ich-besoffenen Schwung herausgeraten ist, ein schier verzweiflungsvolles Unterfangen, die Sprache des Romans zu fassen zu bekommen. Ein Ausflug in die Poesie mag das verdeutlichen. Vielen Gedichten des „Westöstlichen Divans“ liegen Hafis-Übersetzungen des Orientalisten Hammer-Purgstall zugrunde, und es verblüfft stets aufs Neue, durch welche winzigen Bearbeitungen, den Austausch eines Wortes oder eine Änderung im Rhythmus, aus ehrenwerter Gelehrtenarbeit unverwechselbare Goethe-Gedichte wurden. Das ist bei erzählender Prosa nicht anders, wie die vielen großen Erzählungen von Büchner, Kleist und Hebbel bezeugen, die unter Verwendung von Aktenstücken und Zeitungsartikeln geschrieben wurden. Die epische erzählende Prosa taucht jählings auf und verschwindet wieder, und hat oft ihr Gesetz nicht preisgegeben. Kein Wunder, dass es einen Schriftstellertypus gibt, der dieses unbeherrsch-

bare Phänomen mit Gewalt oder jedenfalls doch Kraft bezwingen will, der ein Rodeo der Sprache abhält, sich auf ihr wie auf einem wild umherspringenden Pferd festkrallt und sie zucken und schäumen lässt. Dabei kommt es manchmal zu staunenswerten Leistungen, wenngleich sich hinter solchen zwischen Raserei und Dressur schwankenden Darbietungen oft jene Verzweiflung abzeichnet, die Flaubert auf der Suche nach „dem Stil“ beinahe verrückt werden ließ. Ob „Triumph des Willens“ oder skrupulöses Abhorchen des Sprachleibs, um seine zartesten Regungen zu erhaschen: Die Unsicherheit, ob die zweite Natur der Sprache, die neben ihrer Alltagsgestalt wohnt, sich mit ihr deckt, sich von ihr abwendet, unverständlich wird, sie überhöht oder unterbietet, ob diese zweite, die Roman-Natur, sich gezeigt hat oder ob sie ferngeblieben ist – für manchen Schriftsteller wird sich das auch in einem langen Arbeitsleben niemals geklärt haben. Und das ist das Gesetz: Wenn die Sprache nicht da ist, ist gar nichts da. Sie ist das Medium, das alles, was es befördert, entweder zunichte macht oder ihm ins Leben hilft. Jorge Luis Borges, ein *arbiter elegantiarum* des Schreibens, hat in einer gleichsam nebenbei gemachten Bemerkung – fast nur in Parenthese – zwei Kategorien von Schriftstellern unterschieden: Er nennt den Stil der einen, die sich vor allem „dem Genus“ ihrer ererbten und vorgefundenen Sprache unterwerfen, die deren Gesetze ergründen und sich nach deren Maß messen lassen wollen, den „generischen Stil“; von den anderen sagt er, „sie wollten innerhalb des großen Ganzen der Sprache ihren eigenen kleinen eiteln Dialekt schaffen“. Man sieht, wo Borges' Vorlieben liegen, er spricht sogar von der „moralischen Überlegenheit“ seiner „generischen“ Autoren. Man könnte einwenden, dass es vielleicht gewagt ist, bei allen Schriftstellern eine echte Wahl zwischen den beiden Stilfamilien zu unterstellen. Es mag vereinzelt den manieristischen Stilisten geben, der seine Prosa, wie einst die Spiegel-Redaktion, einer konsequenten stilistischen Umarbeitung unterzieht; aber je länger einer schreibt, desto mehr verschmelzen die Stilmittel seiner Prosa mit der Art seines Denkens und Empfindens. Auch ein Borges würde keinem Autor verbieten wollen, in der Sprache höchstmögliche sprachliche Eigentümlichkeit anzustreben, solange ihm bewusst ist, dass unsere wirkliche Eigentümlichkeit uns selbst immer unbekannt bleibt, wie es ja schon die Befangenheit, ja das Missbehagen verrät, das einen jeden von uns beim Vernehmen der eigenen Stimme befällt. Und so darf der Autor denn sicher sein, seine unverwechselbare Sprache gefunden zu haben, wenn ihm daran keine stilistischen Eigenheiten mehr auffallen. Die Sprache, die ihrem Schöpfer klar wie Wasser und durchsichtig bis auf den Grund erscheint, ist seine eigene. Und mit ihr ist er für das Wagnis eines Romans hinreichend gerüstet.

AM KÄLTEPOL DES UNIVERSUMS:  
QUANTENMECHANIK ZUM ANSCHAUEN  
ULRICH SCHOLLWÖCK

„Die Hypothese des Reduktionismus mag unter Philosophen immer noch ein kontroverses Thema sein; aber ich denke, dass sie von der großen Mehrheit aktiver Wissenschaftler ohne Frage akzeptiert wird.“ Ist diese Aussage von Phil Anderson, Nobelpreisträger und einer der führenden Physiker des zwanzigsten Jahrhunderts, einer dieser arroganten Sätze, mit denen Physiker recht unsubtil andeuten, wo in etwa sie sich in der Hierarchie der Forschungsfelder anordnen? Im Wissenschaftskolleg konnte man in diesem Jahr eine Karikatur sehen, die für eine gewisse Aufregung gesorgt hat: sie stellte eine intellektuelle Nahrungskette dar, in der Chemie nichts anderes als angewandte Physik, Biologie nichts anderes als angewandte Chemie ist, und so fort, bis man dann ganz unten ankommt, irgendwo unter Historikern. Der Physiker dieser Karikatur ignoriert jedoch großzügig, dass er ohne Mathematik letztlich taubstumm wäre. Dass Phil Anderson sich wesentlich mehr bei seinem Satz gedacht hat, kann man aber bereits dem Titel seiner grundlegenden Arbeit von 1972 entnehmen, der das Zitat entnommen ist: „Mehr ist anders“.

Es ist vielleicht hilfreich, sich bewusst zu machen, dass die Schlachten um den Reduktionismus nicht nur zwischen der Physik und anderen Wissenschaften, sondern auch innerhalb der Physik selbst geschlagen werden. Im Herzen der Physik findet sich die Teilchenphysik, die die fundamentalen Gesetze der Physik aufdeckt, die dann letztlich bereits alles, was in angewandteren und komplexeren Feldern der Physik wie der Biophysik oder der Festkörperphysik passiert, implizieren. Auch wenn ich versucht habe, hier neutral zu formulieren, stellt sich dieser Zusammenhang den Praktikern der Physik manchmal durchaus anders da: an der Spitze haben wir den faustischen Teilchenphysiker bei seiner unablässigen Suche nach dem, was die Welt im Innersten zusammenhält, wie ihn Rembrandt darstellt (Abb. 1). Aber wir können uns vorstellen, Dr. Faust auch in einer der berühmten Bettlerradierungen von Rembrandt zu sehen, wo er einige Brosamen der Erkenntnis von sei-

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Abendkolloquium gehalten am 21. April 2010 am Wissenschaftskolleg zu Berlin.

nem Tisch an weniger privilegierte Physiker weitergibt, die diese christliche Wohltat dankbar entgegennehmen (Abb. 2). Sie befassen sich, offensichtlich wenig einträglich, mit Gebieten, die Teilchenphysiker gerne als „Materialwissenschaften“ oder „Engineering“ bezeichnen. Um den Subtext dieser Bezeichnungen zweifelsfrei zu machen, sei Murray Gell-Mann zitiert, ein weiterer Nobelpreisträger für Physik und Entdecker der Quarks, der diese Gebiete summarisch als „squalid state physics“ (Schmutzphysik) bezeichnet hat. Phil Anderson ist einer von diesen Schmutzphysikern ...



Abb. 1: Rembrandt, Faust.

Aber was genau meint er mit den Worten „mehr ist anders“? Nichts anderes als das Folgende: Die überwältigende Mehrheit der Physiker (wenn nicht alle; ich persönlich bin noch keiner Ausnahme begegnet) glauben in der Tat, dass das Verhalten komplexerer physikalischer Systeme, wie etwa das eines Computerchips, auf die fundamentalen Gesetze zurückgeführt werden kann. In diesem Sinne sind wir, wie Anderson sagt, alle Reduktionisten; wir benötigen die Forschung der Teilchenphysik. Aber zumindest in der Festkörperphysik, Biophysik und statistischen Physik sind wir ebenso überzeugt, dass das Verhalten dieser komplexen physikalischen Systeme darüber hinaus im Wesentlichen durch *emergente* Eigenschaften charakterisiert wird.



Abb. 2: Rembrandt, Bettlerradierung.

Hier möchte ich, vermutlich aber in Übereinstimmung mit anderen Verwendungsformen des Begriffs, eine Eigenschaft emergent nennen, die man einem Ensemble von (zum Beispiel) Teilchen zuschreiben kann, jedoch nicht einem einzelnen Teilchen. Emergenz erweist sich in der Tat als allgegenwärtiges Merkmal kollektiver Physik und tritt in großer Vielfalt auf. Physikalische Gesetze, die auf der Ebene des einzelnen Teilchens sehr einfach sind, können im Kollektiv zu äußerst komplexen Gebilden führen, wie etwa einer Katze. Aber ihre „Katzenhaftigkeit“ kann nicht zerlegt werden: „Wenn Sie versuchen, eine Katze auseinander zu nehmen, um herauszufinden, wie sie funktioniert, bekommen Sie es zuerst mit einer nicht funktionierenden Katze zu tun“, so ein Zitat von Douglas Adams, das ich den Biologen im Wissenschaftskolleg verdanke. Aber Emergenz führt nicht nur zu komplexerem, sondern auch zu einfacherem Verhalten; darauf möchte ich mich im Folgenden konzentrieren.

Stellen wir uns einen Kasten vor, der mit einem Gas gefüllt ist, einem Haufen von Atomen, die sich frei bewegen, an den Wänden und aneinander abprallen; es ist hier völlig zureichend, sie sich als Billardkugeln vorzustellen. Für jede dieser Billardkugeln gelten die Newtonschen Gesetze der klassischen Mechanik; hier sei nur das zweite angeführt: Kraft ist gleich Masse mal Beschleunigung; die beiden anderen befassen sich mit Trägheit und der Gleichheit von Aktion und Reaktion. Entscheidend ist, dass in keinem dieser Gesetze, die eine vollständige Beschreibung der Bewegung der Gasteilchen geben, eine Größe „Temperatur“ vorkommt. In der Tat, würde ich gefragt, welche Temperatur ein bestimmtes Teilchen hat, müsste ich antworten, es habe keine. Es handelt sich um eine ebenso sinnlose Frage wie die nach der Farbe einer Beethovenschen Symphonie. Aber wie wir alle wissen, hat Luft, ein Gas, sehr wohl eine Temperatur. Wo kommt sie ins Spiel?

Nehmen wir an, wir könnten mit Hochgeschwindigkeitskameras die Position und Geschwindigkeit aller Gasteilchen feststellen. Nehmen wir zunächst einen Kasten mit wenigen Teilchen, etwa ein paar hundert oder tausend. Es wird langsame und schnelle Teilchen geben, und wenn wir eine Verteilung der Geschwindigkeiten aufzeichnen, erhalten wir eine wenig glatte Kurve, die sich von Messung zu Messung ändern wird (Abb. 3). Wenn wir jedoch die Zahl der Teilchen drastisch erhöhen, etwa auf  $10^{23}$  Teilchen, das ist ungefähr die Zahl der Gasmoleküle in einem Liter Luft, wird die Kurve der Geschwindigkeitsverteilung vollkommen glatt und reproduzierbar (Abb. 4). Das ist eine einfache Folge aus dem Gesetz der großen Zahl in der Mathematik: die Schwankungen in der Geschwindigkeitsverteilung mitteln sich im Grenzfall sehr vieler, im Idealfall unendlich vieler Teilchen heraus. Würfelt man sechsmal, ist es nicht sehr wahrscheinlich, dass der Anteil der Sechsen  $\frac{1}{6}$

beträgt (man also genau einmal die Sechs erhält); würfelt man 6 Millionen mal, wird der Anteil der Sechsen sehr nahe bei  $\frac{1}{6}$  liegen. Damit verdienen Spielbanken sehr zuverlässig Geld.

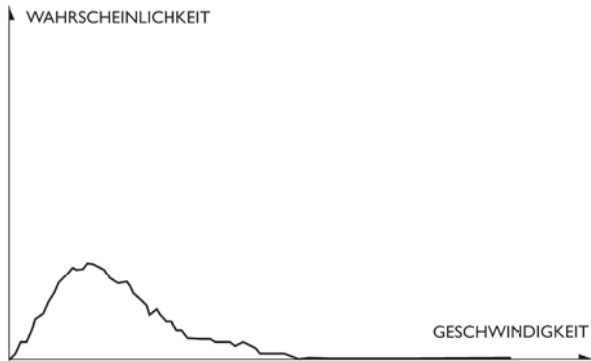


Abb. 3: Wahrscheinlichkeitsverteilung für die Geschwindigkeiten einer geringen Anzahl von Gasteilchen in einem Kasten.

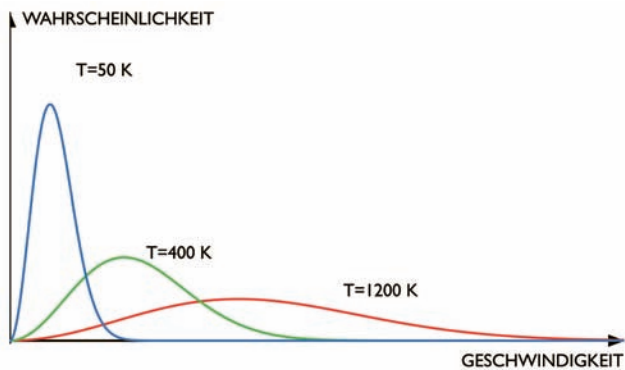


Abb. 4: Wahrscheinlichkeitsverteilung für die Geschwindigkeiten einer sehr großen Anzahl von Gasteilchen in einem Kasten bei verschiedenen Temperaturen.



Die Geschwindigkeitsverteilungen werden immer wieder ähnliche Formen annehmen, wenn wir sie an verschiedenen Kästen voll Gas messen, und man kann zeigen, dass alle unterschiedlichen Kurven durch eine einzige Zahl parametrisiert werden können, die wir *Temperatur* nennen. Die genaue Formel für die Verteilungen ist im Wesentlichen eine Exponentialfunktion, die die Temperatur enthält, aber worauf es eigentlich ankommt ist, dass Temperatur eine Größe ist, die eine statistische Verteilung von Geschwindigkeiten (genauer, Bewegungsenergien) charakterisiert und dass Temperatur zwar in einer genauen Beziehung zur mittleren Geschwindigkeit steht (höhere Temperatur bedeutet höhere mittlere Geschwindigkeit), es aber immer langsamere und schnellere Teilchen im Ensemble gibt. Je höher die Temperatur ist, desto breiter werden die Geschwindigkeiten verteilt sein.

Das alles riecht dennoch nach einer propagandistisch sorgfältig vertuschten Niederlage, nämlich unserer Unfähigkeit, in der Praxis die volle Information zu erhalten, die Bewegung jedes einzelnen Teilchens. Das ist zu kurz gedacht: Jeder weiß aus dem Alltag, dass Wärmeenergie von „heiß“ nach „kalt“ fließt. Sind uns die Temperaturen zweier Objekte bekannt, können wir ohne weiteres die wichtige Frage beantworten, in welche Richtung die Wärme fließt. Aus einer endlos langen Liste aller Teilchengeschwindigkeiten wäre das nicht ersichtlich. Temperatur ist ein emergentes Konzept, mathematisch streng, bedeutungsvoll und nützlich, wenn wir über Physik sprechen. Statistische Physik, Festkörperphysik und so weiter sind daher nicht nur angewandte Teilchenphysik, und genauso wenig Chemie nur angewandte Physik: Auf jeder Ebene benötigt man neue Konzepte und Kreativität bei ihrer Identifizierung, um gehaltvolle und nützliche Aussagen machen zu können.

Nicht nur Temperatur ist ein Alltagskonzept emergenter Natur. Relaxation oder Gleichgewichtseinstellung ist ein weiteres Alltagsphänomen, das eng mit der Existenz einer Richtung in der Zeit zusammenhängt: Geben wir einen Tropfen Tinte in ein Glas Wasser, so wird sich der Tintentropfen im Wasser verteilen und niemals mehr als Tropfen „zurückkommen“. Überraschenderweise enthalten die fundamentalen Gesetze der Physik keine Zeitrichtung, die doch im Unterschied von Vergangenheit, Gegenwart und Zukunft eine unserer grundlegendsten Erfahrungen ist: „Zögernd kommt die Zukunft hergezogen, pfeilschnell ist das Jetzt entfliegen, ewig still steht die Vergangenheit.“ (Schiller). Etwas profaner, jeder von uns kann unterscheiden, ob uns ein Film vorwärts oder rückwärts abgespielt wird.

Stellen wir uns wiederum unseren Kasten vor, jetzt aber mit einer beweglichen Trennwand versehen, durch die er in zwei Hälften geteilt wird, aber wieder verbunden werden kann (Abb. 5). Auf der rechten Seite soll sich ein Vakuum (keine Teilchen) befinden, auf

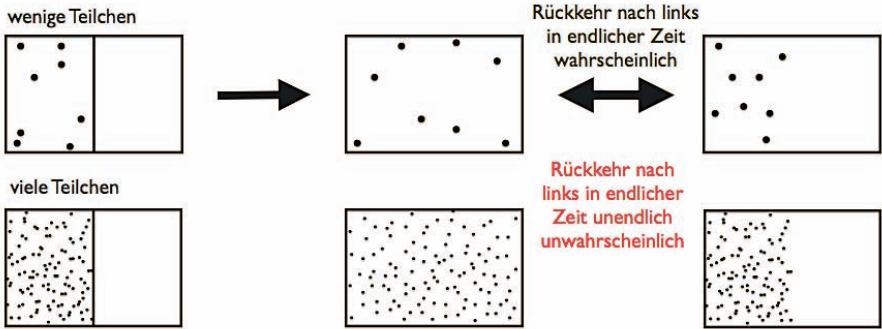


Abb. 5: Erlaubt man Gasteilchen, sich in einem Kasten auszubreiten, so wird es mit zunehmender Teilchenzahl unendlich unwahrscheinlich, dass sie in endlicher Zeit in eine Kastenhälfte zurückkehren.

der linken Seite acht Teilchen. Ziehen wir die Trennwand heraus, so werden sich die Teilchen frei zwischen den beiden Hälften bewegen. Wegen der kleinen Teilchenzahl ist es aber sehr wahrscheinlich, dass recht bald zeitweise wieder alle Teilchen auf der linken Seite sein werden. In diesem Augenblick schieben wir die Trennwand wieder herein. Spielen wir nun den Film der sich hin- und herbewegenden Teilchen vorwärts und rückwärts ab, werden wir den Unterschied nicht feststellen können; von der Herstellung eines Gleichgewichts können wir sinnvollerweise nicht sprechen.

Gehen wir nun wieder zum Fall sehr vieler ( $10^{23}$ ) Teilchen über, allesamt auf der linken Seite. Nach Entfernung der Trennwand wird das Gas in den ganzen Kasten expandieren, aber die Wahrscheinlichkeit, dass alle Teilchen in einer endlichen Zeit wieder in die linke Hälfte zurückkehren, ist nun unendlich klein. Die Zeitskala ist im Vergleich zum ersten Fall um einen Faktor mit etwa  $10^{23}$  Ziffern länger! Im Vergleich dazu ist das Alter des Universums nur ein Lidschlag. Mit einer Wahrscheinlichkeit, die überwältigend nahe an 100 % liegt, expandiert das Gas in den ganzen Kasten, und findet damit seinen neuen Gleichgewichtszustand. Ein Film, der das Umgekehrte zeigt, würde von uns sofort als Fälschung identifiziert, wie ein Film, in dem ein zerbrochenes Weinglas aus seinen Splittern wieder ersteht. Dass sich ein neuer Gleichgewichtszustand einstellt, dass Relaxation auftritt, ist nur als emergentes Phänomen für viele Teilchen zu verstehen.

Emergenz begegnet uns also in vielen grundlegenden physikalischen Konzepten, wie der Temperatur, der Richtung des Zeitpfeils, oder der Relaxation; diese Liste ließe sich mühelos fortsetzen. Bis jetzt haben wir uns aber nur in der Welt der Billardbälle, der klassischen Physik, bewegt. Da die grundlegende Theorie der Physik die Quantentheorie ist, ist es natürlich, nach Emergenz in der Quantenphysik zu fragen. Die Beobachtung emergenter Quantenphänomene wird dadurch erschwert, dass bei einer wachsenden Teilchenzahl das Verhalten des makroskopischen Systems zunehmend klassisch wird. Wir haben also eine Mischung von zwei Arten der Emergenz, der Emergenz der klassischen Welt aus der Quantenwelt, und der Emergenz von Vielteilchenkonzepten, wie wir sie soeben diskutiert haben.

Die Emergenz der klassischen Welt ist facettenreich und ein Thema von eigenem Rang. So soll der Hinweis genügen, dass Quantenphysik durch „Wellenfunktionen“ charakterisiert wird, und die besonderen Eigenschaften der Quantenwelt immer das Resultat von Überlagerungen von Wellen sind, die unterschiedliche Atome, verschiedene Materiezustände und anderes beschreiben. Man könnte an die Schallwellen denken, die die verschiedenen Orchesterinstrumente erzeugen, und die zusammen den Klang einer Symphonie ergeben. Störungen der einzelnen Schallwellen werden die Symphonie zerstören, und das ganze Unterfangen wird umso fragiler, je mehr Instrumente (Teilchen) ein kohärentes Ensemble bilden müssen, da mehr und mehr Fehler auftreten werden. Musikalisch gesprochen, würde eine Kakophonie der klassischen Welt entsprechen, ein Konzert der Berliner Philharmoniker der Quantenwelt. Wir suchen also nach einem Quantenphänomen, das auch im Grenzfall sehr vieler Teilchen (Instrumente) kohärent (eine Symphonie) bleibt. Da hohe Temperaturen stärkeren Abweichungen vom Mittel entsprechen, steht zu erwarten, dass uns unsere Suche zu sehr niedrigen Temperaturen führen wird.

Das reinste Quantenphänomen, das sich bis zu makroskopischen Dimensionen verfolgen lässt, die normalerweise ganz der klassischen Physik zugehören, ist die *Bose-Einstein-Kondensation*, die in der klassischen Physik keine Entsprechung findet. Betrachten wir unser Gas aus Billardkugeln, so sind die einzelnen Kugeln ohne Bezug auf die anderen, außer sie stoßen gerade zusammen. In der Quantenphysik hingegen besteht ein solcher Bezug zu jedem Zeitpunkt; gemäß der Quantenphysik zerfallen alle Teilchen in der Natur in zwei Kategorien, Bosonen und Fermionen, die sich sehr unterschiedlich verhalten, bringt man sie zusammen.

Stellen wir uns einen sehr kleinen Kasten vor; aus der Quantenphysik folgt, dass sich alle Teilchen in einem solchen Kasten in wohldefinierten Zuständen mit wohldefinierten

Energien befinden, die wir in vollkommener Analogie zu den genau festgelegten Frequenzen (Schwingungen) einer Violinensaiten sehen können. Fermionen sind Einzelgänger: In jedem dieser Zustände kann sich genau ein Teilchen befinden. Bosonen hingegen sind Herdentiere: Es gibt keine Beschränkung, wie viele Teilchen in einem dieser Zustände sein können, und wo sich schon viele befinden, werden sich bevorzugt neue einfinden.

1924 sagten der indische Physiker Satyendra Nath Bose und Albert Einstein voraus, dass bei sehr niedrigen Temperaturen etwas Spektakuläres passieren sollte. Da Temperatur ein Maß der mittleren Bewegungsenergie im System ist, werden sich die Bosonen bei sehr niedriger Temperatur in die energetisch niedrig liegenden Zustände begeben; das würden aber auch klassische Teilchen tun (Billardbälle). Der Unterschied, der mit dem Herdentrieb der Bosonen zusammenhängt, ist jedoch, dass die Bosonen unterhalb einer bestimmten Temperatur keine andere Möglichkeit haben, als in ihrer Mehrzahl den absolut tiefsten Zustand zu besetzen. Dieses Phänomen nennt man Bose-Einstein-Kondensation. Das klingt zunächst vielleicht nicht sehr eindrucksvoll, bedeutet aber, dass sich eine makroskopische Zahl von Teilchen in exakt dem gleichen Quantenzustand befinden und im Gleichschritt marschieren, aufgrund eines rein statistischen Effekts, nicht aufgrund einer Kraft, die sie in Reih und Glied bringt. Das resultierende makroskopische Quantenobjekt nennt man Bose-Einstein-Kondensat (aus dem Englischen abgekürzt BEC).

Ein anderer Blickwinkel erlaubt uns, die Temperatur abzuschätzen, bei der das Kondensat entsteht. Betrachten wir ein Gas bosonischer Atome, das wir abkühlen. Bei hohen Temperaturen sind unsere Atome wie Billardbälle mit einem mittleren Abstand  $d$ , der von der Dichte des Gases abhängt. Bei niedrigeren Temperaturen werden Quanteneffekte sichtbar. Man kann im Rahmen der Dualität von Welle und Teilchen in der Quantenphysik zeigen, dass das mit einem Teilchen assoziierte Wellenpaket von der Größe  $\lambda_{dB}$ , der sogenannten de Broglie-Wellenlänge, ist, die mit der inversen Quadratwurzel der Temperatur, d. h. mit Absenkung der Temperatur anwächst. Wenn die Wellenpakete bei hinreichend tiefen Temperaturen schließlich von der Größe  $d$  sind, fangen sie an zu überlappen, und eine gigantische Materiewelle entsteht, die Bosonen sind im Gleichschritt. Die Temperatur, bei der das passiert, definiert die kritische Temperatur; kühlen wir weiter ab, sind schließlich alle Atome im Kondensat. In einem typischen ultrakalten Atomgas beträgt der mittlere Teilchenabstand etwa 400 Nanometer. Daraus lässt sich eine kritische Temperatur von etwa 300 Nanokelvin berechnen, 300 Milliardstel eines Grads. Wie kalt ist das?

Wir reden von den tiefsten Temperaturen im Universum! Machen wir ein paar Vergleiche (Abb. 6). Physiker benutzen die Einheit Kelvin. 1 Kelvin entspricht 1 Grad Celsius, mit

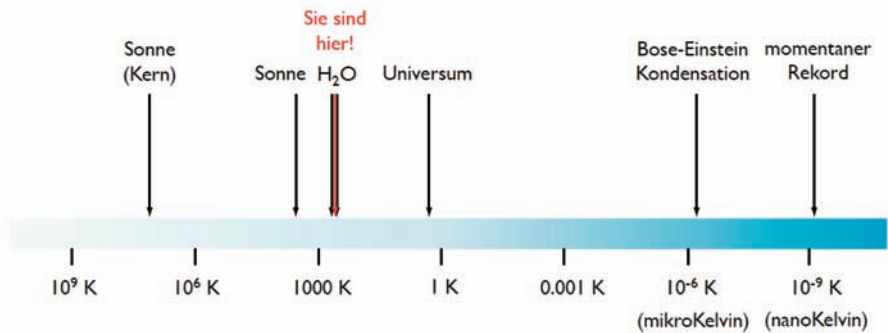


Abb. 6: Einige Temperaturen aus Alltag und Labor in logarithmischer Darstellung.

dem Unterschied, dass nicht vom Gefrierpunkt des Wassers aus gerechnet wird, sondern vom absoluten Temperaturnullpunkt, der bei  $-273,15$  Grad Celsius liegt. Somit gefriert Wasser bei  $273,15$  Kelvin und verdampft bei  $373,15$  Kelvin; Zimmertemperaturen liegen bei etwas unter  $300$  Kelvin. Die Oberfläche der Sonne ist  $5800$  Kelvin heiß, ihr innerster Kern  $15$  Millionen Kelvin. Auf der kalten Seite ist die Hintergrundtemperatur des Universums,  $2,7$  Kelvin, recht erfrischend; diese Temperatur geht auf die Mikrowellenhintergrundstrahlung zurück, die das Universum als Abglanz des Urknalls durchdringt. Im Labor kann man leicht mit flüssigem Helium Temperaturen von einigen Kelvin erzeugen. Danach wird es schwierig: wir müssen um sechs weitere Größenordnungen abkühlen, um die Bose-Einstein-Kondensation zu erzielen! Der Weg nach unten ist mit mehreren Nobelpreisen gepflastert; der gegenwärtige Rekord liegt bei  $0,06$  Nanokelvin, die am MIT in Boston erreicht wurden.

Wie können wir einzelne Atome kühlen? Bei sehr niedrigen Temperaturen sind sie so langsam, dass sie an Oberflächen kleben bleiben, so dass ein kontaktfreies Verfahren benötigt wird. 1975 hatten Schawlow und Hänsch die überraschende Einsicht, dass man mit Licht kühlen kann (Abb. 7) – überraschend, weil Licht aufheizt, wie man etwa feststellen kann, wenn man sich aus dem Schatten in die Sonne begibt: Licht transportiert Energie, und wenn man das Licht absorbiert, dann absorbiert man auch die Energie.

Licht transportiert aber nicht nur Energie, sondern auch Impuls, den wir auch absorbieren, aber nicht wahrnehmen, weil unsere Körpermasse so groß ist. Ein kleines Atom spürt ihn umso mehr!

Atome absorbieren nicht beliebiges Licht, sondern nur Photonen, deren Frequenz (Energie) der Energiedifferenz zwischen zwei internen Zuständen des Atoms entspricht (z. B. seinem Grundzustand (energetisch niedrigstem Zustand) und einem angeregten Zustand). Ist dies der Fall, so wird das Photon absorbiert: seine Energie versetzt das Atom in den angeregten Zustand, der Impuls wird auf das Atom übertragen wie von einer Billardkugel zur anderen.

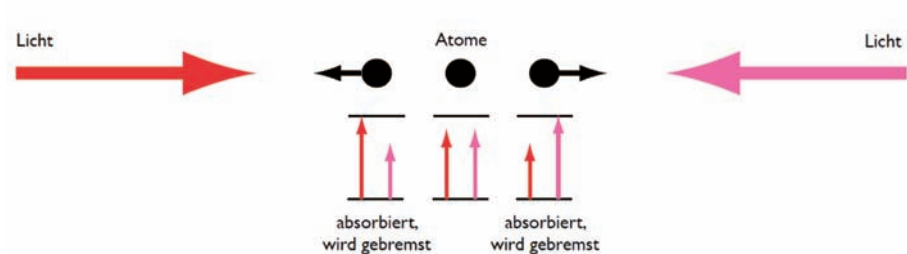


Abb. 7: Kühlen mit Licht. Atome können Licht (Energie und Impuls) nur absorbieren, wenn die Lichtfrequenz zu den inneren Energieabständen des Atoms passt. Durch Ausnutzung des Dopplereffekts kann erreicht werden, dass Atome Licht nur dann absorbieren, wenn es aus einer ihrer Bewegung entgegengesetzten Richtung kommt, und dadurch abgebremst werden.

Sollte es uns gelingen, den Impulsübertrag immer genauso zu vermitteln, dass das Atom abgebremst wird, würden wir das Atom abkühlen, da eine systematische Verringerung der Geschwindigkeit einer Verringerung der Temperatur des Ensembles entspricht. Um das zu erreichen, muss das Licht jedoch immer aus der der Bewegung des Atoms entgegengesetzten Richtung kommen. Da sich die Atome in beliebige Richtungen bewegen, müssen wir sowohl Beschleunigung als auch Abbremsung erwarten, und der gewünschte Effekt scheint sehr schwer erreichbar. Der Trick besteht nun darin, den Doppler-Effekt auszunutzen, den wir alle von einem schnellen Zug kennen: Solange er sich auf uns zu bewegt, ist die Tonfrequenz erhöht (das Fahrgeräusch klingt höher), wenn er sich dann von uns weg bewegt, ist die Tonfrequenz erniedrigt.

Betrachten wir zur Vereinfachung eine eindimensionale Bewegung des Atoms (also nur nach links bzw. rechts). Wir lassen Licht von beiden Seiten auf das Atom einfallen, aber mit einer Frequenz bzw. Energie, die nicht hoch genug ist, um in Resonanz mit dem Atom zu

sein und absorbiert zu werden. Aber aufgrund des Doppler-Effekts wird ein Atom, das sich nach rechts bewegt, das Licht, das von rechts kommt, bei einer höheren Frequenz sehen, die die Resonanzbedingung erfüllt. Das Licht kann daher absorbiert werden, und das Atom, das sich nach rechts bewegt, wird abgebremst. Das Licht, das von links kommt, wird bei einer (noch) niedrigeren Frequenz gesehen und spielt daher keine Rolle. Umgekehrt absorbiert ein Atom, das sich nach links bewegt, das von links kommende Licht und wird ebenfalls abgebremst. Die Geschwindigkeit nimmt bei jeder Absorption um ein paar cm/sec ab und erfasst alle Atome.

Um die Atome wirklich langsam werden zu lassen, muss eine derartige Absorption mehrfach erfolgen. Allerdings kann ein Atom, wenn es in seinem angeregten Zustand ist, kein weiteres Lichtteilchen absorbieren. Glücklicherweise verbleiben Atome nur eine zufällige, aber endliche Zeit in ihrem angeregten Zustand; danach begeben sie sich wieder in ihren Grundzustand, unter Aussendung eines Lichtteilchens in eine zufällige Richtung. Der damit verbundene Rückstoß beschleunigt die Atome wieder; da aber die Abbremsung immer in die gleiche Richtung weist, während die Beschleunigung in eine zufällige Richtung geht, setzt sich die Abbremsung durch, wobei die verbleibende zufällige Bewegung eine untere Schranke für die erreichbaren niedrigsten Geschwindigkeiten setzt. Man kann errechnen, dass diese Temperaturen dem Bereich von 100 Mikrokkelvin entsprechen, was noch nicht ganz für die Bose-Einstein-Kondensation ausreicht. Aus der Beziehung zwischen Temperatur und mittlerer Geschwindigkeit können wir jedoch berechnen, dass die Atome, die sich bei Zimmertemperatur mit einer typischen Geschwindigkeit von 400 m/sec bewegen – schneller als ein Düsenflugzeug – nun ungefähr bei gemütlichen 5 cm/sec angekommen sind.

Die experimentellen Apparaturen, die man zur Umsetzung dieser ebenso einfachen wie genialen Idee benötigt, sind durchaus aufwendig, ein komplexes Zusammenspiel von Lasern und Magnetfeldern, die man nicht nur zur Kühlung, sondern auch zum Einsperren der Atome verwendet, denn auch bei ihren sehr niedrigen Geschwindigkeiten würden sich die Atome in beliebige Richtungen entfernen und müssen daher in einer Falle gefangen werden. In solchen magnetooptischen Fallen, die im Zentrum der Apparatur etliche Millimeter groß sind, kann man dann mit bloßem Auge Wolken von vielleicht 100 Millionen Atomen sehen. Schaltet man die Falle ab, so fliegen sie mit wenigen cm/sec auseinander, wie ein Sternschauer bei einem Silvesterfeuerwerk. Schnappschüsse von solch einem Auseinanderfliegen erlauben abzuschätzen, wie viele Atome sich mit welcher Geschwindigkeit bewegen, die schnellen ganz außen, die langsamen ganz innen.

Mit weiteren technologischen Durchbrüchen in der Laserkühlung von Atomen, die ich hier nicht besprechen möchte, gelang es schließlich 1995, die BEC-Temperatur zu erreichen, zuerst in Boulder, Colorado, durch Cornell, Wieman und Mitarbeiter, dann am MIT in Boston durch Ketterle und Mitarbeiter. In den ersten Experimenten wurden Übergangstemperaturen von einigen hundert Nanokelvin erreicht und sogar noch viel niedrigere Temperaturen von einigen Nanokelvin und darunter, die kältesten Temperaturen, die wir gegenwärtig kennen. Die Zahl der beteiligten Atome ist typischerweise von der Größenordnung 1 Million, was ausreicht, um die Emergenz statistischer Phänomene zu sehen.

Wie wurde die Bildung des Bose-Einstein-Kondensats beobachtet? Es sitzt in einer kleinen Falle und es ist nicht möglich, direkt zu sagen, welche Atome sich im niedrigsten, dem Bose-Kondensat-Zustand befinden und welche in einem energetisch höheren Zustand. Hier hilft ein Trick. Der Zustand niedrigster Energie, in dem die Bosonen kondensieren, hat Impuls bzw. Geschwindigkeit null, alle anderen Zustände haben endliche Geschwindigkeit. Schalten wir also die Falle ab, werden die Atome im niedrigsten Zustand verharren, die anderen sich ausbreiten. Abbildungen nach einer kurzen Zeit zeigen uns damit den Anteil der Atome im niedrigsten Zustand. Stellt man die Zahl der Atome auf einer bestimmten Position in der zweidimensionalen Abbildung bei jeweils unterschiedlichen Temperaturen oberhalb, bei oder unterhalb der kritischen Temperatur von ein paar hundert Nanokelvin dar, so entstehen die in den letzten Jahren schon fast ikonisch gewordenen Bilder von der herausstechenden Bose-Einstein-Spitze (Abb. 8).

Obwohl diese Experimente in exzellenter Übereinstimmung mit jahrzehntealten theoretischen Voraussagen sind, wäre es ein noch schlagenderer Beweis für die Existenz des Kondensats, wenn Eigenschaften beobachtet würden, die zeigen, dass es sich in der Tat um einen makroskopischen Quantenzustand, eine (nach atomaren Maßstäben) gigantische Welle handelt.

Ein typischer Welleneffekt, den man aus der Badewanne kennt, ist die Interferenz von Wellen. In der Tat kann man bei der Kollision zweier Kondensate ein sehr klares konstruktives und destruktives Interferenzbild sehen (Abb. 9). Eine genauere Analyse der Abbildung zeigt, dass die Längenskala der Interferenz nur ein wenig kleiner als 0,1 Millimeter ist, der Dicke eines menschlichen Haars, das wir problemlos mit bloßem Auge sehen können. In „normaler“ Quantenphysik sind die typischen Größenordnungen Nanometer oder kleiner, wir haben also einen Sprung um etwa sechs Größenordnungen geschafft und Quantenmechanik zum Anschauen erhalten.



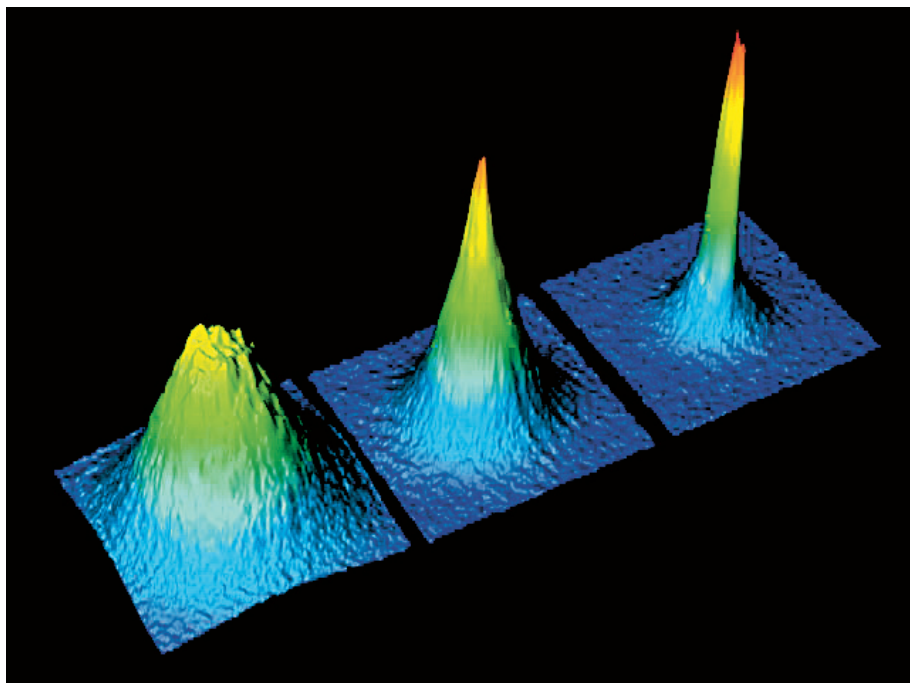


Abb. 8: Geschwindigkeits- bzw. Impulsverteilung der ultrakalten Atomgase (von links) oberhalb, bei und unterhalb der kritischen Temperatur. Die scharfe Spitze signalisiert die Anwesenheit des Bose-Einstein-Kondensats (T. Esslinger, ETH Zürich, <http://www.quantumoptics.ethz.ch>).

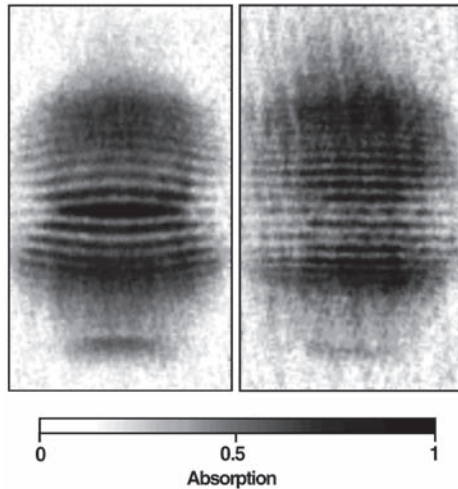


Abb. 9: Interferenzmuster zweier sich durchdringender Bose-Einstein-Kondensate als Nachweis der wellenartigen Natur der makroskopischen Materiewelle. Die Interferenzstreifen sind nur wenig dünner als ein menschliches Haar, das man noch mit bloßem Auge sehen kann (M. R. Andrews, C. G. Townsend, H.-J. Miesner, D. S. Durfee, D. M. Kurn, and W. Ketterle. „Observation of interference between two Bose condensates.“ *Science* 275 (1997): 637–641.).

Ein vielleicht noch überraschenderer Effekt wird erzielt, wenn man ein Kondensat in einer Falle rotiert – zunächst bedeutet das einfach, dass sich die Atome in Bewegung setzen. In der Quantenphysik hängt die Bewegung aber direkt mit der räumlichen Änderung der Phase der Welle zusammen, also wie rasch Berge und Täler in der großen Kondensatwelle aufeinander folgen. Es gibt aber ein mathematisches Theorem, das zeigt, dass die Rotation mit der Beziehung zwischen Bewegung und Phase nicht in Einklang zu bringen ist, außer es gibt ein Loch im Kondensat (einen Wirbel). Das ist jedoch genau, was passiert: Um rotieren zu können, erzeugt das Kondensat Löcher, um so mehr, je schneller die Rotation ist; die Löcher ordnen sich zu einem Dreiecksgitter an, wie es schon vor mehr als fünfzig Jahren von Abrikosov in einer Nobelpreisarbeit vorausgesagt wurde (Abb. 10).

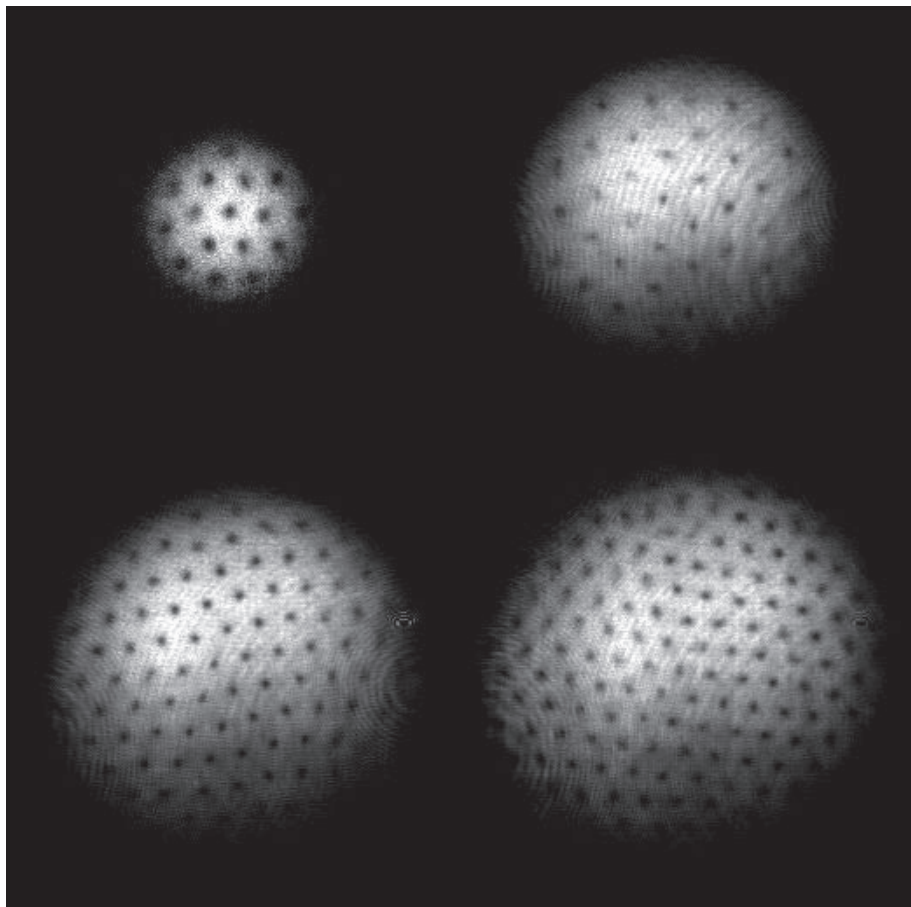


Abb. 10: Dreiecksgitter aus Löchern (Wirbeln) in einem rotierenden Bose-Einstein-Kondensat (J. R. Abo-Shaer, C. Raman, J. M. Vogels, and W. Ketterle. „Observation of Vortex Lattices in Bose-Einstein Condensates.“ *Science* 292, (2001): 476–479.).

Das alles mag faszinierend, vielleicht sogar ästhetisch ansprechend sein, aber hat diese Physik am Kältepol des Universums irgendeinen Bezug zur realen Welt? In der Tat ist dies in recht unerwarteter Weise der Fall.

Machen wir einen scheinbar großen Sprung weg von ultrakalten Atomen in die Welt der Festkörper. Diese sind deshalb für Physiker unter anderem deswegen so interessant, weil sie die Grundlage zahlloser Anwendungen bilden, zum Beispiel der gesamten modernen Informationstechnologie, und gleichzeitig einen enormen Reichtum an physikalischen Phänomenen aufweisen. Etwa die Hälfte aller Physiker auf der Welt arbeiten in diesem Gebiet.

Wir würden zum Beispiel gerne die elektronischen und magnetischen Eigenschaften von Magnetit verstehen, dem berühmten Magnetstein der alten Griechen. Dafür haben Physiker ein Rezept: Man muss die Schrödinger-Gleichung  $H\psi = E\psi$  lösen, um die Wellenfunktion  $\psi$  zu erhalten, die eine vollständige Beschreibung des Systems darstellt. Alle unangenehmen Details des Rezepts sind im Ausdruck  $H$  versteckt, der zwar sehr kompliziert aussieht, aber letztlich nur die Summe aller im System steckenden Energien ist. Man könnte auch sagen, er ist eine Liste aller Dinge, die Elektronen tun; sie bewegen sich, haben daher Bewegungsenergie; sie sind gleich geladen und stoßen sich daher ab, was ihnen Wechselwirkungsenergie gibt, und sie spüren den Einfluss des Kristallgitters, in dem sie sich bewegen. Diese drei Beiträge decken bereits einen enormen Bereich der Physik ab, von Metallen über Halbleiter hin zu Magneten. Leider kann niemand diese Gleichung für allgemeine Vielteilchenprobleme exakt lösen – obwohl sie im Prinzip alle Antworten enthält, können wir sie nicht aus ihr hervorlocken. In den letzten achtzig Jahren haben Physiker zahlreiche Näherungsverfahren entwickelt, die oft funktionieren und unglaubliche Fortschritte in der Beschreibung von Festkörpern und Geräten erlaubt haben, wie zum Beispiel Mobiltelefonen und Computern. Manchmal versagen diese Näherungsverfahren jedoch völlig – was tun?

Ein dann gewählter Zugang ist oft die Entwicklung physikalischer Modelle. Modelle sind vereinfachte Beschreibungen, so einfach wie möglich, aber nicht einfacher, in den Worten von Einstein. Was wir suchen, sind Karikaturen der Welt, die bei aller Verzerrung noch die Antworten auf die Fragen enthalten, die uns interessieren und sich in der Regel nicht mit den kleinsten Details befassen.

Unsere Karikatur eines Festkörpers stellt sich wie folgt dar: Wir benötigen ein Kristallgitter, eine sich periodisch wiederholende Struktur. Dies nähern wir durch eine Anord-

nung an, bei der Elektronen nur an bestimmten Plätzen in periodischem Abstand sitzen können, die wir Gitterplätze nennen.

Aufgrund ihrer kinetischen Energie bewegen sich die Elektronen frei durch das Gitter, in unserer Näherung hüpfen sie von einem Gitterplatz zu einem anderen. Es ist nicht sehr wahrscheinlich, dass sie sehr weit hüpfen: Wir beschränken uns daher auf Hüpfprozesse zwischen benachbarten Gitterplätzen. Das ist unsere Karikatur der Bewegungsenergie.

Gleichzeitig stoßen sich die Elektronen elektrostatisch ab. Die Kraft fällt mit dem Quadrat des Abstands ab, ist daher für weiter voneinander entfernte Elektronen vernachlässigbar. Für unsere Karikatur gehen wir so weit wie möglich und vernachlässigen die Abstoßung für alle Elektronen, außer sie sitzen auf dem gleichen Gitterplatz – das ist die größte denkbare Näherung.

Das resultierende Modell, das auf den britischen Physiker Hubbard und das Jahr 1964 zurückgeht, ist das minimale Modell, das noch Bewegung und Wechselwirkung enthält, weshalb es seit mehr als vier Jahrzehnten ein Hauptthema der Festkörperphysik ist. Leider können auch die Eigenschaften dieses sehr einfachen Modells von ein paar Spezialfällen abgesehen nicht exakt berechnet werden. Wir verfügen lediglich über mehr oder weniger überzeugende Näherungen. Darüber hinaus würden wir gerne verstehen, wie gut es wirklich die „reale Welt“ beschreibt; viele Physiker glauben beispielsweise, dass dieses Modell die Hochtemperatur-Supraleitung erklären sollte, ein spektakuläres Phänomen, das nach 25 Jahren immer noch auf seine Erklärung wartet.

Naturgemäß denken wir an große Computer, um diese Probleme zu lösen, aber die große Hürde besteht darin, dass unsere Computer der klassischen Physik gehorchen (sie sind nichts anderes als gigantische Ansammlungen von An-/Ausaltern) und damit unendlich weniger komplex sind als wahre Quantensysteme, in denen auch Überlagerungen von „an“ und „aus“ erlaubt sind, was einem klassischen Schalter nicht möglich ist; Computer sind daher nicht ohne weiteres in der Lage, nichttriviale Quantensysteme zu simulieren. 1982 hat Richard Feynman daher vorgeschlagen, stattdessen Quantensysteme, die man sehr gut kontrollieren kann, zu verwenden, um andere, die man nicht beherrscht, zu simulieren; die kontrollierten Quantensysteme wären dann eine Art Quantensimulator oder Analog-Quantencomputer. Das ist leichter gesagt als getan – vielleicht sind ultrakalte Atomgase die ersten Vielteilchensysteme, mit denen man diesen Vorschlag umsetzen kann.

Ein eleganter Vorschlag, ultrakalte Atomgase als Quantensimulatoren zu nutzen, wurde 1998 in Innsbruck von Peter Zoller und Mitarbeitern unterbreitet, die die Ausnutzung optischer Gitter vorschlugen (Abb. 11): Mittels sich in entgegengesetzter Richtung ausbrei-

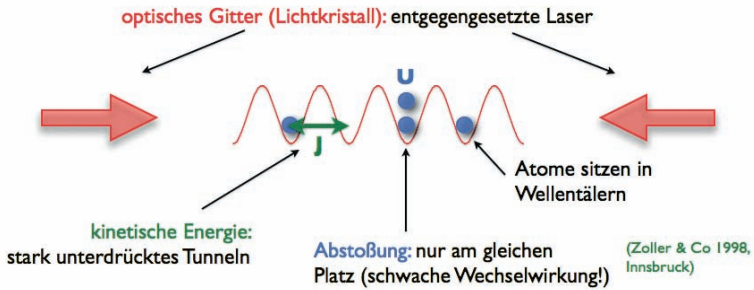


Abb. 11: Aufbau eines Minimalmodells eines Festkörpers durch ultrakalte Atome in einem optischen Gitter. Die Atome simulieren dabei Elektronen (D. Jaksch, C. Bruder, J. I. Cirac, C. W. Gardiner, and P. Zoller. „Cold bosonic atoms in optical lattices.“ *Phys. Rev. Lett.* 81, 1975 (1999)).

tender Laserstrahlen kann man eine stehende Lichtwelle erzeugen, die als ein Lichtkristall dient, bei dem die Atome an wohlbestimmten Gitterplätzen sitzen. Sitzen sie an verschiedenen Gitterplätzen, nehmen sie einander nicht wahr; sitzen sie am gleichen Gitterplatz, so stoßen sie einander ab, mit einer Wechselwirkungsenergie  $U$ . Zugleich können sie quantenmechanisch durch die vom Lichtkristall erzeugten Energiebarrieren zu benachbarten Gitterplätzen durchtunneln, wodurch sie eine Bewegungsenergie  $J$  erhalten. Damit sind sie eine perfekte Inkarnation unserer Karikatur!

Es gibt aber noch eine wunderbare Zugabe: Ultrakalte Atome sind beinahe wechselwirkungsfrei, außer auf extrem kurzen Abständen, so dass der Energiebeitrag der Wechselwirkung nur sehr klein ist. Dies ist perfekt, um Bose-Einstein-Kondensation zu studieren, wo Wechselwirkungen lediglich ein rein statistisches Phänomen maskieren würden, hilft aber nicht, mehr über Festkörper zu erfahren, bei denen Wechselwirkungen stark sind. Der Vorschlag, optische Gitter zu verwenden, löst dieses Problem ganz nebenbei. Der entscheidende Punkt ist, dass die Bewegung der Atome durch sie stark unterdrückt wird, weil sie durch eine hohe Energiebarriere hindurchmüssen, um zum nächsten Platz zu gelangen. Dadurch wird die Bewegungsenergie stark unterdrückt, und obwohl die Wechselwirkung absolut gesehen nicht stärker geworden ist, kann sie nun im alles entscheidenden Vergleich zur Bewegungsenergie sehr stark sein! Letztlich haben wir also ein System mit ansehn-

lichen Wechselwirkungsstärken, die ganz einfach durch eine Verstärkung oder Abschwächung des Lichtkristalls durchgestimmt werden können.

Warum sind Physiker von diesem Quantensimulator begeistert, von der Hoffnung auf Antworten abgesehen? Experimentell handelt es sich um ein sehr attraktives System: Der optische Aufbau ist sehr rein, im Gegensatz zu Festkörpern mit Kristallstörungen und Verunreinigungsatomen. Die Details des Aufbaus können mit hoher Genauigkeit ausgerechnet werden, was im Festkörper sehr schwer ist. Ferner ist er, wie schon gesagt, durchstimmbar: Im Vergleich zu Festkörpern ist es sehr einfach, die Wechselwirkungsparameter über mehrere Größenordnungen zu variieren – man muss lediglich die Laserintensität variieren.

Da die Energieskalen sehr klein sind, laufen quantenmechanische Prozesse sehr langsam ab, weil in der Quantenmechanik Zeitskalen das Inverse der Energieskalen sind: Während sie im Festkörper von der Größenordnung  $10^{-13}$  Sekunden sein können, sind sie nun auf der Größenordnung von Millisekunden. Das ist ziemlich langsam, und bedeutet, dass wir Parameter experimentell auf Zeitskalen ändern können, die nicht nur (noch) langsamer, sondern – was interessanter ist – deutlich kürzer sind. Dadurch erhält man Zugang zu einem großen Reichtum von physikalischen Problemen, zum Beispiel dem „Quenching“, bei dem ein Quantensystem abrupt und drastisch aus seinem Gleichgewichtszustand entfernt wird.

Darüber hinaus kann man viele Manipulationen vornehmen, die in einem Festkörper undenkbar sind und zu neuen Materiezuständen führen. Darauf soll hier nicht weiter eingegangen werden; hier setzt uns nur unsere Phantasie die Grenzen.

Kehren wir zu einem (emergenten) Alltagsphänomen zurück, den Phasenübergängen: Wasser gefriert bei Abkühlung, Eis taut bei Erwärmung, und die Wassermoleküle befinden sich jeweils in einem ganz anderen Zustand.

Das grundlegende Experiment, das gezeigt hat, dass ein Quantensimulator sinnvoll sein kann, und das vormalig völlig getrennte Gebiete der Physik zusammengebracht hat, wurde 2002 an der Universität München von Immanuel Bloch, Tilmann Esslinger und Mitarbeitern in der Gruppe von Ted Hänsch ausgeführt. Seine Wirkung mag man daran erkennen, dass es die meistzitierte physikalische Veröffentlichung des Jahrzehnts ist.

Es greift die Idee eines Phasenübergangs auf, aber in sehr spezieller Weise. Im Experiment wurde, wie in Innsbruck vorgeschlagen, ein optisches Gitter aufgebaut und mit Bosonen in einem Kondensat-Zustand gefüllt. Danach wurde die effektive Wechselwirkungsstärke langsam von sehr schwach zu sehr stark durch Variation des optischen Gitters

durchgestimmt. Das langsame Durchstimmen stellt sicher, dass die Atome ausgehend vom Kondensat im energetisch niedrigsten Zustand verbleiben. Experimentell wurde die Geschwindigkeitsverteilung (genauer: Impulsverteilung) der Atome bei anwachsender Wechselwirkungsstärke gemessen. Zu Beginn verblieben alle Atome bei Geschwindigkeit null, wie für das Kondensat erwartet. Bei anwachsender Gittertiefe tauchten weitere Maxima in der Geschwindigkeitsverteilung auf, die typisch für ausgedehnte Wellen in einem Gitter sind. Ihre Intensität nimmt zu, bis sie plötzlich recht überraschend verschwinden und nur eine diffuse Geschwindigkeitsverteilung übrig bleibt (Abb. 12). Was ist passiert?

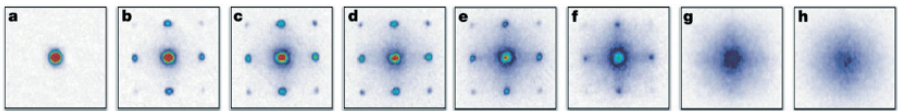


Abb. 12: Geschwindigkeits-(Impuls-)verteilung ultrakalter Atomgase im optischen Gitter bei zunehmender Wechselwirkungsstärke: Der ursprüngliche Kondensatpeak und die sich darauf entwickelnde Struktur wird beim Übergang in den Mott-Isolator durch ein diffuses Bild ersetzt (M. Greiner, O. Mandel, T. Esslinger, T. W. Hänsch und I. Bloch. „Quantum Phase Transition from a Superfluid to a Mott Insulator in a Gas of Ultracold Atoms.“ *Nature* 415 (2002): 39–44).

Bei schwacher Wechselwirkung bilden die Teilchen im Wesentlichen weiterhin eine gigantische Materiewelle, die kohärent über das ganze Gitter delokalisiert ist, eine sogenannte Superfluid. Wird die Wechselwirkung stärker (das Gitter ausgeprägter), können wir uns vorstellen, dass die Atome stärker lokalisiert werden, weil die Hüpfvorgänge unterdrückt werden. Stellen wir uns die experimentell relevante Situation vor, dass sich im Mittel ein Atom pro Gitterplatz befindet. Setzen wir genau ein Atom auf jeden Gitterplatz, so würde Delokalisierung bedeuten, ein Atom auf den benachbarten Platz zu setzen, auf dem sich dann zwei Atome befänden. Aufgrund ihrer abstoßenden Wechselwirkung kostet das jedoch einen hohen energetischen Preis. Wechselwirkung friert daher die Atome, von kleinen Fluktuationen abgesehen, ein, das System wandelt sich in einen sogenannten Mott-Isolator (benannt nach Sir Neville Mott), und durchläuft dabei einen Quantenphasenübergang, „Quanten“, weil der Übergang nicht durch eine Temperaturänderung ausgelöst wird; wir sind effektiv am Temperaturnullpunkt. Ein kontrollierter Quantenphasenüber-



gang in einem wechselwirkenden System war 2002 ein definitives Novum, sowie der erste Nachweis, dass ultrakalte Atome dazu dienen könnten, komplexe kollektive Quantenphänomene zu simulieren und ein vollständig neues Gebiet der Physik zu eröffnen.

Die Quantennatur des Vielteilchensystems wird aber in der folgenden Variante des Experiments noch offensichtlicher: Ausgehend von einem schwach wechselwirkenden superfluiden Zustand wird die Wechselwirkung wieder stark gemacht, aber nun quasi instantan. Das ist einfach, da die typische quantenmechanische Zeitskala im Bereich von Millisekunden liegt; die Laserintensität kann in Mikrosekunden variiert werden.

Wie reagiert das System? Betrachten wir wieder die Geschwindigkeitsverteilung, so verschwinden zunächst die für das Superfluid im Gitter typischen Spitzen, und das für den Mott-Isolator charakteristische diffuse Bild erscheint, wie man es bei einer starken Wechselwirkung naiv erwarten würde. Aber dann taucht das alte Muster wieder auf! (Abb. 13) Diese Abfolge von Zusammenbruch und Wiedererstehung kann man etwa fünfmal hintereinander beobachten und als Film darstellen, um einen Faktor 100 verlangsamt. Es ist eigentlich unglaublich, ein so langsames Quantenphänomen zu haben, dass man seinen Herzschlag unter einer Verlangsamung von lediglich zwei Größenordnungen mit dem bloßen Auge beobachten kann.

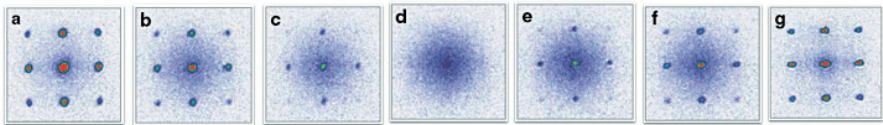


Abb. 13: Zeitliche Entwicklung einer Wellenfunktion: Bei plötzlicher Erhöhung der Wechselwirkungsstärke geraten die Komponenten der quantenmechanischen Wellenfunktion außer Phase (Bild d), um nach einer gewissen Zeit für einen Moment wieder in Phase zu gehen (Bild g): Die ursprüngliche Wellenfunktion ist nach einem Kollaps wieder aufgelebt (M. Greiner, O. Mandel, T. W. Hänsch und I. Bloch. „Collapse and revival of the matter wavefield of a Bose-Einstein condensate.“ *Nature* 419 (2002): 51–54.).

Die Erklärung für dieses Phänomen ist letztlich recht einfach. Die quantale Wellenfunktion kann man sich als Überlagerung einer großen Zahl von Wellen vorstellen, so wie die Schallwelle eines Symphonieorchesters sich aus der Überlagerung der Schallwellen der individuellen Instrumente zusammensetzt. Die Quantenmechanik lehrt uns, dass nach

dem plötzlichen Ändern der Systemparameter diese Wellen nun mit unterschiedlichen Frequenzen zu oszillieren beginnen und damit aus dem Takt geraten: Ein dekohärentes Signal (der Zusammenbruch) erscheint. In diesem Experiment geraten sie aber in einer ganz speziellen Weise außer Takt, so dass sie nach einer gewissen Zeit für einen kurzen Moment wieder alle im Takt sind (die Wiedererstehung). Man stelle sich zwei Musiker vor, die in einem permanenten *da capo* die gleiche Melodie spielen; spielt einer doppelt so schnell wie der andere, treffen sie nach zwei Wiederholungen durch den schnellen und eine durch den langsamen wieder auf der gleichen Note aufeinander!

Zum Abschluss möchte ich einen Blick auf ein sehr aktuelles Forschungsthema werfen, das ich mit meinem Mit-Fellow Jens Eisert in diesem Jahr am Wissenschaftskolleg verfolgt habe. In den letzten Jahren ist es den Experimentatoren gelungen, immer komplexere Lichtkristalle bzw. optische Gitter zu bauen, wie zum Beispiel ein „Übergitter“, bei dem sich zwei stehende Wellen unterschiedlicher Wellenlänge überlagern. Das Ergebnis ist eine Struktur von Doppelmulden, die durch Verschieben der zwei Gitter drastisch geändert werden kann. Diese Umformungen erlauben die Präparation von Mustern von Atomen, man kann sie zum Beispiel von der linken Position in einer Doppelmulde auf die rechte verschieben, und experimentell unterscheiden, ob sie links oder rechts sitzen.

Äquilibrationsprozesse (man denke an den Tintentropfen) sind Teil des Alltags, und in der Quantenphysik kann man fragen, wie diese Prozesse auf mikroskopischer Skala ablaufen, was für ein Gleichgewicht sich einstellt, und dergleichen mehr. Ein Vorschlag von Jens Eisert und mir war es, diese Übergitter als Simulatoren zu verwenden, bei denen man sehr spezielle Muster vorbereitet, die nicht im Gleichgewicht sind, und zu beobachten, wie diese Gleichgewichtsbildung stattfindet. Was diese Systeme besonders macht, ist die Anwesenheit einer starken Wechselwirkung sowie die beinahe perfekte Abwesenheit von Reibung (Dissipation), die normalerweise einen starken, aber störenden Mechanismus für Äquilibration darstellt.

2008 haben wir vorgeschlagen, einen Übergitterzustand zu präparieren, bei dem sich genau ein Atom auf jedem zweiten Gitterplatz befindet (Abb. 14). Wir sprechen dabei von Hunderttausenden von Atomen, und wir wollen jede einzelne Position kontrollieren – aber das ist jetzt möglich! Schaltet man nun das zweite Gitter ab, so befinden sich die Atome in einem Nichtgleichgewichtszustand: Sie können sich frei herumbewegen und der Gleichgewichtszustand wäre definitiv einer, bei dem alle Plätze gleich wahrscheinlich besetzt werden (also mit einer Wahrscheinlichkeit von 50 Prozent). Da die Experimentatoren zwischen linken und rechten Gitterplätzen unterscheiden können, können wir Aspekte dieses

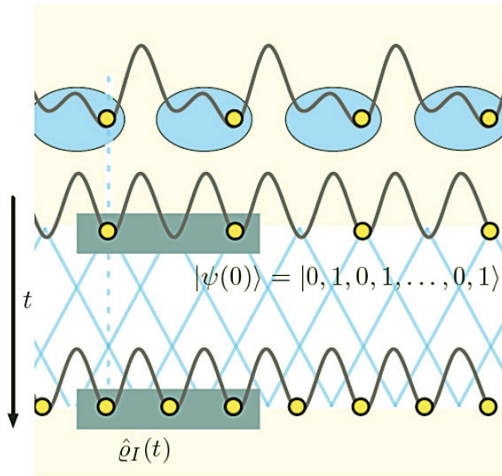


Abb. 14: Vorschlag eines Relaxationsexperiments: Ein atomares Muster mit einem Atom auf jedem zweiten Gitterplatz entwickelt sich in der Zeit, wobei sich das Muster auflöst und quantenmechanische Korrelationen aufbauen (M. Cramer, A. Flesch, I. McCulloch, U. Schollwöck und J. Eisert. „Exploring local quantum many-body relaxation by atoms in optical superlattices.“ *Phys. Rev. Lett.* 101, 063001 (2008)).

Relaxationsprozesses beobachten. Immanuel Bloch und einer seiner Doktoranden, Stefan Trotzky, haben diesen Vorschlag nun in einem realen Experiment umgesetzt, dem ersten seiner Art.

In Abbildung 15 sieht man die Ergebnisse der ersten Messungen, bei denen etwa 60.000 Atome aus dem speziellen Ausgangszustand bei recht starker Wechselwirkung (etwa dem fünffachen der kinetischen Energie) relaxieren. Alle starten in den rechten Positionen, bewegen sich nach links und oszillieren hin und her, bis sich die Dichte bei 0.5 Atomen pro Gitterplatz einpendelt.

Wir haben diese experimentellen Resultate mit unseren quantenmechanischen Voraussagen verglichen, um den Quantensimulator zu eichen, d. h. zu zeigen, dass er in der Tat die gesuchten physikalischen Phänomene simuliert und Information zuverlässig ausgelesen werden kann. Die unschuldig daher kommende oszillierende Kurve ist dabei sehr schwer berechenbar, und wir haben erst seit 2004 eine Methode, diese Art von Rechnungen durch-

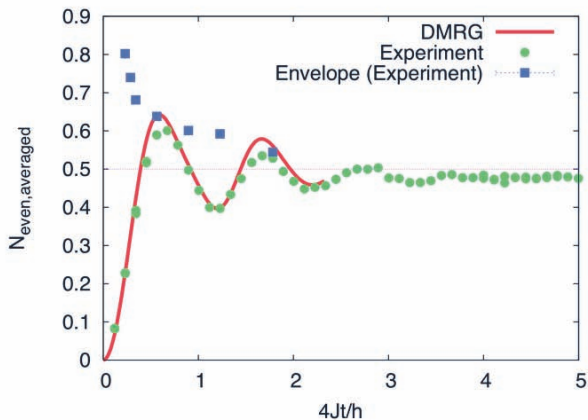


Abb. 15: Sich in Abhängigkeit von der Zeit (x-Achse) in den Gleichgewichtszustand einschwingende Teilchendichte im stark wechselwirkenden Relaxationsexperiment; Theorie („DMRG“) und Experiment stimmen trotz des sehr komplexen quantenmechanischen Prozesses ohne Anpassungsparameter exzellent überein (S. Trotzky, Y.-A. Chen, I. McCulloch, U. Schollwöck, J. Eisert und I. Bloch. “Probing the relaxation towards equilibrium in an isolated strongly correlated 1D Bose gas”, arXiv:1101.2659).

zuführen, die mittlerweile weit über hundert Anwendungen in der Quantenphysik gefunden hat. Man sieht eine nahezu perfekte Übereinstimmung zwischen Theorie und Experiment ohne – und das ist sehr wichtig – „Anpassungsparameter“; das bedeutet, dass wir vollständige Kontrolle über die Nichtgleichgewichtsdynamik und den Relaxationsprozess erlangt haben. Gleichzeitig konnten wir zeigen, dass die einfach aussehende Dynamik hochgradig nicht-trivial ist: Alteingeführte Näherungen, dass das System seine Vergangenheit vergisst oder dass man den Vielteilchenaspekt vernachlässigt, versagen vollständig.

Einige Kollegen waren trotzdem der Ansicht, dass die Relaxation vor allem auf Störungen von außen zurückzuführen sein könnte. Wir haben aber ebenfalls vorausgesagt, dass die Atome während der Relaxation ein kompliziertes Ballett korrelierter Bewegung aufbauen sollten – Abbildung 16 zeigt, dass ein bestimmter Grad an Korrelation zwischen Nachbarn, der sehr stark von der Wechselwirkungsstärke abhängt, auf langen Zeitskalen

überlebt. Das Experiment zeigt nun eine sehr gute Übereinstimmung zwischen Theorie und Experiment für diese Korrelationen, die durch Störungen rasch zerstört würden; dies ist ein sehr starker Beweis für die Validität des Experiments und ein erster Einblick in die Korrelationsphysik des Nichtgleichgewichts. Dies sind allerdings nur die ersten Schritte, die man mit einem solchen Simulator unternehmen kann!

So haben wir das Ende eines langen Wegs erreicht: Ultrakalte Atome, die kältesten Objekte des Universums, erlauben die kontrollierte Untersuchung und Visualisierung kollektiver Quantenphänomene. Atome und Lichtkristalle stellen Quantensimulatoren der materiellen Welt (der Festkörper) dar, und geben uns Einblicke in kollektive Quantendynamik, wie den Zusammenbruch und die Wiedererstehung von Quantenwellen. Erste Einsichten in die Details emergenter Quantenphänomene liegen vor. Der Pfad ist steil, aber die Wunder der Emergenz versprechen uns auch in Zukunft zahlreiche spannende Phänomene, die es zu entdecken und zu verstehen gilt.

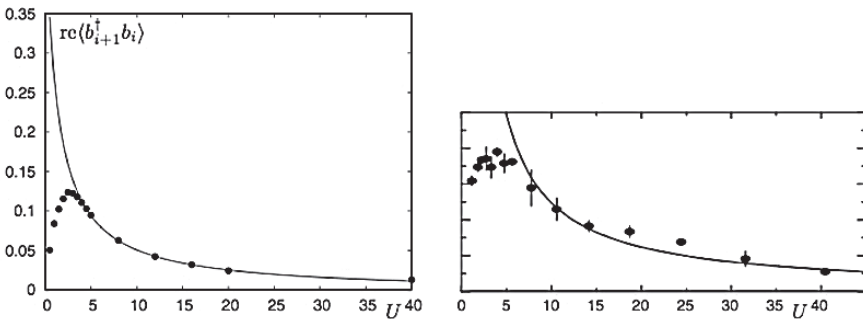


Abb. 16: Theoretische Vorhersage (links) und experimentelle Messung (rechts) für die im Grenzfalle langer Zeiten entstehenden Quantenkorrelationen zwischen Teilchen auf benachbarten Plätzen in Abhängigkeit von der Wechselwirkungsstärke  $U$  (x-Achse). (A. Fleisch, M. Cramer, I. McCulloch, U. Schollwöck und J. Eisert, „Probing local relaxation of cold atoms in optical superlattices.“ *Physical Review A* 78, 033608 (2008); S. Trotzky, Y.-A. Chen, I. McCulloch, U. Schollwöck, J. Eisert und I. Bloch. “Probing the relaxation towards equilibrium in an isolated strongly correlated 1D Bose gas”, arXiv:1101.2659).

ELECTIONS AND REPRESENTATION  
IN CONTEMPORARY INDIA  
YOGENDRA SINGH YADAV

In my talk I address two simple, related and rather obvious questions about the state of democracy in my country. What is wrong with representative democracy in today's India? And, what can be done about it? Questions of this kind are considered too simple, too general or perhaps too large for academic students of politics to answer. I suspect that in its search for *clever* questions and *novel* answers, academia often loses sight of *significant* questions and *good* answers. Or so I hope to persuade you.

Let me first clarify the questions. The first question contains two questions within it. Does the system of competitive elections succeed in representing the people in terms of what they demand, what they desire or what they need? If it does not – at this stage let me not get distracted into the fascinating distinction between these three terms and how these set up three different ways of measuring the gap between the actual and the ideal – then the natural question is – why not? There are many obvious candidates for an answer here: the quality of political leadership, the nature of political parties and party competition, the institutional rules of electoral competition and popular beliefs, attitudes and values. How much weight do we assign to these possible explanations? An understanding of what and why should give us some clues about how we can go about correcting the democratic deficit. Where should the thrust of the attempts at political reforms be directed? Does it call for constitutional and legal redesigning? Or should we look at institutional modifications? Or does the answer lie in the domain of political action?

I cannot hope to answer all these questions in my talk even if I were to pretend to know the answers. But I do wish to suggest a general way of thinking about and answering these questions in the Indian context. In this sense my argument is specific to India. What I say may not be unique to India; I do hope that something in my argument may apply to other

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Tuesday Colloquium held at the Wissenschaftskolleg zu Berlin on June 8, 2010.

contexts as well. At the same time I make no attempt here at law-like generalizations, and the validity of the argument does not depend on its applicability outside India.

A brief comment on the state of academic wisdom on this question and its relationship to political common sense is in order here. The questions that I raise here are not altogether unattended by academia. On the contrary, academic political science houses many resources to forge an answer to these questions. But these resources are scattered across academic sub-disciplines. The established division of academic labour discourages any attempt to piece together the big picture.

Western Political Theory has a rich tradition of thinking about the foundational questions of representation. What do we mean by representation? What kind of representation can we reasonably expect from democracies? The task of specifying the real-life conditions under which democratic elections may or may not yield responsive and accountable government has been left to the sub-discipline of Comparative Politics. There is now a growing academic literature that studies the impact of the quality of governance on electoral mandates and whether the nature of mandate makes a difference in what the governments do. Increasingly colonized by the economists and couched in a language of “scientific” models, this literature draws much of its material and assumptions from North America and Europe. Thinking about how all this relates to the opinions, attitudes and behaviour of ordinary voters is a task left to another semi-technical sub-discipline of “Election Studies”. Scholars in this sub-discipline, focused or modelled on North America, tend to draw their evidence from sophisticated statistical analyses of survey data to draw precise but limited conclusions about why voters vote the way they do. And then there is the scholarly literature on electoral systems and their reforms that looks at the political consequences of electoral laws in western democracies.

Most of these fields do not speak to one another. Besides, as noted above, most of the general propositions have a built-in reference to western democracy, for they draw their material and assumptions from the working of democracies in Europe and North America. Interestingly, the only literature that focuses specifically on the working of elections in the global South is the non-academic “manuals” on election monitoring prepared by international NGOs and human rights organizations. This highlights the difficulty of answering the kind of questions that I have asked with the help of the existing academic scholarship.

Perhaps this is also why the established academic wisdom plays little role in shaping political common sense on this issue in contemporary India. Scholars would of course put it down to the illiteracy of the politicians and public intellectuals. But it could also be read,

equally plausibly, as a sign of disconnect between political science and political sense. India has rich, almost obsessive, public debates on what is wrong with representative democracy and what can be done about it. Political common sense on this question is forged by political debates in legislatures and committees, jurisprudence and the legal discourse, “civil society” recipes for political reforms and media debates around specific instances of lack of accountability and responsiveness in politics. Yet this debate has virtually no point of contact with the professional knowledge of politics listed earlier.

### Three Objections Met

Let me begin by responding to three possible objections to the line of inquiry that I undertake. It could be argued that the questions I ask are not worth pursuing because a) India is not quite a democracy, or b) there is nothing really wrong with the outcomes of democracy in India, or c) one should not expect democracy to address issues like mass poverty.

In defining democracy I follow the “minimalist” tradition of defining democracy as a form of government in which those who rule are elected by the people in competitive elections and run the risk of losing power in regular elections. In this definition the election of rulers by the people is subject to some qualifications:

The election should be competitive in that there should be more than one serious contender;

The opposition should have a fair chance of winning, should they have popular support;

The electoral mandate cannot be revoked by the loser and the winner should get to exercise highest political power; and

The elections should be held at regular intervals irrespective of the wishes of the incumbent.

Examined closely, this definition is actually not so minimal, for these conditions cannot exist without there being a certain regime of freedom, rights and rule of law. But I do not wish to pursue that line of argument here. A minimalist definition of democracy is particularly suited to the task at hand, for it reminds us that democracy is only one of the things we value, and that it cannot be presumed to usher in all other good things (at least not by definitional fiat). We cannot assume that democracy has benign social consequences. Obversely, we must not insist that a regime that does not bring about social well-being cannot be called



democracy. It reminds us that the conceptual trick of equating democracy with social democracy may have its rhetorical value, but it comes with huge analytical costs.

Following this definition, it seems fair to categorise India since independence as a “democracy”. To be sure, there has been more than one instance where these minimum rules have been violated. The illegitimate, though strictly speaking not unconstitutional, extension of the term of the Lok Sabha during the state of national “emergency” imposed by Indira Gandhi (June 1975 to March 1977) was one instance at the national level. There are several instances of gross violation of the minimum requirements of a democratic rule at the state level, where the overall verdict of the elections could not be described as a fair reflection of popular choice. I would put all elections except the one held in 1977 that took place in the state of Jammu and Kashmir before 2002, all elections in Nagaland before 2003 and in Mizoram before 1987, the state assembly election in West Bengal in 1972, Assam in 1983 and Punjab in 1992 in that category. This is an embarrassing but finite list of exceptions that otherwise serves to prove the rule that India since independence must be characterised as a democracy in the minimalist sense of the term.

The second objection can be met by pointing to one gross failure in India since independence, namely the continued existence of a vast population well below a floor of minimum goods and services required for dignified living. Now, talking about poverty is the professional turf of the economists. I do not wish to enter into a discussion on the very rich literature on competing approaches to defining poverty: absolute or relative measures, objective or subjective approaches, material or non-material dimensions. For the purpose of the present argument it is necessary to reiterate what would be acceptable by nearly all the participants in the debate, namely that a substantial population in India is poor. The exact count does not quite matter to my argument here except in a minimal way: the poor are not a tiny fraction of the Indian population which may be explained away as a minor malfunctioning of the otherwise well-functioning system, nor are the numbers diminishing in a way as to make poverty a phenomenon of passing interest. Although the official count of the Government of India puts the proportion of persons “below the poverty line” somewhere around a quarter of the country’s population, all reasonable estimates point to a much higher figure. As has been persuasively argued, the official “poverty line” is really a “starvation line”. Once floor level requirement of material needs other than food intake (clothing, housing, energy, medical care, education) are factored in, nearly two-thirds of our population lives below the floor of minimum goods and services required for dignified living.

Finally, the third objection: why are we surprised at the co-existence of democracy and mass poverty? Simply put, majority rules in democracies and we should be surprised if those who (can) rule do not use this power to improve their conditions of life. This is not to say that the desire or demands of every kind of majority are routinely fulfilled in any democracy. Clearly, the strong desire of an overwhelming majority of the electorate in all the democracies to have clean, accountable and efficient government is routinely frustrated. The point here is that the non-fulfilment of this expectation calls for an explanation. There is nothing new in this expectation: democracy was always seen as the rule of the poor. Before the recent spread of the democratic form of government all over the globe, democracy was the dread of the propertied classes and the hope of those who believed in radical redistribution.

The expectation is based on the following chain of argument: In conditions of mass poverty, it is reasonable to expect that those who live below the floor of dignified existence would desire to move out of it. It is also likely that the existence of mass poverty will generate a moral unease among a section of those who are not poor, unless this form of deprivation is culturally sanctified. Both of these, or at least the first one, will generate a reservoir of latent or revealed preferences for floor-securing social policies. Given a free media, it is reasonable to expect these preferences to be articulated in the public domain and translated into definite signals. This issue is expected to become at least one of the main issues of public life that is reflected in social and ideological divisions and is likely to attract the average voter (“median voter” in the language of election studies) who is likely to be poor. In conditions of open and free competitive politics, the contending parties are expected to respond to these signals by changing their political agenda to reflect the priorities of the median voter. Since the issue has some salience in public life and the poor are a very large part of the electorate, the party that is seen as presenting a credible floor-securing social policy should stand a better chance of winning the elections. The prospect of winning elections and holding on to power in the next one is expected to provide the political will to design and carry out floor-securing social policy.

This logic is summarized in Figure 1. The purpose of this simplified model is to spell out the logic behind an intuitive expectation and to identify the various stages in which the real life experience of democracy can be compared with this expectation. The model does not predict that its expectation shall be fulfilled. The point instead is to identify the mechanisms that account for the non-fulfilment of this expectation.

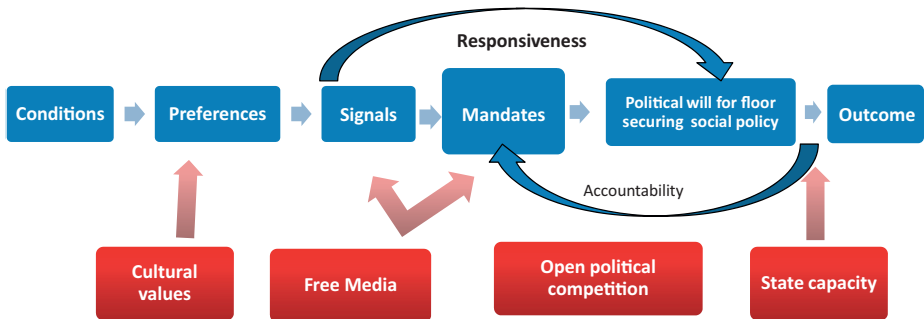


Fig. 1: Why do we expect democratically elected governments to carry out floor securing social policies. Modified version of Przeworski, Stokes and Manin 1999 and Yadav 2008

In fact, the paradox of the co-existence of democracy and mass poverty is deeper in India than in many other societies. Some of the common reasons why democracies do not care for their poor do not hold true for India. First of all, the institutional design of Indian democracy (parliamentary system, asymmetrical federalism, flexible constitution amendment) is not “demos-constraining” in that it does not put significant obstacles to the democratic popular will. There are not too many veto points that might account for the failure of floor-securing social policies to be legislated and implemented. Second, the party system is intensely competitive with very high electoral volatility. The first-past-the-post system accentuates the effect of voters’ volatility into dramatic change in seats and government formation. Though the level of volatility has come down in this decade compared to the previous one, a ruling party in an Indian state has just about a 50 per cent chance of coming back to power (Figure 2). Parties cannot afford to be complacent and overlook issues that might concern a significant proportion of population. Third, the state capacity in India is higher than most of the comparable poor countries; it still commands the force to impose its will and is not crippled by absence of resources to meet some of its key projects. All this makes it even more intriguing that the ruling parties/coalitions should not (be able to) muster adequate political will to carry out anti-poverty policies.

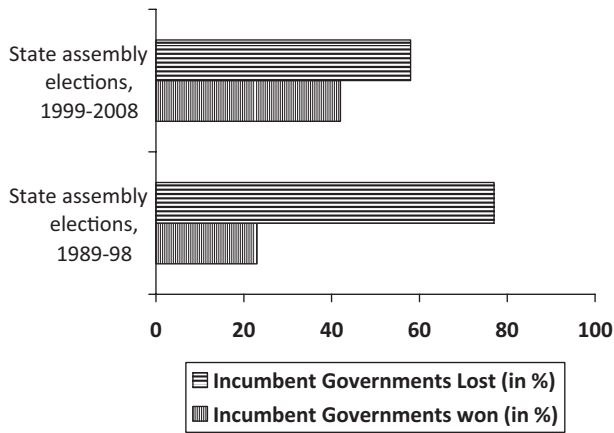


Fig. 2: Success rate of incumbent state governments, 1989–2009. Source: Yadav & Palshikar (2009: 415). Note: There were 57 elections in total in each round from 1989 to 1998 and 1999 to 2008. The figures reported are in percentages.

Finally, what makes it truly intriguing is that the poor have not opted out of democratic politics in India, at least not from the routine participation in electoral politics. The evidence put forward by the National Election Studies in India show that the participation level and the sense of the efficacy and legitimacy of the system are still fairly impressive in the case of the poor. While electoral participation rates are declining in older democracies, turnout at the state assembly level has risen in India (Figure 3).

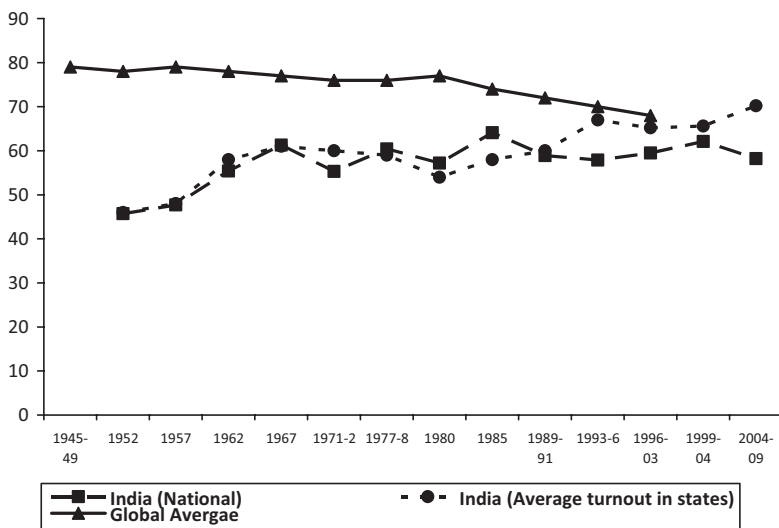


Fig. 3: Turnout trends in India compared to global trends since 1945. Source: For India (National) and India (Average turnout in States) – CSDS Data Unit. For Global Average – Voter turnout Database, IDEA international website. Note: The turnout figures are in percentages.

Turnout in Indian elections goes up as one goes down the multiple tiers of democracy; the highest turnout is recorded in local level elections. Unlike Europe and North America, the participation rates do not decline in India as one travels down the social hierarchy. Citizens at the lowest rung of caste, class and educational hierarchy turn out to vote in numbers as great, if not greater, than those at the top (Figure 4 and 5). Villagers vote more than city dwellers and women’s participation level is catching up with men’s.

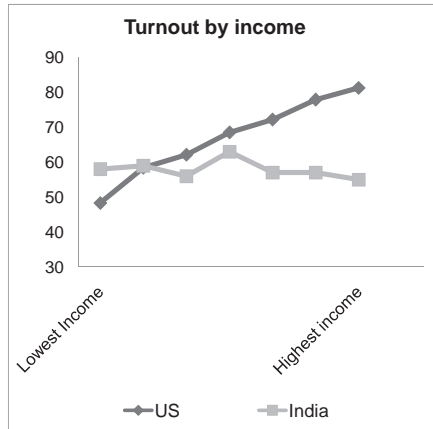


Fig. 4 A: Turnout by income groups in 2004 elections: India and US compared. Source: For India – NES 2004, CSDS; For USA – <http://www.census.gov/prod/2006pubs/p20-556.pdf> [accessed on 2 Feb 2011]. Note: ANES 2004 in US uses annual household income variable where as NES 2004 in India uses monthly household income variable.

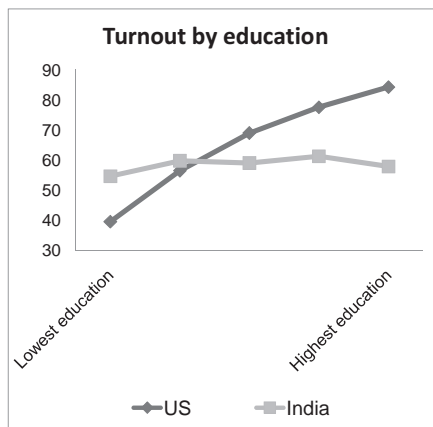


Fig. 4 B: Turnout by educational attainment in 2004 elections: India and US compared. Source: For India – NES 2004, CSDS; For USA – <http://www.census.gov/prod/2006pubs/p20-556.pdf> [accessed on 2 Feb 2011]. Note: The turnout figures are in percentages.

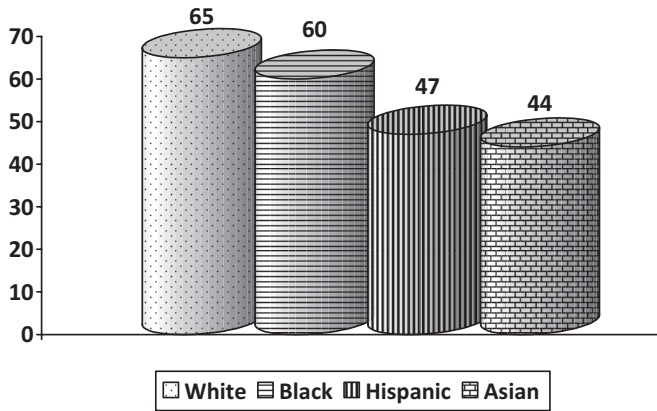


Fig. 5A: Turnout by race/ethnicity in US, 2004. Source: <http://www.census.gov/prod/2006pubs/p20-556.pdf> [accessed on 2 Feb 2011]. Note: The turnout figures are in percentages.

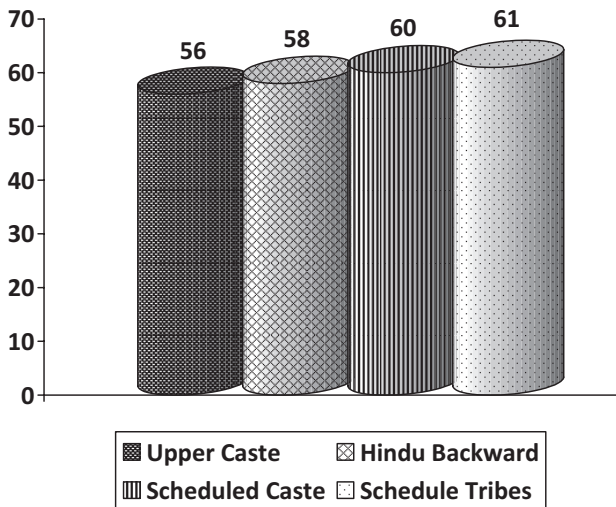


Fig. 5 B: Turnout by caste/community in India, 2004. Source: Kumar, Sanjay (2009:49). Note: The turnout figures are in percentages.

To sum up: the co-existence of a functioning democracy and mass poverty does constitute a paradox that we need to think about, especially in the case of India. A meticulous way to respond to this paradox would be to take up each link in the chain of argument summarized above and specify at each level the mechanisms that do not let this expectation be realized. Many of these mechanisms would turn out to be nearly universal and are fairly well understood. Grossly unequal distribution of private wealth and the constraints it imposes on the nature of democratic politics are good examples of such universal factors. I take these into account while proposing the way forward, but let me focus here on some of the mechanisms that are distinctively Indian.

### Specificity of Indian Elections

Sudipta Kaviraj recognizes this specificity when he says “Modern politics in post-colonial societies involves strange objects masquerading under familiar names.” Indian elections are a good case in point. As the system of competitive elections expands to most parts of the world, there is a tendency to interpret and evaluate electoral politics as if it were the same and familiar object all over the globe. This tendency often goes unnoticed, since the end product of this game is recorded in a format that is universally recognized and lends itself to easy surface comparison. It’s all about seats and votes, the chemistry of popular mood or the arithmetic of alliances, advantage or otherwise for the incumbent government or representative and of course the charisma or otherwise of the political leadership. We do recognise the differences across countries in terms of the impact of the electoral system, the structure of political choices offered by the party system, the social basis of political preferences, agenda setting and public opinion formation, the invisible role of issues and ideologies, interests and identities. Yet we simply assume that elections perform the same role everywhere. The end result of this similarity is that the experience of electoral politics in societies like India is interpreted in the light of the narrow historical experience of Western Europe and North America. Hence the need to understand the distinctiveness of the Indian experience of elections.

One of the first things that strikes any observer of Indian elections is the centrality of elections in India’s political life. Banners, posters and crowds fill the streets; massive processions and rallies are a norm; the media are full of election news and every street corner is buzzing with political gossip. Though on a steady decline of late, this kind of visibility in Indian elections symbolizes the pivotal role elections have come to occupy in Indian politics.



If a tension between the pre-existing social form and the borrowed legal-political structure provides the basic frame for understanding Indian democracy, the story of Indian politics is a story of the attempt by millions of ordinary people to write their own political agenda in an alien script. An encounter such as this, if it is to lead to meaningful outcomes, requires bridges or hinges that connect the two different worlds. The institution of elections came to perform this crucial role in India. It became the hinge that connected the existing social dynamics to the new political structures of liberal democracy allowing for reciprocal influence. Election is often the site for a fusion of popular beliefs and political practices with high institutions of governance.

Thus election is an occasion for the transfer of energy and resources from the “unorganised” to the “organised” sector of democracy. This is the moment when the legal-constitutional order of liberal democracy makes contact with the messy social and political reality of India. The “formal” sector is highly visible, it leads a legal-constitutional existence, it involves “civil society” groups and NGOs or a certain segment of political parties, it speaks a familiar modern language, mobilises secular identities and is easy to incorporate into a global register of democracy, even if it draws modest energy and participation. Every political actor is aware of another, “informal” sector, often seen as a source of embarrassment. Political organizations and movements that inhibit this sector speak a homespun hybrid language and fall back upon identity-based mobilisation. Though political practices in this sector lead an invisible, often para-legal existence below the radar, this sector remains the most happening political site in terms of popular mobilisation and energy. The chasm that separates the two worlds and the absence or non-functioning of the other possible bridges have resulted in the unusual salience of the institution of elections. This unique role is what accounts for the continued dynamism of the electoral process in India, while a number of other imported institutions and processes are floundering.

This hinge-like role has meant that Indian elections simply do too many things. All over the world, elections perform the foundational function of legitimising the rulers in the eyes of the ruled and of ensuring transfer of power without violence. They are also expected to ensure responsive and accountable government. This in itself would have been complicated enough. Modern democracies, especially those with a first-past-the-post electoral system as in India, expect their voters to use a singular instrument of vote to elect a representative, select a ruling party, choose from various policy packages and name a leader.

As if this were not enough, elections in India perform many more functions. For a post-colonial country like India, successful elections are still a symbol of a national political com-

munity, something of a festival of collective identity. For the poor and the marginalised, who are excluded from the normal functioning of the state, elections are an affirmation of their citizenship and are seen as a sacred ritual of political equality. Notwithstanding a robust media that routinely uses public opinion polls, elections are still the principal site for the dissemination of political ideas and information and also the only reliable method to gauge public opinion on the big issues facing the country. Elections force political parties to take into account ideas, interests and entities that do not lend themselves to easy aggregation through instrumentalities of the “organised” sector. Thus, elections often appear as the only bridge between the people and power, as the only reality check in the political system.

Elections are also an occasion for settling, unsettling or resetting local equations of social dominance and the arena of struggles for social identity and dignity. Elections are a site for contestation for social dominance in a locality, leading to assertion by dominant social groups and protests by subaltern groups. Attempts by clever political entrepreneurs to manufacture a social majority often involve building a local coalition of castes and communities. This often leads to an invention of community boundaries and sometimes the gerrymandering of settled boundaries. In a micro as well as macro setting, elections are an occasion for distribution and redistribution of resources. This is the time for patronage distribution as well as the occasion for the ordinary citizens to collect their “dues” from the political class. All this accounts for the festival-like character of the Indian elections and the fierceness with which elections are contested here. At the same time, this compression of multiple decisions into a single act also results in an under-emphasis on the representational functions of elections.

Two other structural features of Indian elections have accentuated this difficulty. One of these has to do with the problem of scale in politics. The design of representative democracy in India simply lifted a system meant for much smaller communities and applied it to a polity of continental scale. This resulted in a manifold increase in the scale of representation and led to a qualitative difference in the nature of the relationship between the representative and the represented. An Indian member of Lok Sabha, the popular chamber of the parliament, typically represents a population exceeding two million and a member of the state legislature in one of major states represents anything between 200 and 500 thousand persons. A comparison with the scale in Britain (less than a hundred thousand for each member in the House of Commons), which served as the model, brings out the sharp contrast. Figure 6 compares the scale of political representation in India with some of the other large democracies. The mega-scale of the system of representation had many consequences

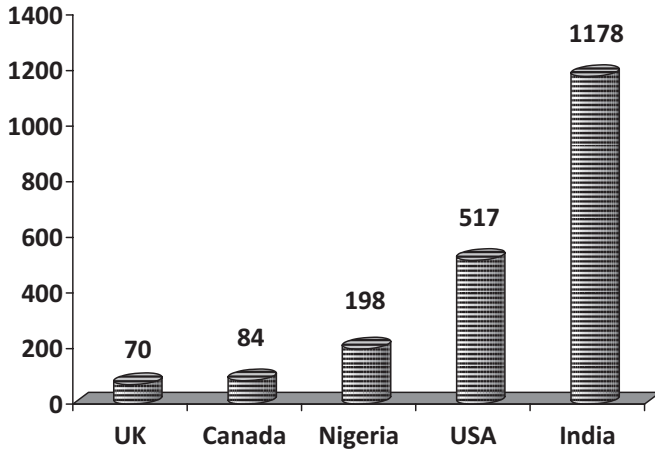


Fig. 6: Average electorate per parliamentary constituency: India compared to other large democracies. Note: Average electorates per constituency (in thousands).

for the nature of political representation. The minimum requirements of resources and information needed for this kind of election result is a very high entry barrier for a new entrant to the system. The impossibility of face-to-face interaction between the representative and the represented has necessitated an army of rent-seeking intermediaries and is beginning to lead to the mediatisation of constituency-level politics.

Finally, a system with multiple levels of governments and its corollary of multiple non-corresponding electoral cycles in a parliamentary system have introduced a peculiar disjunction between different levels of government and elections. Over the years, state-level politics has become the principal arena of political contestation. But the design of Indian federalism allocates principal power and resources to the central government. And most of the principal or at least immediate problems faced by citizens require a solution at the level of local self-government. In the absence of well-functioning local bodies with matching resources or accountable local officials, elections to parliament and state assemblies also perform a routine municipal function of attending to local grievances and connecting the people to the administration. Parliamentary elections often reflect the verdict for or against state government. This conflation in levels has meant that the central government is simultaneously under-accountable and over-accountable. It is over-accountable, for every round

of state-assembly elections is politically sensitive for the national government. At the same time the central government can be under-accountable, for its fate is largely determined by what some other governments do.

### Political Lessons for our Times

These distinctive Indian features can now be placed in a wider context to arrive at some general propositions about the relationship between democracy and poverty. We need to guard against two simple-minded ways of thinking about this question. On the one hand, there are good reasons to question the idea that the needs, desires and demands of the overwhelming majority of the underprivileged would prevail in a free and open political competition in a democratic setting. This dominant and celebratory account of democracy turns out to be rather naïve understanding of how the logic of political competition works. As in the open market, free competition with a level playing field is an ideal that is rarely approximated in real life. On the other hand, there is a need to resist the rather gloomy conclusion that this democracy is but a sham, that the final outcomes are predetermined to favour the interests of the economically and socially dominant classes. Open political competition in a democratic setting does offer many openings, some of which can lead to radical social policies. The probability of enacting pro-poor social policies is higher when it depends on the survival instinct of the politician and their hunger for power than when it depends upon the goodwill of political guardians or the vanguard. At any rate, any rejection of the democratic system must be tempered by a realization that this may be the only game in town, that the citizens, including the poor, may have invested more in this system than is often acknowledged.

A rejection of these two extremes opens the way for a tentative and contingent answer that appears to hold some water in the Indian context. Political competition can and does lead to political will on the part of the ruling party to use state power to carry out pro-poor social policies, but the prevalence of many factors ensures that it happens rarely. Some of these are structural and cannot be wished away. Gross economic and social inequalities, especially the system of private property and its skewed distribution, set limits to how level-playing the political field can be. In the absence of conscious efforts to neutralize the effect of private money on politics, the role of dominant economic classes has grown over the years and finds articulation in multiple ways, from the control of political workers, leaders and parties to the buying of media and setting limits of state policy. This is accentuated by some

political institutions: the scale of political competition introduces remote control, multiple-level governance leads to conflation of choices and the pivotal role of elections as a hinge results in a congestion of decisions, while the short political cycle reduces the time horizon of political actors. The institution of the mass media introduces a specific distortion in the process of political agenda setting: it accentuates the pre-existing uneven access to information, foregrounds the voice of a privileged minority and masks the opinions, concerns and issues of the underprivileged majority. The systemic “drag” introduced by these economic structures and political institutions puts the onus of correction on political organizations, political leadership and political practices. A rapid decline in party organization across the political spectrum, the atrophy of political judgment among the leaders and the non-political character of dynamic social movements have meant that the resistance to systemic drag has weakened, especially in the last two decades.

Is there a hope, then, for pro-poor social policies in a democracy where the overwhelming majority is poor? If there is, notwithstanding the structural, institutional and processual odds stacked against it, the driving force is the overwhelming number and proportion of those who need such social policies. An overwhelming majority of India’s population still lives below the acceptable minimum level of access to goods, services and dignity. They use every available opportunity offered by universal adult franchise and open political competition to secure better conditions of life. Very often they don’t succeed, for the political menu on offer is very narrow and hard to alter, especially at a time when mainstream political parties are more insular and party organization is very fragile.

What, then, needs to be done? If the argument offered above has any force, it points in two directions. The first and a pressing need is a package of political reform that reduces some of the institutional constraints that prevent the needs of the majority from being translated into political signals leading to political will for social policies. Let me provide here a checklist of the changes required. The basic idea is not to bring India in conformity with the global practices, for “deviance” has been the strength of the Indian system. Nor do we need to change India’s electoral system or de-crowd the electoral arena of contestants, as many enthusiastic reformers have suggested in recent times. What we need is, first of all, decentralisation of political power by creating smaller states, greater assured resources to state government, autonomous district-level governments, greater funds, functions and functionaries to local bodies. Second, we need measures to strengthen other mechanisms of accountability and responsiveness by instituting independent regulatory institutions and reforming the bureaucracy and the police to bring them closer to people. Three, we need

measures to reduce the asymmetry of information, such as a genuine public service broadcaster, regulation of cross-media ownership, checks against private treaties and stronger disclosure norms for public functionaries. Four, we need measures to reduce the inequality of resources in politics, such as public funding of elections by vote-linked cash reimbursement on a non-discriminatory basis and tax support for political contributions. These reforms are urgent, for their absence would hurt not just the prospects of social democracy but also the existence of democracy itself.

Constitutional and legal reforms may be a significant part of, perhaps even a prerequisite for, improving the prospects of a politics of social democracy, but principally the challenge of creating a politics of social democracy is a political challenge. Specifically, the challenge is to create a firm and institutionalised bond between the constituency for social policies (which is large and expanding) and its political instrumentalities. It could mean forging a new political bloc that mobilizes the energy released by social movements and identity politics and could take the space once occupied by the various shades of the political left: the Communists, the Socialists or the Congress-Left. Or it could involve overhauling the existing political parties so as to forge a bond with the newly empowered sectors and their organizations. Both these routes involve reinvesting in party organizations and reviving some elementary organizational protocols of internal democracy. This is also an intellectual challenge that involves rescuing political judgment and marrying the moral ideal of social and economic equality to energetic politics and intelligent economics.

### Conclusion

A fairly common way to think about representational deficits in India is that representative democracy in India has not yet evolved to the level of the “advanced” democracies. There are too many parties, too much caste-based identity politics and too little ideology, which allows political entrepreneurs to take advantage of ill-informed citizens. The view invites us to be patient with the maturing of Indian democracy and encourages legal interventions to nudge it in the right direction.

I have explored a different response that recognizes the distinctiveness of Indian elections in their own terms. Elections in India have come to be the hinge that connects the “formal” sector of high politics with its underbelly, the “informal” sector of politics. That is why elections have acquired an exaggerated visibility in India’s political life. Emphasis on the “bridge function” and citizenship-affirming role of elections has ensured robust partici-

pation, better descriptive representation and summary trial of governments. At the same time it has meant a relative neglect of the representational role of elections as an instrument of responsive and accountable government.

This reading gives us a different perspective on what's wrong with representative democracy in India. The problem is not that the people are uneducated and lack ideological orientation; the problem is that popular preferences do not get translated into politically relevant signals by the media. The problem is not that caste mobilization subdues other cleavages, but that the multiplicity of cleavages fractures the majority. The problem is not that the proliferation of parties leads to fragmentation, but that an increase in parties is compatible with a shrinking of political choices and the capture of parties by special interest groups. Finally, the problem is not with the first-past-the-post (FPTP) system, but with the massive scale and multiple levels of representation.

This reading recognizes the need for some corrective measures: lowering the scales, reducing the asymmetry of information, monitoring media and levelling the playing field in terms of resources. At the same time it also reminds us that democracy cannot be made responsive and accountable by tinkering with institutional design alone, that the quality of democracy is in the last instance a function of the intensity and nature of politics.







WISSENSCHAFTSKOLLEG ZU BERLIN    WALLOTSTRASSE 19    14193 BERLIN  
TELEFON +49 30 89 00 1-0    FAX +49 30 89 00 1-300  
WIKO@WIKO-BERLIN.DE    WWW.WIKO-BERLIN.DE