Thinking through the Environment

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Green Approaches to Global History

Edited by

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Acknowledgements

Everyone has experience of being present in the environment and interacting with it. Personal experiences also help a researcher imagine and enter into the milieux of historical events and development trends. However, being with the environment is just a basic step. Being able to think history through the environment requires much more: profound knowledge of the human–environment relationship and dedication to applying this expertise to historical research. Environmental historians have developed various approaches to tackle this issue. To become acquainted and communicate with scholars who have elaborated new ways of comprehending interactions with the environment of the past has been a great expedition.

The path from idea to final product is generally long and this book is no exception. It has gone through a complex process of gestation. The volume contains a selection of articles made from numerous submissions received; we are thankful for all of these. Manuscripts were chosen and reviewed by the editorial board, comprising Pertti Grönholm, Laura Hollsten, Jaro Julkunen, Aino Laine and Timo Myllyntaus. On the basis of comments made at this stage, some authors thoroughly revised their papers and considerably deepened their analyses. The editorial board has been very pleased with the cooperation of the authors.

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All associated with producing this collection fervently trust that it will make constructive contributions to discussion of the past and future of our environment.

Timo Myllyntaus
Turku, January 2011

Biographical Sketches

Dilshad Rahat Ara received her PhD in architecture in 2006 from the University of Melbourne, Australia. She is currently assistant professor at the Department of Architectural Engineering of The United Arab Emirates University, Al Ain. She has also been a practising architect in Bangladesh. Her dissertation on the Chittagong Hill Tracts, which analyses building technology as a cultural practice, was awarded the John Grice Research Prize in Australia and the 2006 Stanley Smith Book Prize (UK) for the best doctoral thesis.

Mariano Barriendos obtained his PhD in geography in 1994. He was engaged in post-doctoral work at the Department of Environmental History, University of Bern, from 1995 until 1996; then he returned to the Department of Modern History at the University of Barcelona. He is currently involved in several projects dealing with climate reconstruction from documentary sources and climatic variability.

Katrin Bürger is a freelancer at the Environmental Consulting Agency (DUC), Wiesbaden, Germany. Her thesis, *Changes of Forest Ecosystems Caused by Historical Land Use in the Black Forest and the Vosges Mountains*, earned her a PhD in geography. Past research projects have been focused on the analysis of historical extreme flood events and their triggering weather conditions.

Timothy Clack is employed as a Research Fellow at the African Studies Centre, School of Interdisciplinary Area Studies, University of Oxford. He completed his doctoral studies at the School of Arts, Histories and Cultures at the University of Manchester in 2006, his subject being the experience, memory and evolution of cultural landscapes. He is currently engaged in fieldwork projects in Tanzania and Ethiopia, thereby further developing his doctoral research.

Paul Dostal is a research associate at the Environmental Modelling Group, University of Mainz, Germany. For his PhD thesis he reconstructed from documentary sources the regional climate of south-west Germany over the last 500 years. His current research activity focuses on historical climatology (especially historical hydrometeorological extreme events) and urban climatology.

Anu Eskonheimo works at the Ministry for Foreign Affairs of Finland and nowadays acts as a councillor of rural development at the Embassy of Finland, Nairobi, Kenya. She has a PhD in forestry and agriculture and a Master's degree in political sciences from the University of Helsinki. For her doctoral studies in 2002–2006 she conducted multidisciplinary research on local people and their role in land degradation and environmental rehabilitation.

Florian Imbery, research associate at the German Weather Council in Offenbach, is mainly engaged in regional climate modelling. For his PhD thesis at the Meteorological Institute of the University of Freiburg he researched the long-term variability of forest-related surface characteristics and energy fluxes on a pine stand in the Southern Upper Rhine valley.

Timo Myllyntaus is Professor of Finnish history at the University of Turku, Finland. His articles on environmental history deal with forest, water and climate history as well Finnish historiography. He co-edited *Encountering the Past in Nature, Essays in Environmental History* (2001) and the anthology *Pathbreakers, Small European Countries Responding to Globalisation and De-globalisation* (2008). He is a Board member of the European Society for Environmental History and chairs the local organising committee of ESEH's 2011 conference in Turku.

Jukka Nyyssönen works as a Researcher at the Department of History and Religious Studies, University of Tromsø, Norway, where he was awarded the degree of Dr. Artium. He previously worked as a research fellow at the University of Jyväskylä, Finland, with funding from the Academy of Finland. He has published in the fields of environmental history and the history of minorities. Sámi history, globalisation and resource management in Northern Finland are among his main research interests.

Viktor Pál is engaged in doctoral studies in the University of Tampere, Finland, having obtained a MA in the history of technology at the University of Miskolc, Hungary. He is a visiting researcher at the Department of History at the University of California Los Angeles and earlier undertook research at the Center for European and Eurasian Studies at the same university. He has also lectured at the Aleksanteri Institute of the University of Helsinki. The focus of his research is on the environmental and technological history of Central and Eastern Europe during state socialism.

Guido N. Poliwoda obtained his MA in environmental history and new German literature at the Free and Technical University of Berlin in 2000. He has extensive international experience. He joined Christian Pfister in Bern in 2001, later becoming his assistant. His doctoral thesis, completed in 2004, was entitled *Learning from Disasters: Saxony Fights the Floods of the River Elbe 1784 to 1845*. He was appointed Assistant Professor at the University of Bern and since 2005 has been working as a personal instructor for PhD candidates and leading the CAPRICORN project. He is now writing his second book: *The Financial Mitigation of Severe Floods and Winter Storms in Germany and Switzerland between 1850 and Today*. Outside his scientific interests he is a fire fighter and supports various humanitarian institutions.

Libby Robin is an environmental historian at the Fenner School of Environment and Society, Australian National University and at the Centre for Historical Research, National Museum of Australia, Canberra. Her books include the environmental

art project described here, *Strata* (2005); a monograph, *How a Continent Created a Nation* (2007); and *Desert Channels: The Impulse to Conserve* (2010), another project with Mandy Martin. From 2011, she is Guest Professor at the Royal Institute of Technology (KTH), Stockholm, Sweden.

Leena Rossi is engaged in doctoral studies at the Department of Cultural History, University of Turku, Finland. Her forthcoming dissertation concerns an ordinary individual's life-long environmental relationship. She has written and edited several books about the history of education, club activities and everyday life, as well as articles about oral history.

Helena Ruotsala acts as Professor of European Ethnology University of Turku in Finland. Her doctoral studies were in ethnology, her dissertation dealing with reindeer herding from an ethno-ecological perspective. She has published a monograph on the socio-cultural impacts of water regulation and several articles on environmental ethnology, fieldwork and indigenous studies. Her current research interests focus on transnational everyday life in the twin-city of Tornio-Haparanda in the cross-border area between Finland and Sweden.

Jochen Seidel is employed as research associate at the Department of Hydrology and Geohydrology at the Institute of Hydraulic Engineering, University of Stuttgart in Germany. He obtained his PhD with a study on Holocene sediments and anthropogenic influences on landscape development. From 2005 to 2008 he worked on a research project dealing with historical climatology and reconstruction of historical extreme flood events.

Erik Törnlund has a PhD in economic history from Umeå University, the subject of his dissertation being the abolition of timber floating in northern Sweden from 1945–1980. His post-doctoral publications have focused on the history of timber floating from 1850–1980 and the restoration of watercourses since the 1980s. In his studies he has examined how rivers and streams have been physically and ecologically affected by floatway constructions and stream clearing. Currently he works as a researcher at the Demographic Data Base, Umeå University, Sweden.

Frank Uekötter received a PhD from Bielefeld University for his dissertation on the history of air pollution control in Germany and the USA. He has published several books, including *The Green and the Brown. A History of Conservation in Nazi Germany* (2006) and an edited volume, *The Turning Points of Environmental History* (2010). After many years at Bielefeld University, he was nominated Dilthey Fellow with the Research Institute of the Deutsches Museum in Munich, engaged in a project on the history of agricultural knowledge in the twentieth century. Since the beginning of this decade he has also worked as deputy director of the Rachel Carson Center for Environment and Society in Munich.

Fiona Watson is a medievalist by training. She was appointed lecturer at Stirling University in 1995, with responsibility for developing the study of both medieval and environmental history. In 1999 she helped to set up a Centre for Environmental History at the universities of Stirling and St Andrews, of which she was the Director until 2006 when she left academic life to pursue a writing career. She has published three books, including *A History of the Native Woodlands of Scotland* with Chris Smout and Alan MacDonald.

Donald Worster currently holds the Hall Distinguished Professorship Chair in American History at the University of Kansas. His principal areas of research and teaching include North American and world environmental history and the history of the American West. Among his books are *A River Running West* (2001), *Rivers of Empire* (1985), *Dust Bowl* (1979), and *Nature's Economy* (1994).

Preface

Methods in Environmental History

Timo Myllyntaus

Reality is a narrow but continuously moving slice of time, for only the present moment is existent and tangible. Of the past we retain fading traces and the future we can just glimpse through our flashes of anticipation: ultimately we have direct contact with neither. While nothing but a tiny present moment is real, we are mentally beset by uncertain signals from the past and future. Time flies and we can never get a firm grip on it.

Something that makes historical research exciting is that conceptions of time and reality vary from one subdiscipline to another. Dimensions of time in nature and society also differ, which is one reason why environmental and human history have divergent analytical palettes. The aim of this volume is to examine the past from an environmental perspective and to elaborate on approaches to environmental history, a fascinating and rapidly expanding field of study, wielding a great variety of methods. Challenges facing this relatively new multidisciplinary area include the need to originate and refine methodological tools for the study of complex relations between humans and nature in the past.

Methods mean to researchers what tools do to craftsmen. For both groups, although the devices and techniques are important, the skills required to deploy them are equally significant. The skilful use of proper tools can produce a masterpiece with reasonable expenditure of time and effort. This dialectic relationship between methods and skills, defined here as craftsmanship, is a prerequisite of successful and result-oriented work. Historical research is based on various elements and combines various methods to organise, connect and interpret versatile data sets. Methods guide procedures in how research materials are selected, processed and placed in a context. Historians use them to analyse primary sources and other evidence in their search for solutions to their research questions and arguments, as well as when they give expression to their knowledge and interpretations. The

primary incentive for compiling this edited volume is our interest in gathering an appropriate methodological arsenal for the study of environmental history.

Environmental history is effectively the broadest discipline of historical research because it examines the interaction of the natural material world and human affairs, whereas other branches primarily focus on human and societal issues. Given the extent and complexity of the discipline, the methods used tend to be more numerous and versatile in environmental history than in other fields of historical research. In facing these challenges, environmental historians have invested much time and effort in discovering and applying various methods, some of which are perhaps less commonly utilised in other fields of historical research.

According to the Finnish historian Jorma Kalela, historical research is characterised by three major premises.[1] The first of these is the choice of study subject to give direction to the research process; the second is the selection of an approach, which means deciding on the context within which the historian will address the research topic; and the third is its significance – why the researcher supposes it is important to examine a certain topic from a particular angle in a chosen context. These are the necessary starting points for any research endeavour.[2] Studying history means making choices, defining and framing topics – processes that also structure environmental historical research.

Significance of topics[3]

One might claim that environmental history lacks a methodology of its own and that, therefore, environmental historians have to borrow research methods from other disciplines. Considering the varied approaches of environmental history as a whole, one might say that the methodological palette of the discipline is diverse. It is still shaping its approaches and perspectives.[4] Many of the distinctions that are clear in other fields of historical research, such as macro-history and micro-history or the history of events and history of structures, have not yet been established in environmental history. Donald Worster may be considered the best-known exception among environmental historians, his 'levels of environmental history' being widely referred to and discussed.[5]

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1. Jorma Kalela, *Historiantutkimus ja historia*, (Helsinki: Gaudeamus 2000), pp. 76–8.
2. Kalela, *Historiantutkimus ja historia*, pp. 76–8.
3. I am grateful to Tomasz Samojlik for his constructive comments on this section.
4. Timo Myllyntaus, 'Old Wine in New Bottles? Traditions of Finnish Environmental History', in Erland Mårald and Christer Nordlund (eds.), *Värna, vårda, värdera: Miljöhistorisak aspekter och aspekter på miljöhistoria*, Skrifter från forskningsprogrammet Landskaper som arena nr 5, (Umeå: Nyheternas Tryckeri 2003), pp. 177–200.
5. Donald Worster, 'Doing Environmental History', in Donald Worster (ed.), *The Ends of the Earth: Perspectives on Modern Environmental History,* (Cambridge: CUP 1988), p. 293; Cf.

Methods in Environmental History

In one sense, environmental historians started out with clear viewpoints as early as the 1970s and 1980s, when they tended to focus on big issues, often environmental problems of the past or the present. As they concentrated on serious issues with manifold environmental and societal consequences, the entire discipline got the image of 'dismal history'. Later, environmental historians included minor topics and favourable developments in their purview. This has helped give a more balanced impression of the discipline, revealing that both favourable and unfavourable developments take shape simultaneously. Differentiating between these contrasting lines of development may be difficult – at least in the short term. Petra van Dam and Wybren Verstegen write that 'to evaluate environmental changes as good or bad, one must first define the criteria being used: good or bad for whom or what, for which people or species and so on?'[6]

Highlighting favourable development lines helps advance the belief that work for the environment serves a purpose; in some cases there is an opportunity to improve the state of the environment and increase the motivation to do so in society at large. Narratives and analyses of success carry potential to spread optimism, even passion, for the future wellbeing of the environment.

Nevertheless, environmental historians cannot specialise only in telling stories with happy endings or promising prospects.[7] They should also reveal grim cases of failure and discord in interactions between the natural and societal realms.[8] Some critics argue that current environmental history is too cautious in its objectives; they expect those within the discipline to tackle environmental problems with more determination and show 'what went wrong'. These kinds of expectations are not generally loaded onto the shoulders of other historians. Environmental history is essentially focused on analysing problems in humans' relationship with the environment. This viewpoint is accepted, at least on a general level, by most environmental historians; however, very many of them are unwilling to work primarily on environmental problems and calamities because they regard environmental history as a much broader research field.

Ilmo Massa, 'Ympäristöhistoria tutkimuskohteena', *Historiallinen aikakauskirja* 89/4 (1991): 296–7; Timo Myllyntaus, 'Environment in Explaining History: Restoring Humans as Part of Nature', in Timo Myllyntaus and Mikko Saikku (eds.), *Encountering the Past in Nature: Essays in Environmental History*, (Athens: Ohio University Press 2001), pp. 152–5.

6. Petra J.E.M. van Dam and S. Wybren Verstegen, 'Environmental History: Object of Study and Methodology', in Jan J. Boersema and Lucas Reijnders (eds.), *Principles of Environmental Sciences*, (Berlin: Springer 2009), p. 26.

7. See for simple 'triumphalist' stories, Peter Burke, 'The New History: Its Past and Its Future', in Peter Burke (ed.), *New Perspectives on Historical Writing,* 2nd ed. (Pennsylvania: Pennsylvania State University Press 2001), p. 20.

8. For example, Tomasz Samojlik, 'The Brown Bear – a Story without a Happy Ending', in B. Jędrzejewska and J.M. Wójcik (eds.), *Essays on Mammals of Białowieża Forest,* (Białowieża: Mammal Research Institute, Polish Academy of Sciences 2004), pp. 69–76.

'Historians are to tell stories.'[9] That is a common conception, but it is not necessarily right to expect 'historical stories' to be mere entertainment. In fact, a narrative can also reveal social or environmental problems and take a stand on developing trends. In general, focusing on significant societal and environmental issues is considered a good characteristic of historical research; therefore, in environmental history, one should not take that belief to represent an unfavourable stigma. Revealing and solving problems is among the core tasks of all sciences. It is wrong to expect any branch of scientific knowledge to provide only bedside stories.

It is considered natural for social sciences to attempt to explain human behaviour by tackling major societal issues. It is thus surprising that focusing on environmental problems is often regarded as dismal, pessimistic or politically motivated research, impelling environmental historians to avoid the big issues and concentrate their research efforts on exploring harmless – if not trivial – curiosities. Perhaps some readers prefer to consume this sort of history and this phenomenon may be a factor that persuades funding institutions to support research projects of this popular type. Nevertheless, there should be space and resources for environmental history that confronts and explains the emergence of major, intractable problems. That challenging area of research, though more difficult to articulate to a wide readership, is necessary to achieve a critical understanding of the evolution of the human–environment relationship: it is therefore the task of the environmental historian to exercise craft and produce compelling work that appeals to an audience beyond the academic sphere.

We do not know environmental changes profoundly enough. For instance, we are not aware of how and why some environmental problems have emerged and, therefore, we do not understand them with sufficient depth. Nevertheless, such knowledge would make tackling these problems easier and perhaps more effective. Revealing distasteful facts from the past may not be pleasant but, for the common interest, it may nevertheless be necessary. Such grim research should be given a chance as well as public and financial support to bring its results under discussion.

In environmental history, several damaging natural trends still lack explanations. Why were harvest failures and famines so frequent in history and why do they persist? This is but an example of a major past environmental issue; there are many other unexplained problems.

'If where we live is so unique for the whole of Europe, why shouldn't the residents benefit rather than suffer?' asked Mayor Albert Litwinowicz of the Białowieza district (population 2,400) in eastern Poland in July 2009.[10] The key

9. William Kelleher Storey, *Writing History, A Guide for Students*, (New York: Oxford University Press 1999).

10. Gabriela Baczynska, 'Feature: Climate Change Clouds Fate of Ancient Polish Woods', Online article by *Reuters*, US Edition, 29 July 2009, http://www.reuters.com/article/idUSLN291035 Accessed 15 March 2010.

issue there is whether or not to expand the 150,000-hectare Białowieza National Park to cover the entire Polish part of Białowieza Primeval Forest (BPF) and improve the conservation prospects of the European lowland bison (*wisent*) or whether to modernise the economy of the region.[11] In 1981 the Soviet Union built a fence to divide Polish and Belarusian parts of this primeval forest, in order to stop the Polish Solidarity movement from spreading eastward. Even after Poland joined the European Union in 2004, this 'iron curtain' continued to obstruct the migration of bison, because Belarus has preferred to close its border against illegal intruders with an impenetrable fence. As of now, the national park covers only 105 of 1500 km^2 of the Polish part of BPF. The second, larger part of the forest lies in Belarus and the two parts have been divided for three decades. This fence, however, also prevents the movements of bison in the region. Nevertheless, the stock of 460 European bison keeps on growing in the Polish part of the forest, whereas no proper statistics are available from the Belarusian part.

Some people consider that the growing bison population and plans to expand the BPF are threats to the regional economy and the wellbeing of the local population. For several decades, Eastern Poland in general has had difficulties in maintaining its population and developing its economy, because thousands, especially middle-aged breadwinners, have become migrant workers and left for large Polish cities or abroad. However, Białowieza and other nearby villages have begun to grow in recent years, primarily because the tourism industry has succeeded in turning economic activity in the region from ebb to flood.[12]

Białowieza Primeval Forest is a case where the interests of endangered nature and a human community seem to be in contradiction. Although the European bison has very few natural enemies – only wolves and bears besides humans – the species population has gradually dwindled in Europe since the Middle Ages.[13] During the Holocene period, the European bison lived all over Europe, from the leafy banks of the Russian river Volga to forests in northern Sweden and the green plains of Spain. The stock of free-ranging bison was preserved longest in the zone from the Białowieza to the Caucasus Mountains.[14] The last wild lowland bison were poached in BPF in 1919, and the last Caucasian bison were shot by poachers in the

11. 'Two subspecies are recognised in European bison, i.e. the lowland bison or wisent (*Bison b. bonasus*) and the extinct highland or Caucasus bison (*Bison b. caucasicus*)' – Norbert Benecke, 'The Holocene Distribution of European Bison – The Archaeozoological Record', *Munibe (Antropologia - Arkeologia)* 57 (2005): 421–8, http://www.aranzadi-zientziak.org/fileadmin/docs/Munibe/200501421428AA.pdf

12. Baczynska, 'Feature: Climate Change'.

13. M. Krasińska and Z. A. Krasiński, *European Bison. The Nature Monograph*, (Białowieża: Mammal Research Institute, Polish Academy of Sciences, 2007), pp. 1–307.

14. It is estimated that the bison became extinct in Gallia, France by the end of the 8th century, while it survived to the 11th century in southern Sweden. Zdzisław Pucek, 'European Bison – History of a Flagship Species', in B. Jedrzejewska and J. M. Wójcik (eds.), *Essays on Mammals*

Western Caucasus in 1927[15] but this did not lead to the complete extinction of the biggest mammal on European soil. A few dozen European bison were preserved in zoos and, from captivity, have been reintroduced into the wild since 1952. Now free-ranging herds are found in Poland, Lithuania, Belarus, Ukraine, Romania, Russia, Slovakia, Latvia, Kyrgyzstan and, since 2005, Moldova.[16] In 2006, it was estimated that 1,800 lowland European bison were living in the wild and about 1,400 in captivity.[17] Although numbers of American bison (*Bison bison*) have also been hard-hit, they have never dropped below 1,500. The present population is estimated at 350,000.[18]

Besides the modernisers of eastern Poland, climate change has become another threat to the Białowieza Primeval Forest and the European bison.[19] Concurrently, new pastures have been opened to those animals in Swedish national parks and zoos. In 2009, with the stock still growing, Swedish bison were sent for a reintroduction project in Romania.[20] As a result of climate change, reintroduction may in the future change its direction and there may be more moves of endangered species from central Europe to the Nordic countries, which will be able to accommodate these species with more appropriate habitats, which could be lost in their present central and south-eastern European habitats.

One might ask whether environmental historians have any role in the relocation of endangered species, an activity that may increase considerably as a result of accelerated climate change. Can and should environmental historians work more as consultants for such large international projects to protect and save numerous endangered species? Yes, they certainly should provide their services to practical protection efforts. It is to be hoped that their education will train them to participate in such activities.[21]

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of Białowieża Forest, (Białowieża, Poland: Mammal Research Institute, Polish Academy of Sciences 2004), pp. 25–6.

15. *Ibid.* pp. 25–30; *Wikipedia,* English edition, http://en.wikipedia.org/wiki/Wisent Accessed 15 March 2010.

16. Irina Belousova and Zdzisław Pucek, *European Bison. Status Survey and Conservation Action Plan,* (Gland, Switzerland: World Conservation Union/IUCN/SSC 2004); 'Bison in the Republic of Moldova', http://www.iatp.md/arii/text/eng/pad_domn_bison.htm Accessed 15.March 2010.

17. Zdzislaw Pucek, 'Euroopan biisonien paluu luontoon', *Tieteen kuvalehti* 4 (2001): 74–77; *Wikipedia,* Finnish edition, http://fi.wikipedia.org/wiki/Visentti Accessed 15 March 2010.

18. See http://en.wikipedia.org/wiki/American_Bison Accessed 31 Dec. 2010.

19. Zdzisław Pucek, *European Bison (Bison bonasus): Current State of the Species and Strategy for Its Conservation,* (Strasbourg: Council of Europe 2004).

20. *Wikipedia,* Swedish edition, http://sv.wikipedia.org/wiki/Visent Accessed 15 March 2010.

21. Cf. C. Josh Donlan and Harry W. Greene, 'NLIMBY, No Lions in My Backyard', in Marcus Hall (ed.), *Restoration and History, The Seach for a Usable Environmental Past*, (New York: Routledge 2010), pp. 293–305.

In many countries a vivid public debate has continued for years on 'alien species of plants and animals' and their relationship to 'original or national species'. European nature was in constant flux even before human impact and variations in climate have often boosted the changes. Still, humans have greatly modified stocks of species and thus it is often very difficult to differentiate 'original species' from 'latecomers and alien species'.[22] Environmental historians have participated in tracking down when various species arrived in certain areas and understanding the kinds of habitats where they lived. The issue of regulating stocks and habitats of species is becoming ever more important and in various cases decisions have gone to the political level. So this is another instance where the knowledge and expertise of environmental history can influence political choices and define the outlines of environmental policy. Connections made between environmental history and policy-making should not be considered an obstacle or burden to academic experts but an opportunity to provide political bodies with historical and scientific information in order to promote smart decision-making about the environment.

Changes in the economy can influence changes in the use of natural resources, such as fields, forests and watercourses. When the established commercial utilisation of certain resources comes to an end, these become available for other purposes and, as with formerly economically productive forests, may return to their earlier state. The problem here is determining the state to which these forests should be restored. Because there are many alternatives, landowners ought to cooperate with various specialists and authorities in order to find an appropriate solution. Forest historians and environmental historians specialising in restoration issues can provide valuable information and assist in selecting target states for restoration efforts.[23]

The examples above are given to show that environmental history has the potential to construct practical connections with areas beyond the academic sphere. The missions and expertise of environmental historians are therefore more versatile and constructive in practice than is generally believed.

Contributions to the volume

This book ultimately assembles a methodological toolbox for environmental historians, partly by presenting some case themes currently under research. It introduces various approaches to environmental history including the eco-biographical approach, traditional environmental knowledge, environmental literacy analysis, interviews à la oral history, reconstruction of memoryscapes, using art to express

22. See discussion of these issues in Marcus Hall (ed.), *Restoration and History. The Search for a Usable Environmental Past*, Routledge Studies in Modern History vol. 8, (London: Routledge 2010).

23. See, for more on environmental restoration, Timo Myllyntaus, 'Changing Forests, Moving Targets in Finland', in Hall (ed.), *Restoration and History*, pp. 46–57.

environmental ideas, environmental discourse analysis and a case study approach to linear-logarithmic regression analysis. The volume comprises fourteen chapters, divided into five major sections. In the first section, 'Approaching the Environment of the Past', Fiona Watson and Donald Worster examine some methodological approaches used in environmental history. Watson evaluates interdisciplinarity as disciplinary collaboration between historians, scientists and researchers in the social sciences and discusses the gap between reality and perceptions. Worster, meanwhile, focuses on what a biographical approach can give to environmental history. He does not see this as a substitute for large-scale historical explanations of history: on the contrary, it is a complementary, micro-level approach aimed at recovering individuals' experiences, perceptions and feelings in encounters with various past environments. Eco-biography is a form of grassroots environmental history, or history from below.[24]

Interaction between society and the environment is complex and changeable. Environmental history has versatile connections to political history, while politics is a major governing force in the environmental sphere. Frank Uekötter gives an interesting case study of how the political context has affected nature conservation, by highlighting relations between Nazi rule and the German conservation movement in the 1930s and 1940s.

The second section, 'Cultural Perceptions of Landscapes', focuses on research into landscapes and different ways of observing, analysing and studying our emerging environment. The six chapters apply various approaches, with case studies scattered over five continents. Dilshad Rahat Ara investigates the vernacular architecture of village houses in the Chittagong Hills in Bangladesh. Her approach is interdisciplinary in that she takes an anthropological view of architectural design, positing that the shaping and use of architectural 'space is culturally determined – it is a construct, not a "given"'. Libby Robin concentrates on the arid deserts of central Australia and on spatial aspects of environmental history. She also compares Western scientific knowledge and the indigenous ecological knowledge of Australian Aboriginal peoples, emphasising in her conclusions that 'landscapes demand a visual appreciation and narrative voice, not just action plans for eradicating weeds'.

The expansion of the North African deserts towards the south and the shrinkage of green vegetated areas have been subjects of heated debate and objects of international diplomacy for decades[25]. In her contribution, Anu Eskonheimo examines the idiosyncrasies of local people in Central Sudan, especially farmers and

24. History from below is research conducted from the perspective of the crowd, or ordinary people of unprivileged classes. It is an approach, not a focus on the bottom mud of the past. See Norman J. Wilson, *History in Crisis? Recent Directions in Historiography,* 2nd ed. (Upper Saddle River, New Jersey: Pearson 2004), pp. 77–82.

25. See Alon Tal, 'Desertification', in Frank Uekötter, *The Turning Points of Environmental History* (Pittsburgh: University of Pittsburgh Press 2010) pp. 146–161.

nomad cattle herders, in terms of environmental literacy and their opinions about degradation and desertification of their land. Her conclusion is that these people have their own ways of observing and evaluating African landscapes. Timothy Clack also investigates the environment in relation to culture and the collective memory in his study of communities around Mount Kilimanjaro in Tanzania. He claims that it is a feature of modernity to separate nature from culture and to 'set up humanity as the arbitrator of reality'. He takes a more holistic view and considers landscape as humanised space or as memoryscape, an approach that recalls an old definition: 'Landscape is a mirror of the soul.' Leena Rossi, too, focuses on landscape-related personal experiences and memories in her chapter. She evaluates the potential significance of oral history to environmental history and how methods of interviewing can deepen our knowledge of how a landscape painter experiences his/her subjects.

Indigenous peoples and their traditional ecological knowledge are themes that have attracted the attention of numerous researchers in recent decades. The third section, 'Indigenous Peoples and the Pressures of Modernisation', contains two chapters on the contemporary history of the Sami people and their relationship with nature. The Sami are a minority people living in Lapland, which borders the Arctic Ocean to the north, and they are scattered to the remote corners of four countries: Norway, Sweden, Finland and Russia. The Sami people are considered one of the few remaining indigenous peoples in Europe. It is assumed that reindeer herding has enabled the Sami to maintain their culture in the Arctic environment and to preserve their close relationship with nature. However, the traditional Sami way of life is under threat. Economic considerations favour modernisation but the Sami want to define the limits and conditions themselves and do not wish to be driven by outsiders. Helena Ruotsala considers the traditional ecological knowledge of reindeer herders and their ability to read, interpret and verbalise their Arctic environment, while Jukka Nyyssönen focuses on different approaches to forest disputes in north-eastern regions of Finnish Lapland. At the same time he examines a longlasting problem for the Sami people: the dilemma between Sami culture and modernisation. The radicals of the Sami movement, like Nils-Aslak Valkeapää, have regarded modernisation as pernicious Westernisation that tends to corrupt the Sami way of thinking and force the adoption into their culture of foreign items. In contrast, practically minded participants in the discussion, such as the head of the Arctic Centre at the University of Lapland, Paula Kankaanpää, claim that 'nobody in the northern regions wants to live in an open air museum'.[26] The Sami prefer to decide themselves how to move with the times. Central issues in the mobilisation of the Sami movement have been landownership, conservation of wilderness, the economic utilisation of natural resources and adaptation of traditional means of living to modern society. Nyyssönen comes to the conclusion

26. Kari Huhta, 'Lappi kuumenee jo ennen ilmastonmuutosta', *Helsingin Sanomat* 31 Dec. 2010: A5.

that 'identity is indeed power' but the use of that power requires political skills. Successful identity politics call for appropriate negotiation strategies and entering into constructive alliances.

Environmental history is not unified in its approaches, methods and research agendas. In recent decades, the holistic features of the discipline have become blurred and specific areas of expertise are emerging. Water history is an example of a large and complex sector with its own special characteristics. Water issues have numerous interrelated aspects, many of which involve sophisticated relationships between nature and humanity. The four chapters in the fourth and fifth sections consider the complexities of water history. For millennia, humans have wanted to govern and utilise water. However, watercourses have proven taxing and burdensome to harness. Time after time, communities and entire societies have had to face the power of water in the form of torrents of rain, floods, pollution and other catastrophes. The section 'Managing Flood Catastrophes' focuses on some of the worst natural calamities Central Europe has experienced. In their chapter Jochen Seidel *et al.* investigate a major natural disaster on the River Neckar in Germany in 1824. Guido Poliwoda next considers how flood calamities were managed in Saxony between 1784 and 1845 and how people and institutions responded to those catastrophes. Investments in risk management strategies are a challenge to regions like these, with several big rivers and densely populated areas along their banks.

The final section, 'Remoulding Rivers, Reshaping Societies', examines other types of river-borne environmental problems. The story told by Erik Törnlund is much less dramatic than flood disasters but still significant and fascinating. Exporting huge amounts of sawn timber, pulp and paper was a major factor in Swedish industrialisation in the nineteenth and twentieth centuries. Floating timber, using the energy of flowing water, from the upper tributaries to the deltas of big rivers was the predominant transport method and this led to comprehensive modifications of natural northern rivers. When timber transportation was moved to wheels, to railways and trucks, in the late twentieth century, some rivers were restored to their 'natural state' and landscapes were reshaped again. Viktor Pál also examines the environmental impact of industrialisation. His case study concerns water issues in Miskolc, which used to be the second-largest industrial centre in Hungary. His conclusion is that political oppression was not the main factor silencing environmental debate in the socialist Hungary of 1945–1989. Potential environmental uprisings were suppressed by unfortunate circumstances, since ordinary Hungarians apparently lacked competence in reading signs of pollution and environmental degradation as well as being short of appropriate discussion forums on environmental problems.

Missions of environmental history

For environmental historians, climate change is not entirely a threat – it is also a chance. If predicted climate change takes place, the global environment could look drastically different in 2050. Because of irreversible global warming, habitats and their species composition may substantially change. Even the present state of nature will then become only a past memory. Considering this scenario, it seems quite obvious that the significance of environmental history will increase. The change may be shocking and society will need explanations as to what has happened in the environment and why profound changes have taken place. In such a situation, environmental history may find a new growth path by being able to assist societies in adapting to significant environmental change. The new role of environmental historians will be to consult decision makers and the public at large, as experts in the past and future change. The tasks of future generations include coping with a rapidly changing environment.

For the public, it is hard to accept certain quick changes such as, in Finland, the loss of cloudberries or the expansion of alien species like Spanish slugs (*Arion vulgaris*) or Eastern European deer ked or deer fly (*Lipoptena cervi*).[27] These phenomena are with us now and Finns have to tackle them. Firstly we have to learn the 'new nature' and accept its existence. Secondly there is a requirement to adopt new concepts and approaches, so that nothing less is in question than redefining the characteristics of the national environment and national landscapes. It is quite evident that we have to learn to read the emerging environment in new ways, but who will carry out the redefinitions and will public opinion accept them?[28]

Traditions and memories do not disappear in a generation; some changes will be more difficult to accept than others. If, for example, European bison were to reclaim Lappish reindeer pastures in the Nordic countries, the intrusion would precipitate not only major environmental changes, but serious consequences for the cultural identity and lifestyle of the Sami people. For them, the return of the European bison would be the biggest change in millennia.[29] If such encounters between humans and changing environments increase in this century, the information provided by disciplined environmental historians will act as a useful resource and a powerful tool for society to better understand the environmental consequences it consciously or unconsciously determines through its actions.

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27. See http://en.wikipedia.org/wiki/Spanish_slug; http://en.wikipedia.org/wiki/Lipoptena_cervi Read 31 Dec. 2010.

28. On the concept of 'Environmental literacy', see more in Minna Hares, Anu Eskonheimo, Timo Myllyntaus and Olavi Luukkanen, 'Environmental Literacy in Interpreting Endangered Sustainability: Case studies from Thailand and the Sudan', *Geoforum* 37 (2006): 128–44.

29. For some years American bison have been ranging a small number of Finnish farms.

Environmental historians cannot stop global climate change and other major environmental alterations. However, they will be among the scholars called upon to contribute their knowledge and tools to describe the world's environments, past and present. Nostalgia for lost environments will grow concurrently with climate change. If demand for recollections of nature's history grows, so too will public interest in environmental issues. Ever more accurate scientific information and acute analyses will be expected. Are environmental historians prepared to meet this challenge? The ability to respond to it is one of the pressing missions of environmental history.

This book approaches environmental issues on a broad basis and highlights themes and regions that have been neglected by mainstream environmental history, attempting to open new viewpoints and work on analyses that will inspire future research. All involved in this volume will be satisfied if it produces constructive contributions to the important discussion of green global history.

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PART I

Approaching the Environment of the Past

~ 1 ~

Interdisciplinarity as Disciplinary Co-operation: A Plea for the Future of Environmental History

Fiona Watson[1]

It is no longer debatable whether environmental history is well established here in the Old World. The firm footing now enjoyed by the European Society for Environmental History makes debates about the future relate to 'what kind' rather than 'if'. Equally, and perhaps rather rashly, I would suggest that we Europeans should be entirely at ease with the fact that many of our concerns, particularly but not exclusively with regard to the rural environment, are inspired by a different history from that of our colleagues across the Atlantic. Wilderness, to take one obvious example, is an issue for Europe, but predominantly in the context of highlighting the extent to which the largely unpopulated landscapes that happen to exist today are nevertheless fundamentally a product of the interaction of humans, who will almost certainly have lived and worked on them for thousands of years, with particular biophysical conditions.

Of course, such interaction has not always been benign, on either side. But neither is it always a question of linear descent into collapse; there are many occasions when human activity has created an environmental good (at least, something that is counted as such today). To take one recurring example from my own part of the world, the Atlantic oakwoods of western Scotland are regarded by many scientists and conservationists as having a high degree of 'naturalness', with the requisite positive

1. Until February 2006, I was Director of the AHRC Research Centre for Environmental History at the Universities of Stirling and St Andrews in Scotland, UK, as well as senior lecturer in history at the University of Stirling. Since giving all that up, I am now a freelance historian and writer. I apologise for addressing as a historian a readership that is certainly by no means entirely from that discipline. This is both the joy and the difficulty of environmental history and I do wish that we could all be a bit more explicit about the range of disciplinary backgrounds contributing to the subject and seek to discuss openly our various methodological approaches.

environmental qualities that this implies.[2] In fact, they are in such an interesting ecological condition precisely because they are the direct descendants of woods heavily altered (in terms of, among other management strategies, the removal of all other tree species) by industrial ironmasters only a few hundred years ago. From a methodological point of view, it is perhaps time to consider the historiography of environmental history of the European continent on its own terms, including, of course, its relationship with the colonial past, which has its own distinguished historiography. The similarities and contrasts with the historiographies of other parts of the world would, I believe, be extremely illuminating.

However, the main issue that I want to pursue here is, in my opinion, one of the most critical faced by our discipline. It is something that we all acknowledge as fundamental to the pursuit of environmental history but, in reality, *how* we do it, not to mention *how much of it* we actually do is rarely given more than lip-service, perhaps in part because of the considerable practical and methodological difficulties involved. I am talking about interdisciplinarity. My own interpretation of that word is collaboration, but I am aware that this is certainly not the only, nor even the most common, way of looking at the issue. I realise that as a member of the Centre for Environmental History at Stirling, I was in a very privileged position in that we received money explicitly to engage in projects across disciplinary boundaries. It is therefore a great pleasure to be able to share our experiences and to reflect on what has worked and what has not.

Despite having started out as a very traditional historian, I am a great believer in collaborative work, where appropriate. Given the range of disciplines engaged in understanding the environment and the human place within it, it is imperative that we start to dismantle the boundaries that have grown up between them and take a holistic approach to research questions. Although environmental history practised by historians has a traditional relationship with ecology, up to and including a degree of ambiguity between the subject and ecological history, I would like to suggest that ecologists are not the only other academic community in which we might find those describing themselves as environmental historians; nor is ecology the only other discipline that environmental historians might wish to collaborate with.

If such a premise is accepted, then it follows that an environmental historian is not therefore *by definition* someone who can combine and communicate the ideas and analytical conclusions of both ecology and documentary history, though such a combination is still very relevant. This is also because it is a rare scholar indeed who can do so to the satisfaction of peers in both disciplines and it is vital for the future of Environmental History that its interdisciplinary credentials are as rigorous as those of any single discipline. This caveat applies no matter which

2. See for example, http://www.snh.org.uk/publications/on-line/designatedareas/nnrs/ariundle/ariundle.asp Accessed January 2010.

discipline or even disciplines is involved. Nor, in my opinion, will environmental history find coherence only by attempting to synthesise ecology and history into a single, defined methodology. The diversity of disciplines and approaches being brought to bear by members of the extremely loose community of environmental historians already precludes any attempt at narrowing down in such a way. Nevertheless, the very diversity of this community, as well as the burgeoning maturity of the subject, does demand a degree of critical awareness about the 'what' and the 'how' of environmental history. This in turn also asks its practitioners to be aware of the geocultural peculiarities that they inevitably bring to the subject and which may not preoccupy their colleagues elsewhere. While all history requires such awareness, the combination inherent in environmental history of analyses of both non-human nature and human societies creates even greater potential differences across time and physical space.

Nevertheless, in most parts of the globe, collaboration between the sciences and the humanities is still woefully rare. Despite the fact that the Enlightenment itself did not discriminate between the value of the scientific and historical method, regarding all rational approaches to the acquisition of knowledge as equally valid, the prevailing attitude across the Two Cultures[3] has been increasingly and mutually scornful from as early as the seventeenth century. John Milton noted the tendency, from the point of view of the Arts, to feel alienated from scientists and their language, who 'gird the sphere, / With centric and eccentric scribbled o'er, / Cycle and epicycle, orb in orb'.[4] Today, as disciplines and sub-disciplines proliferate, along with the tendency to build metaphysical walls of impenetrable and exclusive terminology, as causes and organisations try to outbid each other in securing public attention, it is sometimes easy to forget that there is a reality underpinning these concerns. As one American nature writer, John Hay, puts it:

> [M]y society … sees the natural world not as a range of correlated lives and communities but as a province for plunder. The terms it appropriates, such as *ecology*, *the environment,* or *conservation*, may be politically useful to the cause, but they hardly guarantee an intimacy with its sources.[5]

So, we are brave souls indeed to venture into this crowded arena. Nevertheless, it is essential that we do begin to communicate beyond the environmental history community, since we historians (and, please forgive me, but I am predominantly addressing those environmental history practitioners who come from the disciplines

3. The 'Two Cultures' refers to a famous lecture given by the physicist/writer, C.P. Snow, in 1959, discussing the gulf in understanding between the Sciences and the Arts. It was then published as *The Two Cultures and the Scientific Revolution*, followed in 1963 by a sequel, *The Two Cultures: A Second Look.*

4. John Milton, *Paradise Lost* (1667), Book VIII, ll82–4.

5. John Hay, 'The Nature Writer's Dilemma', in Daniel Halpern and Dan Frank (eds.), *The Nature Reader*, (London: Picador 2001), pp. 5–6.

of history or historical geography) in the western world have, for far too long, allowed the sciences almost complete hegemony to do the measuring and counting and suggest to the rest of society what should be done with the results. Even worse, we have often allowed the scientific community, when it has come to the conclusion that human activity can no longer be excluded from the measuring and counting processes, to do our job for us. I would fully acknowledge that this has in part been necessary because, until recently, the historical community has not been there either to work with or from. But now that documentary historians are well and truly focussed on similar issues, there is no longer any excuse for remaining disengaged from this process. Those of us engaged in the analysis of human society over time have a distinct advantage when it comes to interpreting the history of the environment if we can make efforts to cut across the boundaries of the Two Cultures. Our work makes contributions to understanding details of the interrelationship between humanity and the environment. However, most importantly, historians can extrapolate from their data what scientists cannot from theirs: they can understand *why* particular situations arose from the human side of the equation.

There is therefore no doubt that the discipline of history has an invaluable contribution to make, but it is still generally the case that historians have a long way to go to construct a convincing case for the use of their expertise, on their own terms, beyond their own community. There are a number of reasons for this, including continuing mutual incomprehension across the Two Cultures, the structures and restrictions of academic life, the fact that we in the west are often forced to choose between science and the humanities while still at school. However, we must also take our share of responsibility. For example, one thing that environmental historians from a historical background really should not do is merely switch the focus of research to encompass what seems to be environmental but is really only an extension of more traditional economic and social considerations. The history of a natural resource is not necessarily environmental history if no consideration is given to the effects of human resource use on both human society *and* the environment.

Equally many scientists despair of the apparent obsession of the humanities with perceptions. On the one hand, this is sometimes the product of an anti-cultural perspective on their part and it is emphatically the job of the historian to point out the various and changing cultural contexts in which the scientific community, like all others, operates. However we must also remember that perceptions are one thing but they still have a relationship with reality. The power in the analysis of perceptions surely lies in exploring the gap between them and reality, which implies that we are also aware of what the reality might actually have been. But I am well aware that many historians feel entirely ill equipped to take on the reality side of that equation. That is one point at which we might consider talking to our colleagues in the natural and/or social sciences.

There are considerable benefits in doing so. In the first place, it means that those of us who have chosen history as our focus of study, indeed our careers, have no need to pretend we are something that we are not. This does not, of course, excuse us from a responsibility to find out something about the particular aspect of the environment we are looking at. As I have already said, and despite initiatives in the UK to the contrary, environmental historians from any discipline should not, in my opinion, need to turn themselves into experts in another, as a matter of course. While acknowledging the work of those who have achieved it, such as the historical ecologist, Oliver Rackham,[6] I rather think that such cross-disciplinary brilliance is the exception rather than the rule.

Equally, historians like myself must also be honest about the limits of our own discipline. The single biggest problem that we face in terms of turning the documentary and oral record into effective environmental history is in establishing the actual impact that the trends and actions we uncover had on the ground, except on the very broadest of scales. Separating the situations that have serious long-term implications from those that provoke a lot of discussion and even soul-searching at the time but are either attributed to the wrong cause or shrugged off by Nature over the longer term is not usually within the cataloguing power of historians. In order fully to engage our explanatory power – the *why* that should be our most distinctive contribution – we need to work with those who can provide long-term and consistent data on environmental stability and change.

During the lifetime of the AHRC Research Centre for Environmental History, I have had the privilege of overseeing a number of research projects, one of which was funded by the Leverhulme Trust. Here I will examine three of them in terms of my experience of working with palaeoecologists, soil scientists, ecologists and environmental economists.

'Cultural soils'. New approaches to determine their significance and sustainability under various land management systems

This project examined, from a scientific point of view, so-called 'plaggen' or 'cultural' soils, which accumulate up to one metre in depth as a result of human activity, particularly the recycling of waste. The documentary input was intended to understand the causes of this soil improvement, including the types of materials used.[7]

6. Dr Rackham, a fellow of Corpus Christi College, Cambridge, is a botanist by training. However, his books, such as *The Last Forest: The Story of Hatfield Forest,* (London: Dent 1989) or *The History of the Countryside,* (London: Weidenfeld & Nicholson 2000), show clearly that he has turned himself into an excellent historian as well. However, it could be argued that his original discipline has viewed his 'dabbling' in history as, at best, a distraction and, at worst, as detrimental to his reputation within botany.

7. For a discussion of the results of the project, see Donald Davidson *et. al.* 'The Legacy of Past Urban Waste Disposal on Local Soils', *Journal of Archaeological Science* 3/6 (2006): 778–783.

In many ways, this was a textbook case of how not to go about collaborative work, in part because the soil part of the project was funded through another grant. Nevertheless, right from the word go, our inability to discuss the limitations of the data to be provided by both sides proved a serious handicap. In essence, the most serious problems were the inability of soil science currently (though hopefully not eternally) to provide a chronology for soil (which, inevitably, gets churned up by use), combined with the problem of documentary evidence rarely operating at the very precise site-specific level[8] required by the scientists. This was a very illuminating process for me, arousing grave concerns about what was supposed to be an integrated approach. In essence, we discovered the very real dangers of working with scientists whose reliance on the robustness of their modelling techniques could cause them to lose sight of problems with data collection, particularly in terms of applying documentary evidence from one particular physical space to another. To put this very crudely, no matter how complex and innovative the modelling technique, rubbish in – in this case, inappropriate evidence – will still produce rubbish out.

Indeed, this project highlighted a very serious issue that affects collaboration between historians and any other discipline dealing with the physical environment. To what extent can the evidence collected by scientists in one extremely specific place be related to the more general farm/estate/village/town/city/ regional/national evidence looked at by the historian? The scientists that we worked with were guilty of wanting to use evidence from a variety of sources well beyond the subject area, though I would admit that historians can sometimes fall into the same trap. This is not an insoluble problem, but it requires historians to think through the applicability of their evidence to a given physical point. This problem operates in the opposite direction if science is used within a detailed historical study – it is highly problematic to use scientific data if it was not originally collected and analysed for the questions you have in mind. In both cases the evidence is taken out of context and is therefore in danger of being misused.

As an extension of this and presuming that the research is done collaboratively, the detailed *what* (largely uncovered by the scientists, but added to by the historians) and the detailed *why*, when brought together, are not necessarily applicable even to the next farm or village, so we have a lot of work to do before we can generalise. Indeed, I would argue that generalisation is a lot easier for all of us if we do not try to mix the physical with the social–cultural, but that does not justify giving up the attempt. Above all, my experience to date makes it clear that it is essential to discuss, *before* the project takes place, the possibilities and the limitations of the disciplines involved, how site selection will take place and how many sites should indeed be chosen to allow a wider story to be told. Let's be honest; many historians choose their subjects by the quality of the archive. Such

8. I.e. that soil came from exactly there; can the documentary record tell me something about that spot?

a consideration is important, but other 'objective' criteria need also to be thought through, especially what factors – both physical and cultural – should be compared and contrasted in order to provide some degree of representativeness. Historians do not necessarily give much thought to a systematic approach in selecting what they study but it is something we need to get used to if we are going to engage with points on a map as well as points in time. We should surely be doing that anyway.

Such are the pitfalls of beginning collaborative work, but these pale into insignificance when it comes to marrying together the research once it has been done. Clear aims and objectives are a necessary prerequisite for any piece of research but the use of hypotheses[9] and explicit research questions is crucial to maintaining a common focus. This then divides the historian's activities into two distinct aspects. Firstly, we can and should continue to collect the full range of evidence relating to the wider cultural context operating within the physical space being considered, so long as it is relevant to the questions being asked in the project. This is what we traditionally excel at doing and even if there is no direct relationship between the science and such history, we should still be doing it because otherwise our discipline is reduced to merely providing data that can explain the science. Secondly, we also need to interpret our material in terms of its likely direct effect on the environment.

Written in the hills: human impact on upland diversity, past, present and future

This proved crucial during our attempts to understand human impact on upland diversity. The intention behind this project was to try to establish what factors – both human and environmental – have played a role in shaping the underlying diversity (deduced from pollen evidence) of a number of sites across upland Scotland from 1600 to 2000. Wider economic and social drivers, such as war, famine, etc. obviously play a role. However, they cannot be used in a statistical model attempting to reveal causal factors behind changes in diversity over time; only the management procedure being directly applied on the ground, but which may nonetheless have been inspired by, say, a famine or technological revolution, can feature. The historian must then analyse what has caused the change in procedure in increasingly indirect (in relation to the physical site studied) circles of influence. This is, perhaps, the historical equivalent of explaining what happens when a butterfly beats its wings on the other side of the globe. What distinguishes it from traditional historical research, which is obviously based on similarly rational considerations, is the fact that collaborative research is provided with the evidence, through scientific disciplines (in our case, pollen analysis), for what actually happened on the ground. We know, therefore, when the key moments of stability and change actually oc-

9. When using hypotheses, one must take care not to attempt to prove that something did not occur [which cannot be done], only that it did.

curred (within certain margins of error) and, through the statistical model that was also generated as part of this project, we also know which variables (from a choice of animal prices [as a proxy for livestock density], land use change, intrinsic environmental conditions, technological improvements and changes in property rights) appear to coincide with them. In other words, we can show which factors have proved most important in influencing changes in diversity across all of our sites (twelve, in three biogeographical zones) during the 400 years of our study. The results show that both numbers of animals and total abandonment of grazing have had the most significant impact on diversity, indicating that human-induced change was far more important than, for example, climate fluctuations. The key question for future research is, therefore, the moment at which sufficient grazing becomes too much.[10]

This brings me to another crucial point. Although communication is vital at all stages of a project (and particularly once results begin to emerge), the various contributors *must* maintain the integrity of their own disciplinary analysis before any attempt is made to bring the results together. While I cannot stress enough that communication is absolutely crucial in collaboration, there comes a point when it could potentially create a chicken and egg situation. In essence this means that we must not go looking in the historical data for explanations for what is happening in the scientific record (and vice versa) until we are already sure of what our own evidence is telling us on our own disciplinary terms. We do, of course, run the risk that the results end up being contradictory, which will prove 'interesting' when it comes to interpreting them. However, by maintaining disciplinary integrity during preliminary analyses, we can at least be sure that we have neither ignored apparent trends in our own data because they were inconvenient, nor found other trends that might not otherwise have appeared significant just because we know from other data to look for them. This does not preclude us, subsequently, from investigating through the historical evidence issues highlighted by the science. Indeed, the emergence of impacts that are hidden from the historian's eyes in the documentary record but are nevertheless potentially explained by it is a significant reason for engaging in collaborative research. Nevertheless, we must be explicit

10. For a more in-depth discussion of the method behind collaborative interdisciplinary research, based on our work on the Leverhulme-funded project, 'Written in the Hills', see Alistair Hamilton, Fiona Watson, Althea Davies and Nick Hanley, 'Interdisciplinary Conversations: the Collective Model', in P. Warde and S. Sőrlin (eds.), *Nature's End. History and the Environment*, (Basingstoke: Palgrave Macmillan 2009). The results of that project can also be found in A.L. Davies and F. Watson, 'Understanding the Changing Value of Natural Resources: An Integrated Palaeoecological-historical Investigation into Grazing-woodland Interactions by Loch Awe, Western Highlands of Scotland', *Journal of Biogeography* 34 (2007): 1777–1791 and N. Hanley, A. Davies, K. Angelopoulos, A. Hamilton, A. Ross, D. Tinch and F. Watson, 'Economic Determinants of Biodiversity Change over a 400-year Period in the Scottish Uplands', *Journal of Applied Ecology* 45 (2008): 1557–1565.

in our reasoning when we conclude that something detected by scientists 'on the ground' can *subsequently* be accounted for within the written evidence.

Wet desert or promised land? Understanding the historical context to current UK perceptions of the value of the uplands

This last project looked at how particular traditions have come to dominate debates and underpin policy relating to the form and future of two iconic upland landscapes in Britain: the Lake District in north-west England and the Trossachs in central Scotland. Made popular by its profound association with the Romantic movement, the Lake District has helped to engender very strongly held views about upland landscapes and what they should look like but this has arguably created, in effect, a form of living museum. The comparison with the Trossachs, made famous as the setting for Sir Walter Scott's poem, *The Lady of the Lake*, allowed us to assess the extent to which the Lake District is a special case. Finally, a survey of current attitudes assessed the opinions of both local and visitor towards these iconic landscapes, addressing the issue of what is (and is not) acceptable change in relation to them and what might have helped to shape such opinions. It is this last element that I would like to highlight now, since the basic premise was to test whether knowledge of past land-use history and perceptions can influence current views on these landscapes.[11]

The historical information presented to the visitors and locals who participated in the survey[12] related both to how land cover has changed over time, using historical maps and accompanying contemporary descriptions of land cover, and how perceptions of landscapes in popular culture have varied, using readings from two well-known travel writers, Daniel Defoe (eighteenth century) and Dorothy Wordsworth (nineteenth century).

The main results that emerge for both landscapes are that either knowing that a landscape was different in the past or knowing that perceptions of it have changed over time seems to reduce preferences for keeping the landscape as it is today and to increase preferences for changing this landscape in the future by planting more woodland. In other words, becoming aware of landscape as a dynamic concept whose physical structure and perception varies over time decreases the demand for the *status quo*. Though there were differences between what people wanted for the future of the Lake District compared with the Trossachs, this essential finding shows that a knowledge of history provides a better informed context and engenders a

11. For an account of the results of this project, see Hanley *et al.* 'Economic Determinants': 1557–1565.

12. In order to test whether or not the historical information had an impact, some groups were not given any of it and some were given only the maps.

willingness to accept that these landscapes are not static, 'pickled' entities but that change is intrinsic to their nature.

This evidence for the 'use' of history as both a potential driver of contemporary perceptions and an explanation for them is not something that documentary historians could discover through their own techniques. It is only by collaborating with those versed in social science statistical techniques that the power of history itself is revealed.

Conclusions

Certainly, little of the above is rocket science but common sense and the historical discipline are no more lacking in that quality than any other. Equally we would be right to ask ourselves what distinguishes the emphasis that such work inevitably places on points in space as well as time from the research conducted by historical geographers over many more decades than our own interest. In some cases, the answer is, not a lot. However, I would still argue that there might, in other cases, be a significant difference. History is at its most powerful when juggling the analysis of very disparate and often apparently subjective material (at least not conducive to being reduced to the status of a number). Indeed our ability to do so is still regarded with suspicion by other disciplines and is something that we might consider theorising about within environmental history. My own view is that we are able to do so because of our professional immersion within particular societies and time periods, which, in many cases can last an academic lifetime.[13] We do not, as a rule, and unlike many scientists and social scientists, develop a method to systematise our material and then expect to be able to apply it across time and/or space within our individual research. In essence, then, it is our profound and long-standing acquaintance with specific contexts in the past that is our greatest strength. We will need to explain what that means and how we do it to our collaborators, just as we will need, on occasions, to think more systematically about how we collect and deal with certain types of evidence. Nevertheless, we should not apologise for such an in-depth approach; nor should we expect to be treated by our collaborators with anything other than equal respect.

I have no doubt that, if we can strive for further collaborative efforts even in small ways, the results will be fundamentally valuable in two important aspects:

1) We will contribute a far deeper understanding of how landscape, the environment and all the various actors encompassed within those terms, living and non-living, interact with each other and what this means. This will enrich

13. I myself am not a particularly good example, having transmogrified from a medieval political and military historian into an early modern environmental historian, with a subsequent loss of historical depth along the way.

our own knowledge base and society as a whole, both culturally and more pragmatically.

2) We will go a long way to building bridges between the Two Cultures, without which our knowledge systems are essentially impoverished. That is surely the most exciting and far-reaching contribution that environmental history can make to the discipline of history itself.

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Living in Nature: Biography and Environmental History

Donald Worster

Points of departure

This chapter aims to examine biography *and* environmental history, two subjects that are not usually joined together. They are not even shelved together in the bookshops. The biographer, we say, tells the story of a single person's growth and career: the life of Gro Harlem Bruntland or Mohandas (Mahatma) Gandhi. The environmental historian, by contrast, writes about how whole communities or societies interact with the natural world: Finland with its Baltic fisheries, New Zealand sheep farmers with their soils and vegetation or tribal peoples with their tropical rainforests. How could these quite different approaches possibly intersect? What are the methodological issues separating them, should we try to reconcile them and, if we did, how might that be achieved?

I want to argue that the difference between what we commonly mean by history and biography is mainly one of *scale*. Differences in scale need not be regarded as absolute differences in value or rigour. Environmental history can and should be done on many scales, including the scale of biography.

Fifteen years ago, when I was asked by an American journal to describe the field of environmental history for its readers, this matter of scale was left on the margins. My article, which bore the title, 'Transformations of the Earth: Toward an Agro-Ecological Perspective on History',[1] offered a model that was largely unscaled. To the old two-tiered explanatory model of classical Marxism[2] – structure, or mode of production; and superstructure, or ideas and ideologies – I added the dynamics of nature as a powerful third force in history. This was not a merely a 'new and

1. Donald Worster, *The Journal of American History* 76/4 (1990): 1087–1106.

2. See Karl Marx, *Capital. A Critique of Political Economy*, Vol. I-III, Transl. (1) Ben Fowles and (2–3) David Fernbach, (London: Penguin Classics [1867–94] 1992–3).

improved' version of dialectical materialism or class analysis. It was meant to be a more interactive, holistic, non-deterministic and complex model and, as such, it still seems to me to work reasonably well.[3]

By the way, I would continue to insist, as I did then, on the centrality of agriculture to our work – that is, the interaction with land, water, soil, plants and animals to produce human food and energy. Whether we are city people or peasants, however far removed from the land we may live, we are all vitally embedded in the complexities of nature through our bodies and their need for sustenance. And how we go about getting our food still has more impact on the earth than anything else we do.

Unlike most Marxists, I left the question of exactly how those three levels influence one another in ambiguity. There is no *a priori* way to settle which level has been the most important in every situation. Marxists offer a rigid materialist answer based on technology and class struggle. In contrast, most non-Marxist historians embrace an equally simple *cultural* determinism, focusing all their attention on the third of those levels. We environmental historians should try to avoid either extreme; otherwise we would not have much of a field. Instead of environmental history, which calls for a complex view of the past in which cultural and material forces are *both* important, we would be reduced to a subset of materialist Marxism or of culturalist lit-crit studies. Most likely, we would be left with that pathetically shrunken little subject, the cultural history of nature.[4]

There can never be a single deterministic theory of environmental history because there can never be a single explanation for change in people's relationship with nature. Theory means explanation, as represented by Charles Darwin's theory of evolution through natural selection.[5] We can never reduce environmental history to that kind of explanation because the human past has had too many interactive determinants. Environmental history, thus, will always be theoretically open, chaotic and, in a sense, indeterminate. That is not to say that we cannot offer explanations, but only that we cannot offer the same model of explanation for every set of changes.

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3. For an early effort to derive a model for environmental history from the natural sciences and anthropology see my essay, History as Natural History', in Donald Worster, *The Wealth of Nature: Environmental History and the Ecological Imagination,* (New York: Oxford University Press 1993), pp. 30–44.

4. This classic text in cultural history is 'Ideas of Nature', by Raymond Williams. See his *Culture and Materialism*, (London: Verso [1980] 2005), pp. 67–85. See also Richard White, 'From Wilderness to Hybrid Landscapes: the Cultural Turn in Environmental History', *The Historian* 66/3 (2004): 557–64. The most sophisticated theoretical work on Marxism and environmental matters in English is James O'Connor's *Natural Causes: Essays in Ecological Marxism*, (New York: Guilford Press 1998). See also Friedrich Engels, *Dialectics of Nature*, 3rd rev. ed., (Moscow: Progress Publishers [1873–1886] 1964).

5. Charles Darwin, *On the Origin of Species by Means of Natural Selection or the Preservation of Favoured Races in the Struggle of Life*, (London 1859).

Throughout the natural sciences, as in history, scale is an important issue. In the field of ecology, for example, a scientist may choose to work at the scale of the entire biosphere, of continent-wide biomes, of a single local ecosystem (a pond, a forest, a patch of prairie) or at the scale of a single organism in relation to its surroundings.[6]

Considering these many scales, a recent textbook in the field of ecology argues that 'a unified ecology is more of a goal than a reality'. Ecology is best understood as a cluster of inquiries, 'a number of different sub-disciplines … each with its own set of concepts (or world view). Those sub-disciplines are different ways (or perspectives or views) of looking at the same thing.' According to these authors, ecology offers an array of related but distinguishable perspectives nested within one another: landscape ecology, ecosystem ecology, physiological ecology, behavioural ecology, population ecology and community ecology.[7]

Here is a model that environmental historians might take to heart in trying to grapple with our own array of levels, scales and methodologies. We take as our subject the study of what Nancy Langston calls in one of her chapter titles, 'people and nature', as that relationship has changed over time. But within that subject, as in ecology, a single scale or method will never be possible.

Perhaps like you, I once dismissed biography because it could not explain those large-scale, deep-working forces that bring about fundamental changes over time: the *zeitgeist*, the dialectics of class struggle, the shift to fossil fuel, the bio-geographical determinants of change, etc. I was taught to think that way in graduate school and in truth I still feel that way. Historians, most of the time, should try to track those larger scales of change. Biography does not do that. Its scale is more intimate, specific, even private, and never so large or abstract as the nation-state or the world.

This is a real difference and a real limitation confronting the biographer. However, rather than concluding that history is more important than biography, I now believe that we should try to see both as essential to understanding the past. Each brings something valuable and illuminating. We need history to see beyond the individual or case study, beyond the exceptional or the unexceptional person who is the proper subject of the biographer. Nevertheless, we need biography to check the historian's tendency to make sweeping generalisations and over-confident explanations.

At the same time, environmental history and environmental biography have a lot in common. Both start with the view that human life, whether at the individual or collective scale, is lived with more than people. Every scale of human

6. Donald Worster, 'The Two Cultures Revisited: Environmental History and the Environmental Sciences', Special Lammi symposium issue edited by Richard Grove, Timo Myllyntaus and Mikko Saikku, *Environment and History* 2/1 (1996): 3–14.

7. Stanley I. Dodson, *et al. Ecology,* (New York: Oxford University Press 1998), p. 3.

life is caught up in the dynamics of change constantly going on in nature. Every individual life, like that of society, is profoundly shaped by technology, work and the food and energy we extract from the earth. Both at the individual and collective scales, human life responds to the tides and fashions of cultural evolution.

The indeterminacy I mentioned above becomes more obvious when we add the perspective of scale. As we move down the scale from the nation-state or region toward biography, toward the individual life lived in nature, broad generalisations and theories become more and more useless. On a world or global scale explanation may seem easy; at the scale of the individual, however, any full or satisfactory explanation proves elusive. Such indeterminacy I have learned to appreciate through the biographies I have been working on recently. What I have discovered is the unpredictability of any single set of influences, material or cultural, in making an individual what she or he is. How difficult it is to explain change over time, even at the level of a single individual.[8]

John Wesley Powell and John Muir in comparison

The first person I chose for my biography project was John Wesley Powell (1834–1902), the subject of my book published in 2001 by Oxford University Press and entitled *A River Running West.* The second person was John Muir (1838–1914), who is the subject of my most recent book, *A Passion for Nature*, published by Oxford in 2008.[9]

In each case I have tried to rethink biography from a perspective in which the people–nature relationship is significant, meaningful and formative. On the next few pages I want to compare what I have found out about my two subjects and show what biography can contribute to environmental history.

John Wesley Powell and John Muir lived amazingly similar lives, with many striking coincidences, and yet each man developed a unique life and a unique environmental vision. They ended up dwelling in very different places. How could those differences have happened?

To begin with the similarities, both Powell and Muir were born in the 1830s to British-emigrant parents – people of strong evangelical Protestant religion values who came to the American Midwest before the Civil War (1861–1865). For a while they even lived physically close to one another. Around 1850 Powell's family took up farming in Walworth County, Wisconsin, just over the Illinois line, while Muir's Scottish immigrant family had just begun farming in Marquette County,

8. For a discussion of indeterminacy and unpredictability in nature see my essay, 'The Ecology of Order and Chaos', in Worster, *The Wealth of Nature*, pp. 156–70.

9. Donald Worster, *A River Running West. The Life of John Wesley Powell*, (New York: Oxford University Press 2001); Donald Worster, *A Passion for Nature. The Life of John Muir*, (New York: Oxford University Press 2008).

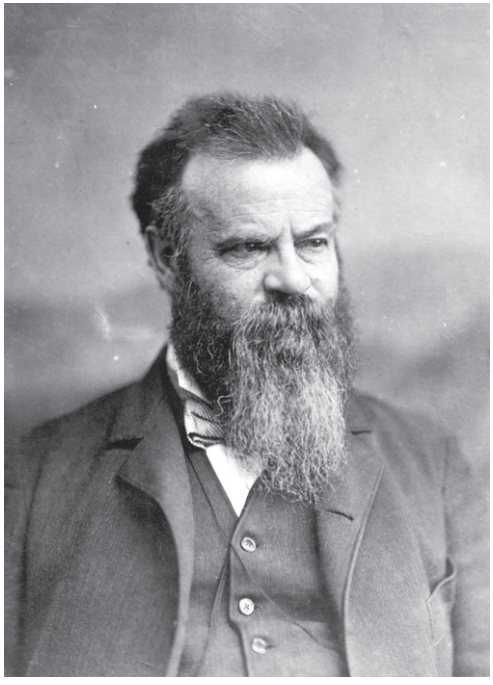

Figure 1. American explorer and geologist John Wesley Powell in his mid-thirties

Wisconsin, thirty miles north of Portage. Each son went off to college for a few years, taught in rural schools to pay his tuition, was drawn to the natural sciences but never graduated from college.

Both men then moved in a direction that neither set of parents could understand or feel happy about: each son rejected his family's evangelical faith. Powell, raised in the Wesleyan Methodist tradition, became completely secular and scientific in his thinking, regarding religion as an outmoded superstition. Muir also abandoned the religion of his father (who started as a dissenting member of the Church of Scotland, then joined the Campbellites or the Disciples of Christ, then wandered off toward his own private version of Protestant Christianity); in contrast, Muir attached his strong spiritual feelings to the wilderness, becoming a follower of the religion of nature.

These examples, by the way, should be a warning to evangelical parents today. Their influence may burn out at some point, as it has done before in history.

Furthermore, they may find their children, as Powell's and Muir's parents did, either rejecting religion completely or taking it in a radical new direction.

Back to the amazing parallels in my subjects' lives. In 1867 each man left his home in the Midwest, Powell travelling *on foot* to Colorado Territory, Muir doing the same to the Gulf of Mexico. The next year found Powell out in the Rocky Mountains, thinking about making a boat expedition down the still unexplored Colorado River, an expedition that he would launch in May 1869. Forever after his name would be attached to that river and to the Grand Canyon; he was the first person to explore and describe the Canyon in the language of science. Meanwhile, in those same years, Muir fetched up in California. In 1868 he got his first glimpse of the fabled Yosemite Valley (a place that would forever be associated with his name) and fell into rapture over the sight of the glistening Sierra Nevada rising beyond.

Together, these two Johns afoot in the American West would give people a new understanding and appreciation of that great land, its special environmental qualities and its awesome landscapes. Their most beloved places in that West would become some of America's most revered national parks.

But then, strikingly, their paths diverged. Powell moved to Washington, DC, became a government scientist and bureaucrat, the head of the US Geological Survey and the Bureau of Ethnology in the Smithsonian Institution. He testified repeatedly before Congress, trying to persuade it to adopt a radical new approach to settling the arid West. Through his travels, Powell had learned to see the landscape in a revolutionary way: as a series of natural, water catchments or basins rather than as artificially constructed political units. He imagined a new society taking root in the West, one based on communitarian and democratic values, a society living within those natural basin lines and protecting both water and land. He offered a vision of *settling and inhabiting* the land, of knowing its limits as well as its promise, and of working cooperatively within the logical patterns of nature. We might call him America's prophet of the inhabited environment – the prophet of the watershed and of watershed democracy.

Powell left an important legacy for the conservation movement and he also left behind a programme of government mapping that Americans are still drawing on today. His maps can still help us see the landscape as an integrated, functioning whole, stitched together by the flow of water.

Muir, in contrast, paid little attention to the problems of knowing and settling the Intermountain West. He became the lanky, bearded prophet of the wilderness, rambling over the Sierra and along the coast of Alaska, often with no more than a loaf of bread and a bag of tea tied to his belt. A private citizen with no ties to the government, he became one of our greatest outdoor nature writers. In 1892, shortly before Powell resigned from the Geological Survey, Muir founded the Sierra Club, one of the nation's first environmental organizations devoted to citizen action, a club that would eventually grow to over 700,000 members. In his

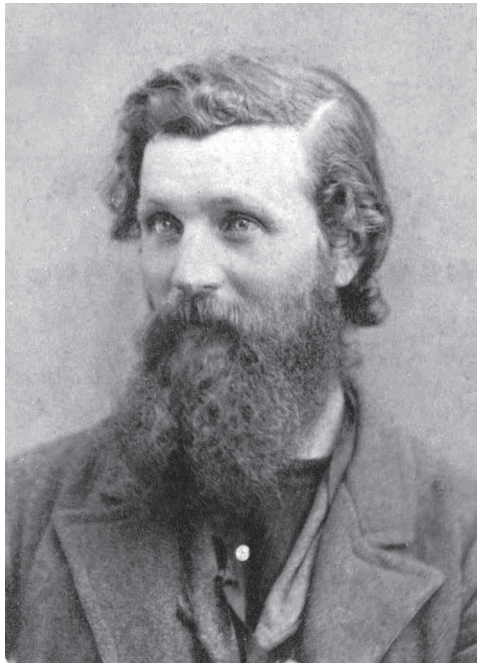

Figure 2. Scottish-American nature writer and early advocate of preservation of wilderness, John Muir, at the age of 34 in 1872

writings and projects he preached the sacred beauty of unspoiled nature, the equality of all forms of life and the gospel of the sublime. His influence still touches the land wherever there are national parks, wildlife refuges and wilderness.

Then at the end of their lives came a few final parallels. In 1902 Powell died of a stroke on the coast of Maine, by which point he had been repudiated by Washington politicians for being too radical and visionary. Disillusioned, he died far away from the deserts and rivers that had made him famous. Twelve years later, in 1914, Muir died of pneumonia in a Los Angeles city hospital. He was likewise far away from the icy mountains where he had experienced the most intense feelings of his life, places that he had made famous and that had made him famous. Like Powell, he died a failure of sorts, after losing a long, tense battle to keep a dam and reservoir out of Yosemite National Park.

Many convergences and similarities and yet many hard-to-explain differences mark these two lives. Why was one man drawn to the problem of western aridity

and the challenge it posed to American settlement while the other was drawn to exploring glaciers and mountains and to celebrating their transcendental grandeur? Why was one so utilitarian, so concerned about wise use of natural resources, while the other was so spiritual, so eager to preserve nature in a pristine state?

If we focused only on their commonalities – those similarities of class, shared background in British-American culture, evangelical Protestantism, growing up at the same time in the Midwest, going west in the same years – we might suppose that these two individuals would think about nature more or less in the same way. They should look like *eco-twins* but in fact they do not – they resemble cousins at best. They surprise us and defy our predictions and expectations. This is where the biographer enters to find answers: he tries to explain those individual divergences in personality and experience that can send two people in quite different directions and leave behind different legacies. Some of that explanation must be material, some cultural.

Grant that a large part of Powell's and Muir's differences must lie hidden from the historian in the convolutions of the brain or patterns of DNA; they did not inherit the same genes or personality. Although one day we may understand the role of genes better than we do now, we are far from being able to use such science in biography or history.

Another reason for their divergence must lie in different social experiences and this factor, fortunately, we can uncover more easily: the often subtle role of parents, the influence of a specific teacher or friend. Furthermore, there is a third kind of explanation we can pursue: how Powell and Muir were shaped by their different experiences of the outdoors.

Powell, the future explorer of the Colorado River and friend of westward moving farmers, was born and grew up in a fairly settled agricultural landscape – the early rural world of New York, Ohio and Illinois – and he came to identify with the farmer on the land. When he got to Colorado, Utah and Arizona, he was shocked by their cloudless skies and scanty surface water. What he had always taken for granted in his agrarian youth was now missing or deficient. Others who had moved abruptly from the green to the brown side of the North American continent were likewise struck by the critical significance of the supply of water. They realised, with a realism that was not common among eastern politicians or western boosters, that they would have to learn to adapt or they would fail to make secure homes in this dry land. Powell learned that material truth by bodily experience. He literally walked across the Great Plains and then walked or rode horseback through the harsh beauty of the Intermountain West – mile after mile of glaring sun, dust caking on his lips, with no water holes in sight. For over a decade he knew aridity at first hand, until he could feel this nature in his bones.

Moreover, Powell had grown up alongside many rivers in his early life: the Scioto of Ohio, the Illinois and Mississippi. For months on end he had travelled on

their currents in small boats, exploring and collecting; the material force of those rivers stimulated his mental processes. He learned in a rowboat how rivers work, so that when he came to the Colorado he was prepared to ask how such a strange river, cutting through canyons and deserts, worked too: how it caused erosion and over what time scales, how much land was needed to make a river in that desert country, how life clustered along its banks and could not survive without its flow. He learned to see all of nature as a kind of flow through the landscape, giving it shape and setting terms for living.

John Muir, on the other hand, spent his first eleven years living in an ancient, stone-walled town on the coast of Scotland, with the forbidding North Sea on one side and large-scale, intensive grain farming on the other. When his father abruptly brought the family to America, Muir felt a huge new freedom in the undisturbed forests and prairies around him. He arrived in a still wild, pre-agricultural Wisconsin that opened his eyes to what he called a 'paradise of birds'. For the first time he came to know the full intensity of continental climates, bitterly cold winters and steaming hot summers. The liberating intensity of that new environmental experience hooked him forever on wild things and he went off looking for more.

As frontier Wisconsin disappeared and was replaced by an agricultural landscape, Muir left for backwoods Canada, South America and the West Coast. He craved to walk under tall, dense trees, to feel around him thick, green vegetation that defied human order. Had he lived out his life in constricted Dunbar, Scotland, would he have ever become the world's leading voice for wilderness? Surely not.

The place that Muir eventually learned to call home was a valley north of San Francisco, a quiet, sheltered sanctuary of vineyards and orchards rimmed by coastal hills. Here winter never came and here fruits grew as abundantly as in the fabled Garden of Eden. Whenever he wandered away from that sheltering valley, his favourite haunts were places like Yosemite and Hetch Hetchy, also Edenic valleys where one could feel safe and secure in the bosom of nature. In these places, Muir found it difficult to think of nature as a harsh or dangerous force. Here in this golden place, wilderness and Eden seemed one and the same.

Conclusions

Nature comes to people in many forms and wears many faces. People take different paths through the landscape, arriving at different destinations, and consequently they end up holding different views of what nature is and what it offers.

John Wesley Powell and John Muir shared a common sensitivity towards the outdoors that was unusual even among their contemporaries. Nevertheless, they were not altogether unique in that sensitivity. North American history is full of people who became excited by the immense size, richness and diversity of the continent and became intensely attached to the places they helped create from it.

Recent biographies of such U.S. environmental greats as Aldo Leopold, Rachel Carson, Frederick Law Olmsted, Gifford Pinchot and George Perkins Marsh have begun to improve our understanding of how that material experience developed and how it affected politics and ideas. Each of those persons experienced nature profoundly, and each in a distinctive way.[10]

Beyond such eminent, influential environmental thinkers lies a multitude of other people, some prominent, some obscure, some rich, some poor, some female, some male. On them too, outdoor nature has had an impact, personal and individual – an impact that we need to know more about – but an impact that varies from individual to individual.

To give us a fuller understanding of the past, I believe historians must begin not only to think ecologically but also to think ecologically *on many scales*. They must see that individuals as well as societies are shaped by natural as well as cultural influences.

Biographers often end up admitting that any human being's life is more complex than we can ever understand or explain. However, biographers should also admit that any human life is more complex than the sum of its social relations. Human life has a material and a biological foundation and it has an ecological and an economic context; that context can be as small as a farm or city block or as wide as a continent or planet. In some cases that individual life may be affected by the presence of rivers running across the land, in others by the presence of deserts, in still others by the bland security of a suburban lawn or the bustle and noise of a metropolis.

I want to end with one more way in which biography can enrich the work of the environmental historian. In the US we talk a lot about how the physical landscape changed dramatically over a short period of time, under the influence of ideas about Manifest Destiny or the economic logic of capitalism. We talk about disappearing grasslands or increasing pollution of rivers. We talk, as other nation's historians do, about the rise of a 'conservation movement' and the passage of many laws and policies. Nevertheless, often missing is what such environmental change looked like to a single individual who went through it. An environmentally attuned biography can recover a fuller and deeper sense of that change over time.

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10. Curt Meine, *Aldo Leopold: His Life and Work,* (Madison: University of Wisconsin Press 1988); Linda J. Lear, *Rachel Carson: Witness for Nature,* (New York: Henry Holt 1997); Mark Hamilton Lytle, *The Gentle Subversive: Rachel Carson, 'Silent Spring', and the Rise of the Environmental Movement*, (New York: Oxford University Press 2007); Witold Rybczynski, *A Clearing in the Distance: Frederick Law Olmsted and America in the Nineteenth Century*, (New York: Scribner 1999); Char Miller, *Gifford Pinchot and the Making of Modern Environmentalism,* (Washington: Island Press 2001); David Lowenthal, *George Perkins Marsh: Prophet of Conservation,* (Seattle: University of Washington Press 2000).

Powell and Muir lived through some of the biggest man-made transformations the North American environment ever underwent. They saw passenger pigeons flying in enormous flocks before they became extinct.[11] They saw a world without many farms and then one with farms stretching to the horizon. They watched a nation grow out of the soil, with big cities, vast industrial complexes, far-flung transportation networks and millions of private homes. Our own experience with environmental change today, tumultuous though it may have been, has surely been less radical than what they went through.

As a biographer I have been walking, at least in my imagination, with Muir through the abandoned cotton fields of the post-Civil War South or across the Central Valley of California while it was still glowing with gold and purple wildflowers instead of today's irrigated agribusiness. I hope that my readers will do the same when they travel through my book, that it will offer them an almost visual experience of environmental change and of its impact on people's minds and bodies. Floating down the Colorado River with Powell, before any dams were built, is an experience that we need to visualise and remember. The old river will never come again but it can be felt and sensed through the eyes of those who saw it in a more pristine state. We cannot fully assess what has happened to any environment or understand why it happened or appreciate what we have gained without going back into that past on a personal and intimate scale.

In the end biography does not produce any arguments or explanations on the larger scales that most historians try to understand. Instead, it helps us recover lost perceptions, forgotten emotions, the dense tangle of thoughts and feelings at the individual level. It analyses the impact of material forces, natural and man-made, on the individual life. We should not ask biography to do what only history can do. We should respect biography for its own abilities and allow it to flourish as part of our multi-scaled enterprise. We should acknowledge the value of what it can do that history cannot do so well.

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11. Mikko Saikku, 'Passenger Pigeon', in Robert Paehlke (ed.), *Conservation and Environmentalism: An Encyclopedia*, (New York and London: Garland 1995), pp. 513–14.

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The Nazis and the Environment – a Relevant Topic?

Frank Uekötter

It is not difficult to imagine that readers will respond to the title of this chapter with a good deal of irritation. They may be tempted to take the title question as a merely rhetorical one: would anyone bother to work on a topic that he or she sees as irrelevant? What is even worse, the title question seems to run counter to two axioms of historical research at the same time: first, that every author is free in his or her choice of topics; and second, that the Nazi regime deserves special attention in the light of the obscene human toll that it claimed. Of course, this author does not intend to challenge either of these two axioms and neither does he intend to discourage further research on the topic: in spite of a number of seminal publications in the last few years, significant gaps in our knowledge about the environmental history of the Nazi era remain.[1] And yet, the title question is more than tongue-in-cheek, for it forces one to inquire more deeply into the status of the topic: for whom is it relevant and in what ways? Is the history of conservation in Nazi Germany an untold story or rather one that is familiar, at least in its general pattern, to every student of the literature on the Nazi era? After all, the general situation of the German conservation movement in 1933 was by no means unusual. There had been an organised movement for the protection of nature since the turn

1. See Thomas Zeller, *Straße, Bahn, Panorama. Verkehrswege und Landschaftsveränderung in Deutschland von 1930 bis 1990*, (Frankfurt and New York: Campus 2002); Thomas Lekan, *Imagining the Nation in Nature. Landscape Preservation and German Identity, 1885–1945*, (Cambridge, Mass.: Harvard University Press 2003); Willi Oberkrome, '*Deutsche Heimat'. Nationale Konzeption und regionale Praxis von Naturschutz, Landschaftsgestaltung und Kulturpolitik in Westfalen-Lippe und Thüringen (1900–1960)*, (Paderborn: Schöningh 2004); Joachim Radkau and Frank Uekötter (eds.), *Naturschutz und Nationalsozialismus*, (Frankfurt and New York: Campus, 2003); Franz-Josef Brüggemeier, Mark Cioc and Thomas Zeller (eds.), *How Green Were the Nazis? Nature, Environment, and Nation in the Third Reich*, (Athens, Ohio: Ohio University Press, 2005). The author hoped to fill some of these gaps in his *The Green and the Brown. A History of Conservation in Nazi Germany*, (Cambridge and New York: Cambridge University Press, 2006).

of the century in many parts of Germany, with state agencies and civic associations striving to protect natural monuments and areas of scenic beauty and although this movement was not apolitical in the strictest sense, it was clearly uninterested in politics and especially in party politics. When political controversies arose at all in conservation circles, as they did in the general assembly of the Heimat association in the Palatinate region in 1931, the most popular plea was for harmony and reconciliation, two principles that were largely anathema to the divisive and often violent politics of the Weimar Republic: 'We do not want controversies, we want peace. We are not a party but non-partisan mediators ... The party seeks division, but we long for reconciliation ... Parties are saying: Marx, Lenin, Hitler. We are saying: Pestalozzi, Goethe, Mozart.'[2] Characteristically, contacts between conservationists and the Nazi party were almost nonexistent before 1933 and NSDAP membership was rare before the Nazis' seizure of power. Paul Schultze-Naumburg, a co-founder of the influential Bund Heimatschutz, was the only prominent conservationist to play a major role in the early Nazi movement and Schultze-Naumburg showed little interest in conservation issues in the 1930s because he concentrated his energies on cultural politics.[3] However, the traditional political abstinence was no longer a viable option after 1933 due to the Nazis' goal of achieving total control over societal action. Like many other movements, the conservation movement had to find a way to come to terms with the Nazi regime and to define a certain stance. But how could it do this?

It is helpful to consider the range of options that conservationists had in deciding their stance towards the Nazis. Open resistance was clearly out of the question, not so much for moral reasons as due to the tradition of political abstinence in the German conservation community. Resistance takes not only courage but also a strong political ethos and the latter was clearly lacking here. Furthermore, the conservationists were rather disappointed in the Weimar Republic: they had been vainly hoping for the passing of a Prussian conservation law and its nonappearance was a significant setback for a movement that had been making rapid advances before the First World War. The complete opposite, a seamless merger between the conservation and the Nazi movement, was no more likely either. After all, the Nazis clearly distinguished between members who had joined them before 1933 – the so-called 'old guard' (*Alte Kämpfer*) – and those who enlisted after their seizure of power: while the former enjoyed Hitler's sustained support even if they turned out to be corrupt, the latter were seen as mere opportunists. Given this background,

2. *Pfälzisches Museum – pfälzische Heimatkunde* 49 (1932): 84.

3. See Andreas Knaut, 'Zurück zur Natur! Die Wurzeln der Ökologiebewegung', Supplement 1 [1993] of *Jahrbuch für Naturschutz und Landschaftspflege*, (Greven: Kilda-Verlag, 1993): 54–60; and Norbert Borrmann, *Paul Schultze-Naumburg 1869–1949. Maler, Publizist, Architekt. Vom Kulturreformer der Jahrhundertwende zum Kulturpolitiker im Dritten Reich*, (Essen: Bacht 1989).

the dearth of pre-1933 contacts between the camps was a significant disadvantage: even if the conservationists had sought to embrace the Nazis wholeheartedly, it is unlikely that they would have succeeded in winning their unconditional support. While some of them did see themselves as quintessential Nazis, however, this cannot be said of the majority of conservationists. After all, the Nazis' rise to power led to changes in the political system that were a significant cause of irritation from the conservationists' viewpoint. Traditionally, German conservationists made a sharp distinction between the state, whose support and partnership they had always striven to enlist, and party politics, which was clearly not their cup of tea. As a result, they had to steer a path that lay somewhere between the extremes of resistance and devotion – an uncharted terrain that many groups were navigating. Somehow, they had to find a mode of coexistence with the Nazis and this inevitably implied many concessions and compromises. Needless to say, this search was anything but heroic and it was based on a mistaken view of the nature of Hitler's regime. Nevertheless, it was a search that was altogether typical for German citizens, especially members of the intellectual community, traditionally the core group of the German conservation community.

It is important to understand the complicated situation of the German conservation community, for such understanding is an effective antidote to the comic-book clichés that have dominated discussions, including some scholarly discussions, on the topic. If this community has taken longer than many other parts of German society to acknowledge its Nazi past, this has not been due to a hidden sympathy for the Nazis among today's environmentalists, rather the opposite: the staunchly leftist and antifascist stance of many current environmentalists nurtured the widespread feeling that there could not be any connection between conservation and the Nazis. If conservation was 'good' and the Nazis were 'bad', there could not have been any 'true' conservation in Nazi Germany. If, nonetheless, there was conservation at that time, it must have been something completely different from the environmentalism of our time. However, the stability of the Nazi regime was, to a great extent, due to its ability to accommodate divergent interests. While fanatics always constituted a small segment of the German population, there was a much larger group of people who felt that one could work with the Nazi regime even if one did not agree with it on every point. In any case, comic-book clichés are also open to moral criticism: thinking of conservation as 'good' and the Nazis as 'bad' and any connection between the two as 'strange' clearly betrays the crude and naïve essentialisation of 'eternal good' and 'universal evil' to which no serious scholar will want to subscribe.

Seen from this perspective, the history of conservation in Nazi Germany no longer appears as the scandalous and unique misstep that some scholars have depicted. Quite the contrary, it appears as a profoundly common phenomenon, as one more chapter in the everyday coexistence between the Nazi rulers and their

subjects. Conservationists may have erred in their evaluation of Hitler's intentions and they may have made decisions that one would not wish for in hindsight but, in that, they stand on a par with many other groups. For example, they did purge from their ranks members who were Jewish or deemed Jewish according to the Nazis' race-based definition but the same occurred effectively everywhere and the absence of sustained resistance against the purge among the conservationists was entirely typical. Environmental historians are therefore well advised to inquire more deeply into the rationale for studying the history of conservation in the Nazi era: is there something in this story that defines it as one worthy of special attention? Is there more to it than the usual search for a mode of coexistence that so many intellectuals were embarking on during that era? In short, is the subject really of special importance *for environmental historians* – or is it rather a topic that will be mostly of interest to historians interested in the fate of intellectuals in Nazi Germany?

For some time, historians have emphasised the ideological links between the conservation community and the Nazis. Briefly, the argument was that the ideology of conservation was so devoted to racist, anti-Semitic and *völkisch* stereotypes before 1933 that conservationists easily recognised like-minded spirits after the Nazis' rise to power, a realisation that paved the way for a seamless merger of conservation and Nazism. In order to sustain this argument, historians have combed the conservation literature for incriminating quotations and the results have seemingly sustained the verdict. Essays consisted of long compilations of appalling quotations, suggesting that the conservation community was tarnished to the core.[4] At first glance, the evidence seemed to be overwhelming. However, in recent years, researchers have shown otherwise: the picture that many of these early publications presented turned out to be misleading and in some respects utterly false.[5]

Doubts arose as soon as historians took on the task of checking the incriminating quotations in context. As it turned out, quotations of this kind were far less frequent than the first generation of scholars had suggested. Articles written in Nazi language were always in a minority and the lion's share of conservationist publications between 1933 and 1945 could be printed again today without arousing suspicion. Of course, this does not excuse the ugly excursions into racist and anti-Semitic clichés: it is appalling, to quote only one example, to read Hans Schwenkel declaring that 'the Jew does not know nature protection'.[6] In fact, it is

4. The most prominent advocates of this approach are Joachim Wolschke-Bulmahn and Gert Gröning. See e.g. Gert Gröning, 'Naturschutz und Nationalsozialismus', *Grüner Weg 31 a* 10 (1996): 4–25.

5. For some of the contributions that raised doubts about these readings, see the articles of Hansjörg Küster, David Blackbourn, Friedemann Schmoll, Ludwig Fischer, Klaus Fehn, Thomas Zeller and Andreas Dix in Radkau and Uekötter (eds.), *Naturschutz und Nationalsozialismus*. The following remarks were inspired by these contributions.

6. Hans Schwenkel, 'Vom Wesen des deutschen Naturschutzes', *Blätter für Naturschutz* 21 (1938): 74.

important to interpret quotations of this kind against the background of a literature largely free of ideologically charged language, for this indicates that ugly quotations were not simply the result of external pressure. One could write without bowing to Nazi language between 1933 and 1945 – a fact that makes the ugly articles all the more in need of explanation. However, this finding clearly shows that the simple research task of 'searching for the ugly quotation' was unproductive. In general, the conservation literature of the Nazi era stands out for its sheer normality. The distance from Nazi propaganda and hateful rhetoric was never made explicit, and for obvious reasons, but it was unmistakable.

Moreover, recent research has shown that there was a group of conservationists who simply focused on conservation issues in their publications and work and never made statements in a distinctly Nazi vein. This group was by no means a marginal or unimportant one. In fact, it even included the supreme conservation advisor of the Nazi era, Hans Klose, the director of the German National Conservation Agency (*Reichsstelle für Naturschutz*) from 1938. While his predecessor, Walther Schoenichen, repeatedly delved into Nazi rhetoric, stating in an article on outdoor advertising, for instance, 'that it would be a worthwhile cause for inquiry in how far this social-psychic disease [i.e. outdoor advertising] is the result of an infection with Jewish poison',[7] Klose's publications stood out for their lack of similar statements. What is more, Hans Klose became the director of a national agency in spite of the fact that he was never a member of the NSDAP. Obviously, it was not essential to have a clear ideological profile as a conservationist during the Nazi era, neither from the conservationists' nor the Nazi point of view.

Furthermore, a more thorough look at many incriminating statements showed that their interpretation was not as easy as early researchers thought. Many of these statements turned out to be contradictory or based on an erroneous reading of scientific facts.[8] Moreover, these contradictions were clearly not the result of individual errors but rather a reflection of the obvious difficulties of merging conservation and Nazism. As it turned out, there were a number of significant obstacles to the seamless merger of the two sets of ideas. One of these was the issue of Darwinism: while Darwinism, especially in its application to humans as Social Darwinism, was a key pillar of the ideology of National Socialism, nature protection has its problems with the concept of evolution to this day.[9] A second obstacle was the traditional preference of German conservationists for their regional homeland,

7. Walther Schoenichen, *Biologie der Landschaft*, Landschaftsschutz und Landschaftspflege 3, (Neudamm and Berlin: Neumann 1939), p. 76.

8. For a masterful exploration of this theme, see Ludwig Fischer, 'Die "Urlandschaft" und ihr Schutz', in Radkau and Uekötter (eds.), *Naturschutz und Nationalsozialismus*, pp. 183–205.

9. See Thomas Potthast, *Die Evolution und der Naturschutz. Zum Verhältnis von Evolutionsbiologie, Ökologie und Naturethik*, (Frankfurt and New York: Campus 1999).

captured in the frequent reference to the notion of *Heimat*.[10] While the Nazi state, based on the concept of the *Führer* state, was clearly a centralist one, conservationists often cherished regional loyalties and stressed the need for regional autonomy. More generally, sentiments within the *Heimat* community were clearly at odds with the Nazis, in that the latter enthusiastically embraced modern mass culture, from the radio to tourism. Since its inception in the nineteenth century, German nature protection, unlike that in other countries such as France and the United States, had shown a pronounced distaste for the touristic exploitation of nature and more generally an elite consciousness that looked down with condescension on the uncultivated masses. Finally, the conservationists encountered severe difficulties in paying tribute to the Nazis' anti-Semitism. The aforementioned quotations from Schwenkel and Schoenichen must not conceal the fact that anti-Semitic statements were extremely rare in the conservation literature and not without reason. For decades, the conservationists had regarded urbanisation and industrialisation as the key causes of the destruction of nature – and there was no way of shifting the blame to a small band of Jews. All in all, the conservation ethic and Nazi ideology appear as two sets of ideas with a considerable degree of divergence. They were not generally in opposition to each other – the lack of paths from the conservation community to resistance is a sad consequence of this – but rather two camps at a distance. Nazi ideology and conservation ideas were two systems of thought that focused on different themes with different goals, neither colliding fundamentally nor merging in a convincing way.

The best proof of this general distance in ideological terms is the lack of attempts to develop a quintessential Nazi brand of conservation. While Werner Heisenberg, the leading authority on nuclear physics in Nazi Germany, was plagued by the adherents of 'German physics' and Walther Frank provoked the rank and file of Germany's academic historians with his *Reichsinstitut für Geschichte des neuen Deutschlands*, which sought to rewrite German history in a Nazi vein, no similar attempt was made to define a distinct 'German conservation' as a competitor to the traditional notions.[11] This is all the more remarkable given that there were indeed attempts to set up conservation networks within the Nazi party that meant

10. The word 'Heimat' is one of those German words that are basically impossible to translate into a foreign language, implying reference to an area of indeterminate size, often a region, as well as implying romantic associations and a sense of cosiness. For some English-language publications that help in understanding the concept, see Elizabeth Boa and Rachel Palfreyman, *Heimat. A German Dream. Regional Loyalties and National Identity in German Culture 1890–1990*, (Oxford: Oxford University Press 2000) and Peter Blickle, *Heimat. A Critical Theory of the German Idea of Homeland*, (Rochester and Suffolk: Camden House 2002).

11. See Steffen Richter, 'Die "deutsche Physik"', in Herbert Mehrtens and Steffen Richter (eds.), *Naturwissenschaft, Technik und NS-Ideologie. Beiträge zur Wissenschaftsgeschichte des Dritten Reiches*, (Frankfurt: Suhrkamp 1980), pp. 116–41 and Helmut Heiber, *Walter Frank und sein Reichsinstitut für Geschichte des neuen Deutschlands*, (Stuttgart: DVA 1966).

competition with the existing state conservation networks. However, the motives behind these NSDAP-based initiatives were solely of a tactical nature. It is evident from the work of the NSDAP conservation representatives that their activity was no different from that of the state advisors; while the institutional basis differed, state and Nazi party conservationists embraced the same goals and methods. In fact, one of the most fervent Nazi conservationists, Hans Stadler of Franconia, explicitly denied any intention to develop a distinct Nazi style of conservation. When a local conservationist asked him whether party membership was mandatory to join his network of conservation representatives, Stadler vigorously denied any preference for party members: 'There has not been any talk about party membership in Franconian conservation, for a tree or a quarry cannot stand right or left politically, but will always remain neutral.'[12] Clearly, the ideological rapprochement between Nazi ideology and conservation ideas remained incomplete: from the conservationists' point of view, Nazi ideology was mostly useless in the light of the daily challenges they faced. It did not produce significant obstacles to their work but neither did it help in any significant way.

It is interesting that this party-based conservation network has so far escaped the attention of environmental historians of the Nazi era. If they looked at the day-to-day work at all, they usually focused on the national level, most prominently on the National Conservation Agency under Schoenichen and Klose.[13] In part, this was due to the fact that the agency's files are easily accessible to researchers in the form of deposit B 245 of the German *Bundesarchiv*, of which microfiches are for sale at minimal cost. As a result, conservation history is mostly written 'from above': researchers are adopting the perspective of the national institutions rather than questioning their relevance. When one goes through the files of the regional authorities, the fallacy of this approach becomes obvious: most of the action was on the regional level and much depended on the regional setting of conservation policy. In contrast, initiatives from the National Conservation Agency influenced local action only to a limited extent, in spite of a blizzard of decrees and inquiries from Schoenichen and Klose. In fact, it seems that the multitude of directives contributed significantly to the lacklustre reaction of the conservation administration's rank and file. After all, who could meticulously observe instructions from an agency that seriously asked people, in a letter from August 1937, to search the regional ponds and rivers for remaining species of *Hirudo medicinalis* – better known to a disgusted public as leeches. Obviously unafraid of making a fool of himself, Schoenichen also sent instructions on how to catch leeches: conservation advisors should search for shallow waters with a lot of vegetation, bare their legs and 'slowly

12. Der Regierungs-Beauftragte der NSDAP für Naturschutz in Unterfranken to Hauptlehrer Hoch in Ebern, 11 March 1935, Landratsamt Ebern No. 1336, Staatsarchiv Würzburg (hereafter StAW).

13. Lekan, *Imagining*, is a noteworthy exception.

wade into the water, lifting their feet every one or two minutes'. Schoenichen even sent instructions on how to mail the catch.[14]

The files of regional conservation administrations have been used only infrequently to study the environmental history of the Nazi era. However, these files provide a multitude of new perspectives on the general topic and they urge reconsideration of the general patterns that have guided research so far. Once more, the surviving files show the inadequacy of an approach that focuses on ideological themes. Most of them are completely devoid of Nazi ideology and instead continue with the themes and issues that were prevalent in the 1920s into the 1930s. In fact, even the exceptions raise doubts about the possibility of a convincing merger of conservation and Nazi ideology, for these attempts often bordered on the absurd. A prime example is a letter written by Hans Stadler in 1937, in which he claimed that '*Holzjuden*' – Jewish merchants specialising in the timber trade – had bought and processed 'the last of the strong oaks and the last of the beautiful walnut trees' in the region and were now seeking to exterminate the pear trees.[15] Even by the excessive standards of the Nazis, it was far-fetched, not to say lunatic, to imagine a conspiracy for the extermination of pear trees. Characteristically, the initiative remained without tangible results.

Crucially, a look 'from below' exposes the twisted road leading towards the rapprochement of the conservationists and the Nazi regime. It is clear from the files of regional and local conservationists that the alliance between the two camps was anything but love at first sight. It is interesting to note, for example, that while ardent Hitlerites were planting countless 'Hitler Oaks' and 'Hitler Lindens' during the first months of Nazi rule, the conservation literature was notably silent on this activity.[16] It would take a while for the conservationists to realise that initiatives of this kind might also be welcome from a conservation standpoint: in 1938, Wilhelm Lienenkämper, one of the more flamboyant regional conservationists of the Nazi era, declared that ceremonial tree plantings were 'concordant with the spirit of the Führer'.[17] In fact, even the ideologically charged statements in conservation journals in 1933 look different if one reads them bearing in mind contemporary efforts to streamline the conservation organisations in the process of *Gleichschaltung*. Incorporated on 27 July 1933, the Reich League for National Character and *Heimat* (*Reichsbund Volkstum und Heimat*, or *RVH*) was set up to unite all associations in the fields of conservation, regional culture and the preservation of historic monuments.

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14. BR 1011 No. 43 p. 185, Hauptstaatsarchiv Düsseldorf (hereafter HStAD).

15. Der Regierungsbeauftragte für Naturschutz in Unterfranken to the Bezirksbeauftragten für Naturschutz in Mainfranken, 12 March 1937, Landratsamt Ebern No. 1336, StAW.

16. Ian Kershaw, *The 'Hitler Myth'. Image and Reality in the Third Reich*, (Oxford: Clarendon Press 1987), p. 55.

17. Wilhelm Lienenkämper, *Das Naturschutz-ABC,* p. 9; LWL Best. 702 No. 184b vol. 2, Westfälisches Archivamt Münster (hereafter WAM).

Once again, it is interesting to note the dearth of discussions of *Gleichschaltung* in the literature. In fact, some researchers have even asserted that the conservation community merged willingly into the RVH,[18] but this reveals little more than their ignorance of the proceedings on the local level: few organisations, if any, were looking forward to the streamlining of civic activities and many considered it an intrusion of almost traumatic proportions.

Several factors contributed to the feelings of scepticism, if not hostility, among conservationists about the Nazis' plans. First, the German conservation movement was traditionally more fragmented than that of other countries and organisational autonomy was tantamount to a good in itself. Skirmishes between conservation groups had been more than an occasional phenomenon since the early 1900s and the prospect of a forced merger was clearly unpopular in the light of these long-standing animosities. Secondly, the arrogant behaviour of the RVH's organisational leader, Werner Haverbeck, increased the scepticism of the conservationists' rank and file. Being only 23 years old when he became secretary of the RVH and distinguished only through his work in the Hitler Youth and the Nazi student body, Haverbeck was clearly not in a position easily to win the hearts of a tradition-loving community of intellectuals. Thirdly, attitudes turned from scepticism towards hostility when it became clear that Haverbeck had different goals from the traditional members. While the latter saw the middle classes, and especially intellectuals, as their primary audience, Haverbeck sought an aggressive organisation that focused on youth and the working class. His penchant for centralism was also at odds with the movement's cherished regionalism.[19]

Of course, the hostility of the conservation community never led to open rebellion, for there can be no doubt that it would have been the loser in an open confrontation with the Nazi regime. Rather, it tacitly sought to fend off intrusions into its internal affairs, hoping that Haverbeck would be unable to win complete control over a membership base that amounted to some five million by the end of 1933. It is revealing that the Bavarian Conservation League (*Bund Naturschutz in Bayern*) approached the president of the RVH, Karl Alexander von Müller, only three months after its foundation in order to win guarantees of institutional autonomy. A historian at Munich University, Müller was a member of the Bavarian Conservation League, perhaps the most popular German conservation association of its time and he readily made the desired promise. It is even more revealing that the League quickly informed its branch officers and regional representatives of Müller's state-

18. Gert Gröning and Joachim Wolschke-Bulmahn, 'Landschafts- und Naturschutz' in Diethart Kerbs and Jürgen Reulecke (eds.), *Handbuch der deutschen Reformbewegungen 1880–1933*, (Wuppertal: Hammer, 1998), p. 30.

19. See Karl Ditt, *Raum und Volkstum. Die Kulturpolitik des Provinzialverbandes Westfalen 1923–1945*, (Münster: Aschendorff 1988), p. 214.

ment that there would be 'no change in the association's internal business', along with a request to bring any violations to the attention of the executive committee.[20]

It is therefore easy to imagine that German conservationists breathed a collective sigh of relief when Haverbeck was discharged as secretary of the RVH on 20 October 1934, after an audit had raised doubts about his conduct in office; the move trigged the collapse of the organisation in the following months. At the same time, however, this event did little to build trust and confidence in the Nazi regime: it was the end of a project that conservationists had always opposed but it implied no commitment for the future. All in all, the conservation community seemed set for a stance that Martin Broszat has called *Resistenz*: a distance from the Nazi regime based on a distinct set of thoughts. Broszat carefully distinguished between open resistance and *Resistenz*: the latter could lead to the former but did not necessarily do so and, in fact, did not in most cases. However, it imposed limits on the Nazis' rule and that is what made it an important part of the history of Nazi Germany.[21] In such a scenario, the conservation movement would have continued with its usual business as independently as possible, accepting that the Nazis were conducting their own business at the same time. In fact, most conservation work in the first two years of Nazi rule followed such a line of reasoning: emphatic declarations that 'there is no need for internal change' were thinly veiled proclamations of 'business as usual'.[22] However, this did not continue, for the distance between the conservation community and the Nazi regime shrunk dramatically after the passage of the national conservation law in June 1935. The change of mind was almost instantaneous and it was dramatic: a movement that had seen the Nazis mostly as intruders into its internal matters now came to celebrate the Nazi regime enthusiastically as one that understood the need for nature protection – unlike the earlier Republic of Weimar.

The provisions of the national conservation law have been discussed extensively elsewhere and there is no need to repeat these findings here.[23] Suffice it

20. Bund Naturschutz in Bayern to the Gruppenvorstände and Vertrauensmänner, 10 October 1933, Landratsamt Bad Kissingen No. 1237, StAW.

21. See Martin Broszat, 'Resistenz und Widerstand. Eine Zwischenbilanz des Forschungsprojekts', in Martin Broszat, Elke Fröhlich and Anton Grossmann (eds.), *Bayern in der NS-Zeit* vol. 4, (Munich: Oldenbourg 1981), p. 697.

22. Susanne Falk, '"Eine Notwendigkeit, uns innerlich umzustellen, liege nicht vor". Kontinuität und Diskontinuität in der Auseinandersetzung des Sauerländischen Gebirgsvereins mit Heimat und Moderne 1918–1960', in Matthias Frese and Michael Prinz (eds.), *Politische Zäsuren und gesellschaftlicher Wandel im 20. Jahrhundert. Regionale und vergleichende Perspektiven*, (Paderborn: Schöningh 1996), pp. 401–17.

23. See Edeltraud Klueting, 'Die gesetzlichen Regelungen der nationalsozialistischen Reichsregierung für den Tierschutz, den Naturschutz und den Umweltschutz', in Radkau and Uekötter (eds.), *Naturschutz und Nationalsozialismus*, pp. 77–105; and Charles Closmann, 'Legalizing a *Volksgemeinschaft*. Nazi Germany's Reich Nature Protection Law of 1935', in Brüggemeier, Cioc and Zeller (eds.), *How Green*, pp. 18–42.

to say that the conservationists were jubilant for more than one reason. First, the law's passage stood out against the background of the failure of a Prussian law in the 1920s. To be sure, other German states did pass conservation laws during the Weimar years: Lippe in 1920, Anhalt in 1923 and Hesse in 1931.[24] However, Prussia was by far the largest state and the law's failure, in spite of a resolution of the Prussian parliament of 1920 that demanded the introduction of such a law, was a painful experience for many conservationists.[25] Secondly, the law seemed to imply a promise that conservation enjoyed the support of the most powerful. After all, laws could be passed in Nazi Germany simply by means of a cabinet decision and conservationists were quick to point out that this one also implied a display of Hitler's personal will. 'I specifically draw your attention to the fact that the national conservation law was created upon the initiative of the Führer', a conservation advisor declared in 1938.[26] Conservationists also praised Hermann Göring, whose support was instrumental in the law's passage and who secured control of German conservation as head of the German Forest Service in the process.[27] 'Now Göring has taken conservation into his own strong hands; he has given a legislative backbone to our concerns', the Bavarian Conservation League declared.[28] Thirdly, the law included a number of important provisions for the protection of nature that made it, in the words of Charles Closmann, 'one of the industrialized world's most wide-ranging conservation laws'.[29]

Nothing substantiates Closmann's statement better than the feverish efforts at implementation that immediately followed the passage of the law. The archival files, which grew significantly in size after 1935, witnessed a boom in conservation work that persisted far into the Second World War – and it was not mere paperwork. In many regions, there was a dramatic increase in the number of nature reserves after 1935. The conservation advisor Karl Oberkirch reported that the

24. Roland Siekmann, *Eigenartige Senne. Zur Kulturgeschichte der Wahrnehmung einer peripheren Landschaft*, (Lemgo: Landesverband Lippe 2004), p. 343; Walther Schoenichen and Werner Weber, *Das Reichsnaturschutzgesetz vom 26. Juni 1935 und die Verordnung zur Durchführung des Reichsnaturschutzgesetzes vom 31. Oktober 1935 nebst ergänzenden Bestimmungen und ausführlichen Erläuterungen*, (Berlin-Lichterfelde: Bermühler 1936), p. 125; G 21 A No. 8/21 and G 33 A No. 16/6, Staatsarchiv Darmstadt (hereafter StAD).

25. *Sitzungsberichte der verfassunggebenden Preußischen Landesversammlung, Tagung 1919/21*, vol. 9 (Berlin, 1921), col. 11782n.

26. Landschaftsbund Volkstum und Heimat, Gau Hessen-Nassau to the Ortsringleiter, 4 June 1938, G 38 Eudorf No. 47, StAD.

27. See Hans Günter Hockerts and Friedrich P. Kahlenberg (eds.), *Akten der Reichskanzlei. Die Regierung Hitler vol. II: 1934/35, Teilband 1: August 1934–Mai 1935. Bearbeitet von Friedrich Hartmannsgruber*, (Munich: Oldenbourg 1999), p. 556n.

28. Bund Naturschutz in Bayern to the Gruppenführer and Vertrauensmänner, 28 August 1935, Landratsamt Bad Kissingen No. 1237, StAW.

29. Closmann, 'Legalizing', p. 23.

number had doubled in the Ruhr region within two years of the law's passage.[30] In Schleswig-Holstein, Walther Emeis reported twelve new nature reserves in 1938, while half a dozen designations were still pending: there had been ten reserves in the province in 1935.[31] Wilhelm Lienenkämper filed papers for nineteen reserves in his Sauerland region between 1936 and 1938.[32] In Württemberg, the authorities created 46 reserves with a total area of 12,995.3 hectares between 1937 and 1943, while Baden designated 58 reserves during the same time span.[33] While figures on the national level are unavailable, due to the loss of files during the Second World War, the general trend is clear: never in German history had so many nature reserves been designated within such a brief period of time.

This finding is all the more remarkable since the legal option to designate nature reserves was not new in itself. It had existed in Prussia since 1920 under the provisions in the Field and Forest Police Law and although this appeared in retrospect as 'an undignified state of affairs in that it offered only a back door to the important cause of conservation', it provided conservationists with an important legal tool.[34] However, the national conservation law not only reiterated the administration's right to designate nature reserves, it also facilitated the process. In practice, prospective nature reserves often implied limitations on land use, such as a ban on clear-cutting in forests. Understandably, property owners often asked for compensation if restrictions of this kind implied significant costs and negotiations often turned into prolonged and painful exercises. It was thus of great significance that the national conservation law incorporated a new approach to the tricky issue of compensation, in that Paragraph 24 generally ruled out indemnity for measures taken in its execution. In other words, the administration could now designate a nature reserve or prohibit alteration of the landscape and the owners of the land would not be able to sue for monetary compensation.[35] The rationale behind this regulation was the Nazi notion that collective interests should reign above individual

30. Naturdenkmalpflege und Naturschutz im Gebiete des Siedlungsverbandes Ruhrkohlenbezirk. Tätigkeitsbericht des Bezirksbeauftragten für Naturschutz in Essen für die Geschäftsjahre 1935/36 und 1936/37, p. 5, RW 24 No. 961, HStAD.

31. Walther Emeis, 'Der gegenwärtige Stand des Naturschutzes in Schleswig-Holstein', *Die Heimat* 48 (1938): 142–45.

32. Tätigkeitsbericht des Bezirksbeauftragten für Naturschutz im Regierungsbezirk Arnsberg für die Geschäftsjahre 1936/37 und 1937/38, p. 4, LWL Best. 702 No. 184b vol. 2, WAM.

33. Häcker, Bärbel, *50 Jahre Naturschutzgeschichte in Baden-Württemberg. Zeitzeugen berichten*, (Stuttgart: Ulmer 2004), p. 28.

34. Schoenichen and Weber, *Reichsnaturschutzgesetz*, p. 3n.

35. See *Ibid.* p. 112n; and F. Kersten, 'Naturschutz', *Juristische Wochenschrift* 64 (1935): 3603.

ones, epitomised in the slogan, 'The common good above the individual good' (*Gemeinnutz vor Eigennutz*) in point 24 of the NSDAP's party platform of 1920.[36]

It was only with the help of this legal tool that conservation work gained momentum during the Nazi era. Interestingly, the key dynamics for this process came from below. Walther Schoenichen and Werner Weber called for 'considerate treatment of the individuals concerned' in their authoritative commentary on the national conservation law, noting that 'the idea of conservation should not triumph on the basis of the destroyed or badly damaged lives of National Comrades'.[37] However, regional conservationists quickly moved beyond such calls for caution. After all, the new legal options were just too tempting not to be used: conservation officials could now point to Paragraph 24 if a property owner was unwilling to yield to their demands, a comfortable situation that contrasted sharply with the painful negotiations of earlier years. To be sure, conservationists still guaranteed compensation if their demands implied severe intrusion into an individual's property rights but it was compensation of a different character: it became an act of grace that they could grant in their own right rather than an individual right that the owners possessed. It should come as no surprise that compensation payments were only a fraction of the market price: in the case of the Westrup Heath nature reserve on the northern fringe of the Ruhr region, the conservation administration offered 21,000 Reichsmarks for some fifty hectares of farmland that the owner had been about to sell to the local waterworks for 60,000 Reichsmarks. After two tough rounds of negotiations, the farmer managed to increase the indemnity payment to 32,000 Reichsmarks but even this settlement involved a serious loss to a farmer who was obviously in financial trouble.[38] For the regional conservationists, Paragraph 24 became something of a magic wand: it was not used indiscriminately but it was at hand whenever trouble with a property owner arose. Little wonder that the Bavarian Conservation League felt in 1935 that the clause was 'of great importance for future enforcement'![39]

It is revealing that the surviving files rarely provide evidence of significant doubts about this practice. One exception was the closure of a quarry on the southwest German Hohenstoffeln mountain, a decision that was celebrated by conservationists in all parts of Germany but that also rendered the mining company's investments in the quarry worthless almost overnight; no less an authority than

36. Walther Hofer, *Der Nationalsozialismus. Dokumente 1933–1945*, (Frankfurt: Fischer 1957), p. 31.

37. Schoenichen and Weber, *Reichsnaturschutzgesetz*, p. 114.

38. See proceedings in LWL Best. 702 No. 185, WAM.

39. Bund Naturschutz in Bayern to the Gruppenführer and Vertrauensmänner, 4 December 1935, Landratsamt Bad Kissingen No. 1237, StAW.

Hans Klose considered the decree essentially an act of 'expropriation'.[40] However, Klose's statement was ineffective, both in the context of the Hohenstoffeln case and more generally. Even after 1945, books and articles on conservation issues were notably silent on Paragraph 24. In fact, the conservation administration in the state of North Rhine-Westphalia used this clause as late as 1949 in order to fend off compensation claims from a mining company in the Sauerland region.[41] Characteristically, Paragraph 24 was never formally rescinded: it merely became invalid as a by-product of the passage of the West German constitution (*Grundgesetz*) in 1949, Article 14 of which included a general ban on the confiscation of property without proper compensation.[42]

Thus, the boom in conservation work in the Nazi era had an ugly underside: it was based on, and intrinsically linked to, the routine violation of property rights. This story is of more general relevance, however, for the blatant violation of civic rights was also an instructive litmus test of the dominant mindset in conservation circles. Interestingly, the widespread use of Paragraph 24 went along with an almost complete absence of discussion and remarks in the administrative files. Even in the case of the Westrup Heath nature reserve, in which there can be no doubt that the paragraph played an important role, the surviving records do not include any reference to the clause and Karl Oberkirch simply noted in his annual report that there had been 'difficult negotiations' without being more specific.[43] In other words, it is highly probable that many conservationists did sense that they were crossing a sensitive threshold with their pervasive use of Paragraph 24 – but they still pursued their course of action. For the conservationists, the goal was to create as many nature reserves as possible and all other concerns were issues of secondary relevance at best.

The issue of compensation claims was not the only consequence of this dubious political morality and probably not even the gravest one. In the amorphous institutional network of the Nazi regime, an effective policy required not only a willingness to stretch legal provisions to the limits but also the readiness of other institutions to cooperate with the administration in question. Once again, the national conservation law seems to have had the effect of elevating the status of conservation in that many parties now sought to embrace the conservation

40. Der Direktor der Reichsstelle für Naturschutz to Ministerialrat Asal of the Ministerium des Kultus und Unterrichts, 7 May 1940, Abt. 235 No. 48275, Generallandesarchiv Karlsruhe (hereafter GLAK).

41. NW 60 No. 694 p. 14R, HStAD.

42. Werner Schubert, 'Zur Entwicklung des Enteignungsrechts 1919–1945 und den Plänen des NS-Staates für ein Reichsenteignungsgesetz', *Zeitschrift der Savigny-Stiftung für Rechtsgeschichte*, Germanistische Abteilung 111 (1994): 522.

43. Naturdenkmalpflege und Naturschutz im Gebiete des Siedlungsverbandes Ruhrkohlenbezirk. Tätigkeitsbericht des Bezirksbeauftragten für Naturschutz in Essen für die Geschäftsjahre 1935/36 und 1936/37, p. 8, RW 24 No. 961, HStAD.

drive, rather than to ignore it or fight it tooth and nail. To give just one example, the leader of the Westphalian peasantry (*Landesbauernführer*) argued for a joint project between the conservation and agricultural authorities in 1936 'in order to identify what is truly worthy of protection and then save as much of it as possible without jeopardising the overarching goal of a secure food supply'.[44] The policy of building alliances turned out to have its pitfalls in retrospect, however. Among the Nazi leaders, conservation enjoyed not only the temporary favour of Hermann Göring, but also the support of a second figure of even more infamous memory, Reichsführer-SS Heinrich Himmler, the leader of the infamous *Schutzstaffel* (*SS*) and the German police.

Formally, Himmler had no jurisdiction over conservation issues and it seems that he never sought to change this situation. However, in his position of command over the *SS*, the backbone of the German police state, he was in a position to exert significant pressure. For example, it was he who started the decisive initiative for rescuing the aforementioned Hohenstoffeln Mountain. On 14 December 1938, he sent a letter to Hermann Göring as the supreme conservationist in Nazi Germany urging him to protect the mountain in its entirety.[45] Göring reacted swiftly with a decree that ruled an end to all mining operations on the Hohenstoffeln, thus closing a quarry that conservationists had been fighting over for almost three decades.[46] Even after 1945, Hans Klose did not find this alliance dubious: 'Given the situation in 1938, it was a very clever move of the Hohenstoffeln's friends to use the influential Herr Himmler as an instrument for a good cause. Nobody will want to blame us for that.'[47] In fact, Klose saw the Hohenstoffeln story as a promising precedent when conservationists in the south-western corner of Germany became involved in another vigorous battle during the Second World War, the conflict over the Wutach gorge. Designated a nature reserve in 1939, the gorge was threatened by a hydroelectric power project that would rob it of most of its water. After more than a year of bitter conflict, the German Forest Service finally overruled the objections of the regional conservationists and gave its consent as the supreme German conservation authority. Instead of accepting this bitter defeat, however, the conservationists sought to re-open their channel to Heinrich Himmler in order to induce another favourable intervention from the Reichsführer-SS. 'If there is any path to success, it goes via the SS', Hans Klose wrote in a letter to Ludwig Finckh,

44. Landesbauernschaft Westfalen, Der Landesbauernführer to the chair of the Heimat- und Naturschutz-Ausschuss des Sauerländischen Gebirgsvereins, 17 December 1936, LWL Best. 702 No. 191, WAM.

45. RSK II No. I 107 pp. 1584-86, Berlin Document Center, Bundesarchiv Berlin (hereafter BArch).

46. Telegram to the Höhere Naturschutzbehörde Baden, 24 December 1938, Abt. 235 No. 48275, GLAK.

47. B 245/3, p. 54r, BArch.

the key player in the Hohenstoffeln conflict. Enthused by the power play behind the scenes, Klose even dreamed of securing the personal decision of the Führer on the Wutach's fate.[48] No one wondered whether it was really a good idea to contact a person who at that time was not only the leader of the German police state, but also the chief organiser of the Holocaust.

Forceful intervention from Himmler never materialised but that does little to excuse the conservationists' action. Neither can it be excused as the result of individual error: after all, it is clear that the course of action was the direct result of a dominant mindset that encouraged conservationists to use every lever they could get hold of and to forget about the rest. It was, after all, not a plot that could be attributed to ideological fanatics. Quite the contrary: Hans Klose had always stood out for his ideological abstinence and the same holds true for Hermann Schurhammer, the second key actor as conservation advisor for the state of Baden. Schurhammer's memorandum on the Wutach of November 1942 was completely devoid of Nazi rhetoric.[49] Once again, the limited role of ideological concerns in the environmental history of the Nazi era is clear. It did not matter whether Klose and Schurhammer thought in a way that was similar to Himmler – in fact, indications are strong that both held views far removed from the racist world of Heinrich Himmler. What mattered was that Himmler was in a position to reverse an unfavourable decision and this was the *only* thing that mattered. The political ethos of Nazi-era conservation showed its ugly side.

The environmental history of the Nazi era thus provides a prime example of the importance of 'thinking through the environment'. Consideration of the topic in a methodologically refined way is important and in fact essential if one wishes to avoid simplistic clichés of 'good conservationists' and 'evil Nazis'. The differentiation between levels of analysis turns out to be crucial: while conservation and National Socialism never truly coincided on the ideological level, practical cooperation between the conservationists and the Nazi regime occurred with surprising ease. After the passage of the national conservation law, the conservationists celebrated the Nazi regime as the fulfilment of their ultimate dreams and not without reason: the new law empowered them to do things that they could not have done in a free democratic society. Moreover, the fact that the ensuing conservation practice ran counter to both civic rights and moral decency was of little concern to the conservation community even after 1945.

At the same time, such nuances provide a new approach to the issue of 'lessons from history' that has always been part of the research agenda in this field. So far, historians have mostly searched for lessons on the ideological level and the results

48. B 245/6, p. 182r, BArch.

49. Hermann Schurhammer, Das Wutachtal als Naturschutzgebiet und das Schluchseewerk. Gutachten der Landesnaturschutzstelle Baden, Kolmar, 30 November 1942, Abt. 235 No. 48295, GLAK.

have not been very convincing. Some authors have argued that the current debate on non-native species follows upon Nazi traditions but that argument is clearly based on a narrow reading of the sources.[50] There was always a considerable range of opinions on non-native species in Nazi Germany and most conservationists took a pragmatic stand that would have been unthinkable if the issue had really been seen as ideologically sensitive: the National Conservation Agency even approved a subsidy for a nature reserve that consisted mostly of trees of foreign origin.[51] Anna Bramwell's attempt to identify a 'green party' in Nazi Germany and to link it to the environmental movement of the 1980s turned out to be no more convincing: scholars as diverse as Raymond Dominick, Gustavo Corni and Gesine Gerhard have taken issue with Bramwell's reading and her argument is clearly discredited at this point.[52] In spite of these dismal results, historians have continued to search for lessons mostly on the ideological level and the tendency has become even more popular in recent years: at no time have so many conservationists been blamed for being in sympathy with the Nazis – and at no time have the criteria for such blame been as dubious as today. Even a conference organised under the auspices of the German Minister for the Environment, Jürgen Trittin, a leftist member of the Green Party, has been accused of 'whitewashing' the Nazi regime.[53]

It may be advisable to shift the general focus in the quest for lessons from the Nazi experience. Rather than seeking ideological parallels that are doubtful at best, historians are well advised to focus on the practical conservation work carried out during the Nazi era, for it is clear that the boom after 1935 was based on the readiness of many conservationists to cross a sensitive threshold. It would be even more useful, and more rewarding, to discuss the activities of Klose and Schurhammer in the Wutach conflict, for this reveals a disturbing fact: one did not have to be an ideological fanatic to cooperate with the Nazis. One did not have to be a racist and anti-Semite; in fact one did not even have to adopt racist rhetoric or anti-Semitic clichés at all to enjoy a close relationship with the Nazi regime. All that it took was

50. Gert Groening and Joachim Wolschke-Bulmahn, 'Some Notes on the Mania for Native Plants in Germany', *Landscape Journal* 11 (1992): 125.

51. B 245/101, p. 101, BArch. For a more general critique, see Frank Uekötter, 'Native Plants: A Nazi Obsession?' *Landscape Research* 32 (2007): 379–83.

52. See Gesine Gerhard, 'Richard Walther Darré – Naturschützer oder 'Rassenzüchter'?' in J. Radkau and F. Uekötter (eds.), *Naturschutz und Nationalsozialismus*, pp. 257–71; Raymond H. Dominick, 'The Nazis and the Nature Conservationists', *The Historian* 49 (1987): 522; and *Neue Politische Literatur* 31 (1986): 501–4 for Gustavo Corni's review. For Bramwell's original argument, see Anna Bramwell, *Blood and Soil. Walther Darré and Hitler's Green Party*, (Abbotsbrook: Kensal Press 1985); and Anna Bramwell, *Ecology in the 20th Century. A History*, (New Haven and London: Yale University Press 1989).

53. Joachim Wolschke-Bulmahn, 'Zu Verdrängungs- und Verschleierungstendenzen in der Geschichtsschreibung des Naturschutzes in Deutschland', in Uwe Schneider and Joachim Wolschke-Bulmahn (eds.), *Gegen den Strom. Gert Gröning zum 60. Geburtstag*, (Hanover: Institut für Grünplanung und Gartenarchitektur, 2004), p. 331.

a narrow focus on conservation issues – and a readiness to forget about the rest. As it turned out, most conservationists found that this was an acceptable price – and if the demands of conservation made it advisable to contact the leader of a network of terror, that was simply seen as a legitimate move. The history of conservation in Nazi Germany provides a sober reminder that thinking about the environment is intrinsically linked with thinking about democracy and human rights.

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PART II

Cultural Perceptions of Landscapes

~ 4 ~

The Culture of Space: Temporal Precincts of a Vernacular Architecture in the Chittagong Hills

Dilshad Rahat Ara

Introduction

The vernacular built environment – a shared built landscape – once viewed from a purely technological standpoint, has recently re-emerged as a field with multi-faceted potential that can provide cues to explore the bond between man and the environment in which he intervenes – conceptual and physical. It has long been acknowledged in anthropology that the perception and spatial behaviour of one culture differ widely from those of another. Yet interpretation of 'space', which is of concern to both the anthropologist and the architect, remains biased, delimited or tightly fitted within the constraints of disciplinary boundaries. Although architects focusing on vernacular architecture have publicly recognised the contribution of anthropology in reconstructing spatial reality within a culturally prioritised built context, avenues remain unexplored for a holistic construction of spatial identity built upon a culture-specific framework.

This chapter elucidates the use of space and its perception in a hill dwelling settlement in the Chittagong Hills. This is a region in south-eastern Bangladesh – a borderland between Bangladesh, Myanmar and India. Although distinctive for its rich diversity of cultural practices, this peripheral region has not been part of any serious study on architecture linked to the socio-cultural practices of the ethnic groups who reside there. The chapter is an attempt to reinstate this connection. Interestingly this region sustains and also defies its identity as a 'cultural area' since each fragmented cultural group has its own distinctive approach to the planning and construction of buildings. This chapter is an inquiry into the vernacular stilt dwellings of the vulnerable Mru people, who share a cultural-geographic location

with other allied groups in the indeterminate cultural landscape of the Chittagong Hill Tracts (CHT).

This chapter stresses that, as vernacular builders structure spaces in the built environment according to social norms, once constructed, the built environment provides cues to behave in a particular order consonant with the prescribed habits of a culture. Hence vernacular 'product' analysis is incomplete without vernacular 'process' analysis, as the circularity characterising cultural matters is also manifested in the built environment. The investigation interprets space and its boundaries from the perspective of the builders and users and brings to light how both physical elements and fixtures and tacit cognitive structure implanted in the habits of the dwellers interact toward the creation of a meaningful space.

To avoid subjective speculations, the text examines these issues while focusing on feedback from primary fieldwork carried out in the Chittagong Hill Tracts (CHT) in 2002–2003. The findings suggest a cross-disciplinary approach is invaluable in eliciting and interpreting the meaning of vernacular architecture.

Architects and vernacular architecture: the methodological dilemma

Formal architectural knowledge has certain advantages in the study of vernacular architecture.[1] Verbal notes alone cannot represent the architectural properties of vernacular or any other types of built forms. An architect is familiar with building methods and he has expertise in representing a three dimensional form through various graphic images – technical or schematic. Describing and classifying forms are easy tasks for an architect since he/she has training, experience and know-how in building technology and requisite drafting techniques for the representation of three-dimensional forms in drawings and models.[2] Documentation of vernacular buildings can thus benefit tremendously from an architect's specialist contribution in the field. Conversely, though, an architect's standard disciplinary conceptions can also create serious problems when exploring a vernacular built setting where perceptions are not shared. An architect can comprehend a design process from a designer's viewpoint but there may be the risk of assuming that buildings are static geometrical artefacts. Critics like Nold Egenter question the view from 'outside' in vernacular architecture study, which often ends up interpreting a complex phenom-

1. Vernacular architecture has been defined by different academics in different ways. This chapter follows the definition by Paul Oliver as given in the world encyclopaedia of the subject: '… comprising the dwellings and all other buildings of the people. Related to their environmental contexts and available resources they are customarily owner or community built, utilizing traditional technologies. All forms of vernacular architecture are built to meet specific needs, accommodating the values, economies and ways of life of the cultures that produce them.' See Paul Oliver (ed.), *Encyclopedia of Vernacular Architecture of the World*, (New York: Cambridge University Press 1997), p. 14.

2. For a similar discussion, see Oliver, *Encyclopedia of Vernacular Architecture*, p. 15.

enon by way of standard disciplinary conceptions and the perceptual experience of the interpreter.[3]

Architects tend to employ technical, functional and aesthetic criteria when evaluating or analysing any architecture. All these factors need careful reinterpretation in a vernacular built setting. Aesthetics is a major concern of architects. Yet mainstream aesthetic concepts of architecture may not always fit into the framework of vernacular design. Moreover, vernacular decorative treatments, when found, are often infused with extra meanings. Social status is often analogous, in a vernacular builder's domain, to material status through extra carving. For example, a high-ranking man of the Suqe hierarchy lives in a large structure with a highly decorated front.[4] A Naga can embellish his house with carved posts and beams if he can attain high social status by giving 'feasts of merits', while the right to such decorations is restricted for others who may be materially rich but lack appropriate social status.[5] Decorative gable finials, which have a symbolic protective function, or signify social status with crossed horns, adorn house elevations of ethnic groups in North-east India and South-east Asia.[6] The occasional use of colour and different weaving patterns in bamboo signify special occasions such as a funeral for the Mru,[7] while deviations are restricted in the normal course of things. Even structural expression may have social meanings – in Nias, a common house has four pillars to the front, in contrast to the chief's house, which has six vertical pillars.[8] Aesthetics derived from playing with the mathematical proportion of solids and voids in forms[9] may not make sense to vernacular designers. For example, the Mru's neighbours the Lushai[10] can only have 'windows' in their dwelling if they can achieve social elevation by performing the Khuangchawi ceremony – a feast to mark one's crossing of social boundaries.[11] Wall-less and windowless houses on stilts are conspicuous in

3. Nold Egenter, 'Theory – and for Whom? Some Notes Regarding the Construction and Function of Theories in the Field of Vernacular Architecture', http://habitat-anthro.ning.com/forum/topics/theory-and-for-whom-some Accessed 14 Jan. 2011.
4. C. Coiffier, *Traditional Architecture in Vanuatu*, (Suva: University of the South Pacific 1988), p. 23.
5. J. P. Mills, 'The effect of ritual upon industries and arts in the Naga Hills', *Man* 35 (September 1935): 134.
6. Roxana Waterson, *The Living House: An Anthropology of Architecture in South-East Asia*, (New York: Oxford University Press 1990), pp. 7–8.
7. L.G. Löffler & C-D. Brauns, *Mru: Hill People on the Border of Bangladesh*, (Boston: Birkhäuser Verlag 1990 [1986]), p. 197.
8. Waterson, *The Living House*, p. 106.
9. Ralf Weber, *On the Aesthetics of Architecture*, (Aldershot: Brookfield Avebury 1995), pp. 17–27.
10. Now known as the Mizo.
11. L.B. Thanga, *The Mizos: A Study in Racial Personality,* (Gauhati: United Publishers 1978), p. 29.

the islands of the South-east Asia and have symbolic meanings.[12] The Mru cannot have 'windows' in the *kimma* because that lack is culturally determined. Decisions about the inclusion and exclusion of enclosures and voids such as walls, windows and openings are often culturally determined. As a result, the outsider's perception of architectural aesthetics may diverge from the concepts in which the native perception is rooted.[13] Moreover, even from a purely aesthetic perspective, the concept of 'beauty' may be culture-specific and have broader philosophical meanings: for example, the Japanese wabi aesthetic principle is strongly suggestive of simplicity, unpretentious features and also imperfection and irregularity, whereby material insufficiency is transformed into 'spiritual freedom unbounded by material things'.[14] A reorientation is also necessary when analysing function. The necessity of shifting from mainstream academic orientation when interpreting vernacular architecture is expressed thus by David Stea and Mete Turan:

> There is thus some danger that the current trend toward the generation of abstract, reified jargon, and the treatment of compartmentalised built form, currently so popular in 'mainstream' architectural education, may spill over into the interpretation of vernacular building, reducing its inherent richness. [15]

Moreover, when studying vernacular architecture, architects often tend to analyse the product in isolation. Such an approach is limiting as the foregoing examples suggest. A vernacular product is built within, 'rather than alienated from, the environmental context of which the building is both a significant and a comfortably embedded part'.[16] This approach is paradoxical in the sense that even a disciplinary concept of the 'architectural design process' suggests reconciliation of three systems – the human system, the environment system and the building system itself.[17] Thus criticisms persist against so called 'mainstream' approaches to the architectural analysis of vernacular built form, which stress solely artistic aspects and view building technology as construction process, omitting underlying and facilitating social, cultural and environmental relations and concepts.[18] Moreover, the ongoing methodological debate in the domain is increasingly becoming stimu-

12. Waterson, *The Living House*, pp. 30 & 34.
13. Waterson, *The Living House*, p. 35 – on absence of familiar architectural features and the dissimilarity in aesthetic view point in European and indigenous communities in the Southeast Asia.
14. Haga Koshiro, 'The *Wabi* Aesthetic through the Ages', In Nancy G. Hume (ed.), *Japanese Aesthetics and Culture: A Reader*, (New York: State University of New York 1995), pp. 246–247.
15. David Stea and Mete Turan, *Placemaking: Production of Built Environment in Two Cultures*, (Aldershot: Avebury 1993), p. 3.
16. Stea and Turan, *Placemaking*, p. 13.
17. G. Broadbent, *Design in Architecture: Architecture and the Human Sciences*, (London: D. Fulton 1973), p. 387.
18. Stea and Turan, *Placemaking*, p. 11.

lated by feedback from fieldwork, as revealing current studies in Africa and Asia point to existence of diverse concepts of vernacular architecture whose scopes lie beyond orthodox architectural theories.[19] These studies show how beliefs, social, political, cultural and economic practices are interwoven with the design of built forms and settlements in many distinct cultures and consequently stress the need for an interdisciplinary approach. Not surprisingly, of all disciplines – with relation to cultural interpretation of building – the most highlighted is anthropology.

Anthropology and architecture: a reconsideration

Anthropology acknowledges the enormous diversity of cultures in the world and the unique order within each culture and as such its contribution to vernacular architecture (which also deals with diversity) cannot be ignored. Anthropology also studies material artefacts; however, ironically, it disregards the built form, which seems puzzling to many. Clare Melhuish echoes this sense of limitation:

> How, one wonders, can any study of the artefacts of 'material culture' – what we know as pots, pans, and the like – overlook the actual buildings in which these objects, and the societies that use them, are housed.[20]

One possible explanation for such delimitation is that the nature of the anthropologist's training does not equip him/her to analyse architecture.[21] Architects, on the other hand, are generally uninformed as to the complexities of social structures and value systems that tie man with his dwelling, although they have long shared the belief that building is one of the three constituents of the primal social bond.[22] This lack of knowledge may be limiting when it comes to interpreting built forms in vernacular contexts: 'structuralist' analysis by Claude Lévi-Strauss has shown how the spatial organisations of Omarakana and Bororo Indian villages (South America) are complex metaphors for the social relationships of the dwellers.[23] Indeed, in culturally sensitive societies, the meaning and interpretation of spaces is often set in the social-cultural milieu, without which architects' understanding of the built

19. Beyond the West, initial works were carried mostly in Africa, India and the Middle East. See Waterson, *The Living House*, p. xv. Only more recently have more comprehensive works started being undertaken in the context of Asia more broadly.

20. Clare Melhuish, 'Why Anthropology', in *Architectural Design* [Architecture & Anthropology], 66/11 (1996): 7.

21. Oliver, *Encyclopedia of Vernacular Architecture*, p. 8.

22. Paul Oliver, *Dwellings: the Vernacular House World Wide*, (London: Phaidon 2003), p.14; Mari-Jose Amerlinck (ed.), *Architectural Anthropology*, (London: Bergin & Garvey 2001), p. 7. Also see Joseph Rykwert, 'Preface', in Mari-Jose Amerlinck (ed.), *Architectural Anthropology, passim.*

23. Claude Lévi-Strauss, *The Savage Mind*, (Chicago: University of Chicago Press 1968); see also S. V. Szokolay, *Understanding the Built Environment*, (Canberra: ANZAScA 1981), p. 12.

environment is incomplete. In search of answers and failing to find them within the disciplinary boundaries of architecture, a platform for the cross-disciplinary exchange of views is currently emphasised. According to Paul Oliver,

> as yet there is no clearly defined and specialised discipline for the study of dwellings or the larger compass of vernacular architecture. If such a discipline were to emerge it would probably be one that combines some of the elements of both architecture and anthropology with aspects of history and geography.[24]

In the *Encyclopedia of Vernacular Architecture* edited by Paul Oliver, it is duly acknowledged that,

> In view of all the various ways in which both architects and anthropologists have begun to discover vernacular architecture as a promising field of study, one would expect that representatives of both disciplines would join efforts to profit from each other's specialist expertise. [25]

Others have initiated searches for a cross-fertilisation of ideas beyond the academic discourse of architecture, for obvious reasons. For example, Labelle Prussin has inclined towards anthropology, having failed to explain within formal architectural assumptions the social, cultural and ideological aspects of African man's efforts to give form to space.[26]

Architecture–space–anthropology

Interpretation of culture is also necessary for a practical analytical purpose, as architectural interpretation engages not only visual imageries but also other fundamental concerns beyond perceivable forms. For example, 'space' is a point where architectural enquiry and anthropological investigation often coincide. Mari-Jose Amerlinck remarks:

> They [architects] are aware that there may be something to be learnt from how other societies conceptualise built space and/or their relationship to the spaces they inhabit. The anthropologist's interest in space, on the other hand, is relational and contextual; it is in the space of practice rather than those spaces that have been physically framed by constructions; although the two may coincide.[27]

24. Oliver, *Dwellings*, p. 13.
25. Oliver, *Encyclopedia of Vernacular Architecture*, p. 8.
26. Labelle Prussin, *Architecture in Northern Ghana: A Study of Forms and Functions*, (Berkeley: University of California Press 1969).
27. Amerlinck, *Architectural Anthropology*, p. 7.

One reason it is necessary to interpret culture when analysing architecture is because 'use of space is culturally determined … it is a construct not a "given"'.[28] For example, in a Japanese minka,[29] space is defined by time linked with a particular function, not by physical barriers as in a Western house.[30] Activities are organised not only in space but also in time and there are other observable variables: a 'wall', which is commonly designed as fixed in a Western house, is designed as semi-fixed in a Japanese house and floor dominates over wall as the organiser of space, which again changes definitions over the course of time.[31] In a contemporary global urban house – modelled in a Western fashion – people move from room to room for each different activity, such as eating, sleeping, working, entertaining and socialising, whereas in a Japanese house people remain in one spot, while the activities change over time with introduction of transportable and semi-fixed elements.[32] In a Mongolian tent, where space is constantly being recreated, cultural behaviour acts as surrogate for physical boundaries. Traditionally, the space within the tent is conceptually divided into a complex grid, east/west, north/south in such a way that exactly predictable social, technical or ritual activities are performed in each part of the tent's volumetric space.[33] Consequently a Western or global assumption about space or the use of space will face difficulty in analysing spaces, enclosures or functions in a Japanese house or a Mongolian tent.

The foregoing discussion summarises some of the advancements, concepts and arguments prevailing in the research area. With 'space' as a converging point between architecture and anthropology and against this backdrop of theoretical debate on appropriate research methodology, which continues to baffle the domain concerned, I now shift to specific findings from primary fieldwork. The fieldwork (conducted in the Bandarban area, CHT, 2002–2003) was initially intended as a linear documentation approach to recording the vernacular architecture of the Mru. In the remainder of this paper, I consider the spatial identity of Mru built settings, after a brief introduction to the cultural and ecological setting of the local architecture of the Mru. I conclude this paper with some outlines emerging from

28. D.P. Crouch and J.G. Johnson, *Traditions in Architecture: Africa, America, Asia, and Oceania*, (New York: Oxford University Press 2001), p. 259.

29. *Minka* is a local term for a 'folk house' in Japan.

30. Matsuda Naonori [with advice from Mogi Keiichiro], 'Japan's Traditional Houses: the Significance of Spatial Conceptions', in Ronald G. Knapp (ed.), *Asia's Old Dwellings: Tradition, Resilience, and Change*, (New York: Oxford University Press 2003), pp. 305–15.

31. Naonori, 'Japan's Traditional Houses', pp. 306–7 and 312–5.

32. E.T. Hall, *The Hidden Dimension*, (London: Bodley Head, 1969), p. 104.

33. E.R. Leach, *Culture and Communication: The Logic by which Symbols Are Connected: An Introduction to the Use of Structuralist Analysis in Social Anthropology*, (New York: Cambridge University Press 1976), p. 54.

the process of fieldwork analysis, which eventually redefined the framework of the approach and documentation method.

The paradox of cultural landscape

From an ethno-linguistic point of view, the Chittagong Hill Tracts (CHT) is the most complex region of Bangladesh. From an architectural viewpoint, the region is also highly complex. Its distinctive built landscape speaks predominantly of diversity of forms and techniques, exemplifying an intricate ethnic mosaic, but there are also many interesting similarities. The ecological setting of the architectural forms and spaces that characterise the region is also distinct. The CHT has distinctive cultural geographic features related to swidden cultivation, locally known as jhum.[34] This practice is different from the wet rice cultivation of flat land peasants of rural Bangladesh.[35] Jhum is not only a distinctive economic practice but also implies a total culture for the jhumias.[36]

Eleven indigenous ethnic groups, collectively known as the jhumias, live in the CHT area. The three largest groups are the Chakma, the Marma and the Tripura.[37] In physiognomic, social and cultural traits the ethnic people of the Chittagong Hill Tracts are conspicuously different from the Bangalis.[38] The hill folks in the Chittagong hills are customarily known as the pahari.[39] This chapter examines the Mru, the largest of the smaller ethnic groups. The highlander Mru, in comparison with other ethnic groups, especially the streamside or valley dwellers, so far appear to be relatively uncompromising in their efforts to retain their cultural identity. Broadly, the distinctive mountain culture of the Mru is characterised by a relatively independent socio-political and economic identity based on a *para* (hamlet) structure, reliance on subsistence economy, simple technologies, oral tradition, traditional kinship based social organisation, 'animistic' belief and elaborate rituals and sacrifices throughout the agricultural cycle. Reciprocity is a dominant social expression as jhuming is still the predominant form of cultiva-

34. Also known as 'slash-and-burn' cultivation.

35. See David E. Sopher, 'The Swidden/Wet-Rice Transition Zone in the Chittagong Hills', *Annals of the Association of American Geographers* 54/1 (1964): 107.

36. A generic term once applicable to the swidden/slash-and-burn cultivators only.

37. See Maung Kyaw Shwe Nue Navy, 'The Concept of Tribe, with Special Reference to CHTs', *Sangu, Tribal Research Magazine* 10/1 (2002): 17; the ethnic communities, are Chakma, Marma, Tripura, Tangchangya, Khyang, Chak, Bawm, Lushai, Pangkhua, Mro[Mru] and Khumi.

38. The mainstream *Bangla* speaking population of Bangladesh.

39. A generic *Bangla* term for all hillmen (*pahari-* from *pahar* or hill).

Figure 1. Mru settlement. Bandarban, Winter 2003. (Photograph: Author)

tion, especially for the ridgetop hillmen.[40] A brief introduction is necessary here to clarify the interpretation of vernacular architecture. In this domain, we are not dealing with self-conscious products but with humble architecture or settings, which recede into the environment and share certain characteristic cultural assumptions. It is commonly acknowledged that, in architecture, vernacular stands against 'academicism' and 'individualism' and thus the specific term is strongly suggestive of the distinctive local culture and ambience of a particular area, of particular social setting, lack of abstract theoretical and aesthetic pretensions, spirit of co-operation and group identity.[41]

Dynamics of spatial transformation vis-à-vis the human reference

The main house, which the Mru call the *kim,* is a simple addition of two blocks, the *kimma and kim-tom* (also called *cholak* in some localities). The two blocks are

40. The ethnic groups of the CHT can be broadly grouped into the valley group and the ridgetop group, based on their cultural preferences for settling in two types of geographic locations.

41. Paul Oliver (ed.), *Shelter, Sign, and Symbol,* (London: Barrie & Jenkins 1975), p. 12; Oliver, *Dwellings: The Vernacular House World Wide*, p. 14. Also see Robert Sommer, *Social Design: Creating Buildings with People in Mind*, (Englewood Cliffs: Prentice-Hall 1983), pp. 111–13.

joined at one side, each under a different roof. The *kimma* and the *kim-tom* are visibly distinct from outside; the *kim-tom* shows a higher elevation as the roof is higher than that of the *kimma.* A *char* (open verandah),[42] elevated from the ground on stilts, is laid in front of the *kim-tom*. Access to the raised main platform of the house is by a notched tree ladder. It is basically a post and tie beam structure with permeable bamboo wall panels and a thatched gable roof.[43] Bamboo and timber are used in the construction of the houses.

Inside a Mru dwelling, activities are organised not only in space but also in time. Space is multifunctional and setting constantly changes with human activities. Variation in human action is a prime stimulus for the definition of space. Thus space is constantly being designed and recreated according to culture specific functions. Man is a priori in the evolving setting. Space serves human purposes, contrary to the contemporary global model, in which we serve the space.

Figure 2. A Mru stilt dwelling, showing the gable end of the kim-tom *and the* char*. Bandarban, 2003. (Photograph: Author)*

42. This is spelled as 'char' rather than 'tsar' as in Löffler's (1990) writing.

43. As documented in the fieldwork carried out in Bandarban, Chittagong Hill Tracts in 2003.

The Culture of Space

The following section isolates the public space of the Mru dwelling – the *kim-tom* – and looks into the meaning of such space; it attempts to reconstruct Mru identity in that place. This probing underlines that, without anthropological insight, the hidden dimensions of geometrical space cannot be construed. In addition, without knowing this hidden dimension, the actual programme or blueprint for the physical design remains unexplored and thus our – the architects' – investigation task remains incomplete and marginal.

The habitable middle space of the three-tiered hill dwelling section is mostly amorphous: it has multiple functions that change with time – such space is constantly in a state of flux, non-specialisation being its characteristic property. This changing nature of space is clearly discernible in the *kim-tom* by charting different activities at different times. Changes take place daily or seasonally. Part of the *kim-tom* is used as a cooking space in the morning and in the late afternoon, as an eating place at meal times and a social gathering space or a place for recuperation in the evening; this turns into a sleeping space for guests and older and unmarried members of the family at night. During intermittent functions such as wedding and feasts of merits,[44] in the absence of a discrete communal structure common to all villagers, the *kim-tom* of the household holding the event has to transform into an enclosed 'community function centre' – a temporal space complementary to the open meandering court, with the shared task of hosting large-scale social feasting and ritual dances.[45] In addition, it has also been noted that the *kim-tom* periodically attains heightened ritual significance through special times in the agricultural cycle – at the time of the symbolic taking home of the first harvested *jhum* foods, rituals involving sacrifices of animals (chickens and pigs) and feasting take place inside the *kim-tom*.[46] In all cases, a very thin line separates the familial ritual from the communal ritual, as reciprocity is a dominant cultural expression, not only in *jhuming* but also in all aspects of living. Consequently, successful enactment of such varied activities in the one physical enclosure of the *kim-tom* demands a dynamic spatio-temporal stage – a place that is able to hold modest domestic functions varying from day to night and can also stretch occasionally to hold elaborate large-scale ritually prescribed communal functions. As illustrated above, different activities congruent with the socio-cultural pattern provide the prime stimulus for this shifting use of space, adding a temporal dimension to its definition. As such, spaces are not perceptible as predetermined or fixed to specific functions as in a Western model of a space. Indeed such optimum use of space is achieved by careful exclusion and inclusion of certain physical decisions, which are in conformity

44. A ritual involving sacrifices, by which an individual gains social status. For a general description of Feasts of Merits and *go-hotta* (cattle-sacrifice), see Löffler & Brauns, *Mru: Hill People*, pp. 225–40.

45. Dances and feasting are vital part of such festivals.

46. Löffler & Brauns, *Mru: Hill People,* p. 123.

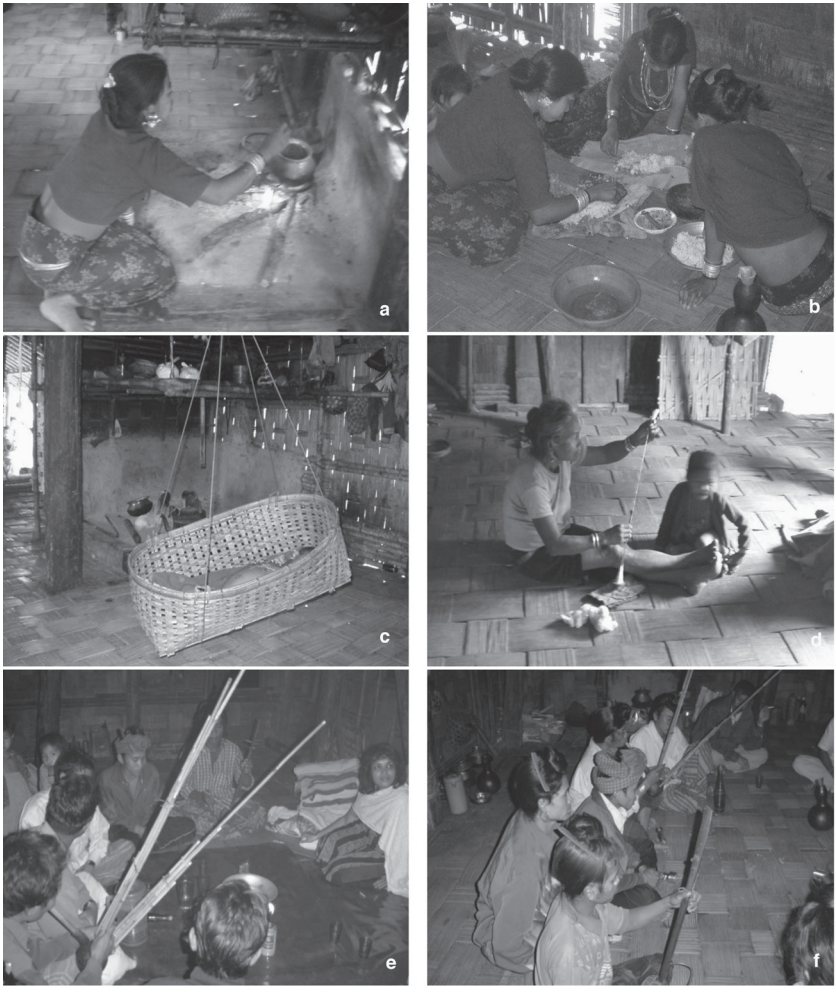

*Figure 3. Different activities carried out in the public space (*kim-tom*), by day and night. (Photographs: Author)*

a. Cooking in the open hearth of the public space. Meals are taken three times daily, though cooking is done twice – once in the early morning and once in the late afternoon. **b.** At mealtimes, a bamboo leaf serves as a platter. For both meals, the main dish is rice. Oil is not usually used in cooking. Side dishes are rudimentary. **c.** A child sleeps in a swinging bamboo basket in the *kim-tom* while parents are busy outside with daily tasks. **d.** An elderly Mru woman sits in front of the doorway in a lighted passage. She is using a manual spindle to make thread from loose cotton in the *kim-tom*. **e, f.** If a household has an outside visitor it is common for villagers to drop in in the evening and organise an impromptu orchestra in the *kim-tom*. A musical instrument made from a gourd with eight or ten long bamboo pipes arranged in two rows is a favourite for these gatherings. After the visit is over, the *kim-tom* transforms into a communal sleeping area for children, the elderly and visitors.

with the social and cultural order of the community. For instance the *kim-tom* is basically designed as a non-partitioned free space, without inclusion of substantial internal partitions and fixed furniture.

The free floor, rather than a wall with a hearth as the spatial focus, acts as the dominant spatial organiser inside the public domain. Such openness allows the internal space to be easily transformed to fit different needs as required.

A simple potential for material addition or retrenchment is created in the *kim-tom* to fit changing contexts. For instance, inside the *kim-tom* the transformation from day to night space can take place merely by the introduction of an additional woven fabric mat; the mat is rolled over and kept aside during the day. The pattern of social gathering and entertainment in the enclosed public arena is similarly defined by the culturally specified nature of grouping, whereby members sit directly on the woven floor mat of the *kim-tom* in a circle; by establishing a physical reference to the hearth; or by ephemerally introducing material artefacts such as musical instruments – *plungs*[47] – or rice-wine pots. Once such activity dies down, the *plungs* and the pots are immediately stored away or taken into the *kimma*.[48] The group then dissolves.

The domains and boundaries of activities in this merged space are more culturally than physically determined, as socio-spatial boundaries only occasionally converge with physical boundaries, yet to exist means to have orientation and order[49]– even in a seemingly undifferentiated space. Consequently certain fixed physical reference points are discernible, such as the hearth, the bamboo pole laid on the floor of the *kim-tom*, or the overhead reference of the ridge axis; these features help in orienting dwellers to particular culturally construed boundaries when performing any particular activity. In addition to such fixed pronounced physical features, other design decisions, such as subtle changes in materials, texture and level, also provide cues to understand the nature of spaces related to different activities. Reading the 'nonverbal cues'[50] reflects that 'design' follows from a heightened sensory experience for the Mru. And thus the embedded message, so encoded, urges us to view Mru architecture as an 'experience', not only as an 'architectural form'.

Space and time: life-cycle changes

The dwelling spaces are amorphous, changing over time, depending upon the activities carried out. However, another intriguing implication of the criticality of

47. Löffler & Brauns, *Mru: Hill People,* p. 228.

48. Valuables, including ceremonial instruments, heirlooms, ritual objects are kept inside the *kimma*.

49. Leach, *Culture & Communication*, p. 54.

50. Amos Rapoport, *The Meaning of the Built Environment: A Nonverbal Communication Approach,* (Beverly Hills: Sage Publications 1982), pp. 48–65.

spaces is tied to life-cycle changes. Inside the *kim*, a movement from one space to another in different phases of the life-cycle is noted. Consequently these movements induced by life-cycle changes are reflected in adjustments and physical interventions to accommodate changes in household organisation.

A number of customs are recorded, linked to various phases. When extended families decide to live together, depending upon the accepted order of the internal social and family organisation, various solutions are adopted. For instance a younger son generally lives with the parents and he is customarily acknowledged to be the new head of household once he is married.[51]

When this happens, the new couple takes over the *kimma* and the parents move out to the *kim-tom*. In such cases, either of the two solutions can happen: the older generation may occupy the non-partitioned public space of the *kim-tom* without any physical intervention in the existing built form[52] or alternatively they may decide to live in a marginally partitioned space in the public domain through compartmentalisation.[53] Thus life-cycle changes may be incorporated not only by marginal physical intervention detectable in the layout, but also merely by changed use of spaces. The addition of a separate one block structure – generally a minutely scaled down replica of the *kimma*, linked by transitional space of the *char* to the main *kim* – is another, more pronounced, physical solution to accommodate changes in life-cycle and household organisation. Usually such increments follow, for example, when a second-generation family, such as that of an elder son, has the option to move out and start a new socio-economic production unit in a separate *kim*.[54] In an extended family, this also happens in the case of a newly married grandson, starting out with the core family and gradually dispersing into a new unit.[55]

Extended family living in the same *kim* has been frequently found, though a nuclear family structure is more common. In the case of a one-generation extended family, such as two brothers living in the same house, the newly married brother may live in a separate block linked by the char to the *kim*. If resources permit he may eventually build a new independent unit.[56]

However, with limited resources, it is not unusual for the second brother to stay in this added block for a long time. It is understood that in the absence of available resources for everyone, one will sustain another within close family ties. A closer look thus reveals that not only life-cycle changes but the role that one is able to play in different phases of life have a bearing on the dynamics of spatial

51. Finding from fieldwork. Also see: Löffler & Brauns, *Mru: Hill People*, p. 186.
52. Fieldwork, Bandarban in 2002–2003.
53. Fieldwork, Bandarban in 2002–2003.
54. Fieldwork, Bandarban in 2002–2003.
55. Fieldwork, Bandarban in 2002–2003.
56. Fieldwork, Bandarban in 2002–2003.

and physical changes and may explain the duration and lifespan of the physical add-ons. The findings also suggest that without socio-cultural understanding of, for example, social organisation and family structure, the interpretation of the dynamics of physical changes occurring organically and in line with life-cycle phases cannot be undertaken.

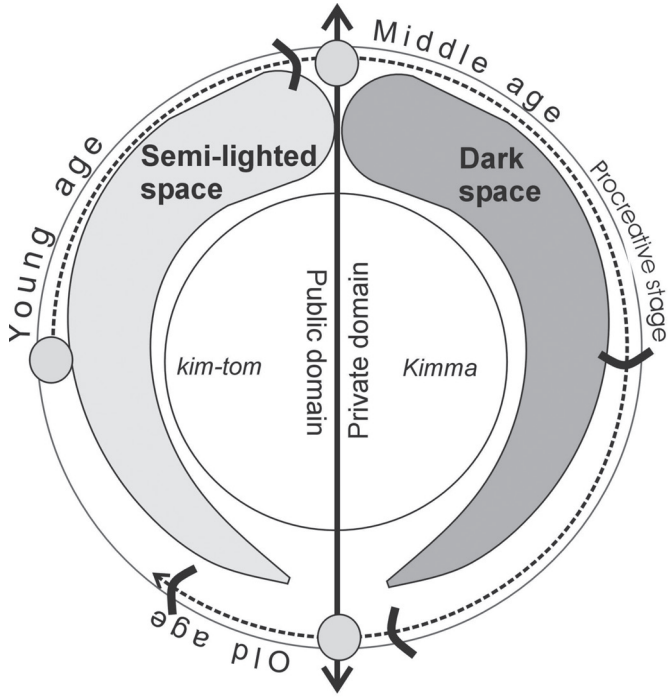

Figure 4. Movement through life-cycle changes and physical domains in a Mru dwelling. (Diagram: Author)

Concluding notes: blurring boundaries between science and culture

Vernacular architecture thus relates to *science* as construction or technology but at the same time to *history* through cultural enactment. Right now we have an opportunity to discover new common ground between architecture and anthropology as science wants to converge more and more with history to explore any habitat in its organic complexity. Today environmental historians acknowledge that *nature* – i.e. the domain of *science* – is, to some extent, a product of *history* (and thus relates to culture). We are beginning to feel the urgency of opening a door in the wall that separates science from culture. Donald Worster reflects:

> We will suffer today from a rigid set of categories that set us apart from one another in the academy. Nature is set apart from culture. The material order is set apart from the spiritual. The realm of objective data is strictly demarcated from the realm of subjectivity, feeling and value.[57]

This crisis is also echoed by architects and anthropologists. We need to find ways of making our interpretation and representation of *space* and *place* in vernacular architecture more unorthodox. In the light of fieldwork findings and analysis of some aspects of the space and its relation to use in the case under study, we encounter certain aspects of this architecture and the methodological dilemma inherent in understanding it. Surely what we need here is a broad-based, interdisciplinary approach, which must further take on a dialectical perspective. In this case, an architect as a researcher has to forge a middle way between architecture and anthropology or, broadly, between building science and culture. This is required to encapsulate a contextually defined environmental and cultural milieu where builders interact with local settings to produce forms and spaces. Obviously these constructional elements are means to carry out accepted social and cultural transactions and therefore have symbolic meanings.

When analysing such a dwelling, a synchronic investigation often fails to provide a complete answer, especially when the approach is limited to the documentation of built forms, materials and technique – without any subjective interest. Recurrently, in redefining spatial enclosures – physical and abstract – architecture as a process comes first. Clearly, here, the attempt to reconstruct space has to take into account the interactive and temporal nature of the built environment with relation to the human setting. The fieldwork analysis reveals that, with life-cycle changes, the building expands or contracts and thus human events are continuously changing the building's definition. Furthermore it is obvious that history appears to be constantly redefining the existence and continuity of the built settings. Grounded both in architecture and anthropology, the process of reconstruction of place from a space engages with a 'setting', which is wide and complex. Thus documentation, as a process of engagement, is further challenged by the need to highlight the relationship between individual elements and how these are connected in a setting (physical, social, behavioural and cultural). A fixed, objectified view of isolated elements fails here. The term 'dwelling' also needs to be approached from a broad perspective as exemplified in this study; we can easily substitute the phrase 'vernacular architecture' with 'meaningful environment', because it lets the builder dwell purposefully in his natural setting.

Finally, as an architect (as a researcher), working in situ in the vernacular setting, I show in this chapter that a particular disciplinary outlook may bring an

57. Donald Worster, 'The Two Cultures Revisited: Environmental History and the Environmental Sciences', *Environment and History* 2/1 (1996): 5.

enormous amount of intellectual baggage to study and analysis. If (vernacular) architecture deals with form and function, then neither form nor function can be analysed without cultural–historical, insight.

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Perceptions of Place and Deep Time in the Australian Desert: Using Art in Environmental History

Libby Robin[1]

Science and the development of Australia

My work began with writing about the history of ideas in the science of ecology, and how ecologists came to understand Australia's'megadiverse' lands. Australia is one of only seventeen countries that together harbour some seventy per cent of the earth's species. Ecological opportunity is intimately tied to variable and uncertain rainfall and irregular river flows. Australia's biggest rivers fluctuate wildly: whereas the ratio between maximum and minimum flows in the Amazon in Brazil is 1.3, and the Potomac in Virginia, USA, 3.9, such Australian rivers as the Murray and Darling have ratios of 15.5 and the 4705.2 respectively. Scientific language like this has become part of national rhetoric. Australia and New Zealand are 'post-Linnaean societies' with settler histories that started after the scientific revolution, the Linnaean (binomial) classifications of the natural world and the industrial revolution.[2] Australian citizens are highly scientifically literate. The British heritage

1. Artist Mandy Martin and archaeologist Mike Smith were equal partners in the *Strata* project that forms the basis for the method discussed here. On the field trip to Puritjarra, Mandy Martin, Mike Smith and I were accompanied by Chris Delaney, Guy Fitzhardinge and Jake Gillen. The collaborative art process was continued by residents of the country, Narputta Jugadai, Daisy Napaltjarri Jugadai and Molly Jugadai, Eunice Jack, Colleen Kantawarra, Alice Nampitjinpa, Linda Ngitjanka and Anmanari Nolan (from the Ikuntji Arts Centre). I acknowledge financial support for this project from the Australian Research Council (DP0208361) and Land and Water Australia (ANU42).

2. The concept 'Linnaean' is derived from the name of Carl Linnaeus (1707–78), a Swedish botanist, physician, and zoologist, who laid the foundations for the modern scheme of binomial nomenclature. He is known as the founder of modern taxonomy. See Margaret J. Anderson, *Carl Linnaeus: Father of Classification*, (Berkeley Heights, NJ: Enslow Publishers [1997] 2009).

has tied national identity to agriculture. Being the 'farm of the Empire' has been an important part of the settler imagination. Australian agriculture was always 'industrial', and informed by science; our agricultural and industrial revolutions arrived simultaneously in 1788. However, conditions on this continent are already more variable and uncertain than in the rest of the world and this story can only become more complicated as global warming and anthropogenic climate change affect already stressed areas. The way science sees the land frames the process for tackling sustainability in Australia and what science identifies as important (or irrelevant) will have impacts on the survival rates of the remaining biota.[3]

The Aboriginal people who lived in the continent for 60,000 years before the British arrived were hunters and gatherers. The fact that Aboriginal people did not fence or 'improve' their land led to the British assumption that Australia was *terra nullius*, a land without legal ownership. Some archaeologists have argued that they did have a form of agriculture, managing the environment through 'fire-stick farming',[4] and there were some parts of Australia (particularly the south-east) where Aboriginal groups had settled lifestyles, for example building stone eel traps into rivers to capitalise on seasonal fisheries. Most Aboriginal groups (there were hundreds of languages and different 'nations' in Australia) lived lightly on the land and left few artefacts. Particularly in the arid heart of Australia, they employed a mobile lifestyle and maintained few possessions, which enabled them to capitalise on opportunities provided by ecological 'booms' following seasonal rains and to move away from country when the inevitable 'busts' followed.[5]

Australia's ecology was poorly adapted to European-style farming systems, and the past two hundred years of history have seen agricultural and ecological science grappling with the mismatch between the natural environment and industrial

3. Libby Robin and Tom Griffiths, 'Environmental History in Australasia', *Environment and History* 10/4 (2004): 439–474; Daniel Connell, *Water Politics in the Murray-Darling Basin*, (Annandale: The Federation Press 2007); Marnie Leybourne and Andrea Gaynor (eds.), *Water: Histories, Cultures, Ecologies*, (Perth: UWA Press 2006); S.R. Morton, 'Land of Uncertainty: The Australian Arid Zone', in Harry F. Recher, Daniel Lunney and Irina Dunn (eds.), *A Natural Legacy: Ecology in Australia* (2nd ed.), (Sydney, Pergamon Press 1986), pp. 122–44; D.M. Stafford Smith and S.R. Morton, 'A Framework for the Ecology of Arid Australia', *Journal of Arid Environments* 18 (1990): 255–78; Libby Robin, *How a Continent Created a Nation*, (Sydney: UNSW Press 2007).

4. A.R. Main, 'Ghosts of the Past: Where does Environmental History Begin?' *Environment and History* 2 (1996): 97–114.

5. M.A. Smith, *Peopling the Cleland Hills: Aboriginal History in Western Central Australia, 1850-1980*, (Canberra: Aboriginal History 2005); Deborah Bird Rose, *Nourishing Terrains: Australian Aboriginal Views of Landscape and Wilderness*, (Canberra: Australian Heritage Commission 1996); A. Clarke, 'Romancing the Stones: the Cultural Construction of an Archaeological Landscape in the Western District of Victoria', *Archaeology in Oceania* 29/1 (1994): 1–15; Marcia Langton, *Burning Questions: Emerging Environmental Issues for Indigenous Peoples in Northern Australia*, (Darwin: Centre for Indigenous Natural and Cultural Resource Management, Northern Territory University 1998).

Figure 1. Puritjarra rock shelter: a key base for Aboriginal people with mobile lifestyles in remote central Australia (Photograph: M.A. Smith)

aspirations in this land. There have been some spectacular successes: despite the fact that it is the world's driest inhabited continent, Australia is a major exporter of agricultural products. Nearly three quarters of Australia's very limited water goes into irrigation for cropping. More than seventy per cent of this takes place in the Murray–Darling Basin, yet the Basin receives only 6.1 per cent of our run off. The vast majority of rain falls as monsoons on rough country in North Australia that is unsuitable for cropping. However, the costs of this scientific agricultural development are beginning to show: Australia has the highest number of threatened species on the planet, with some thirty per cent of mammals extinct since the European invasion in 1788, and has the dubious honour of leading the world in mammalian extinctions.[6]

Science for an ecologically sensitive Australia

Environmental sciences, agricultural sciences and archaeology all combine to provide insights into how Australians can live in the land from deep time to the future. A land with 60,000 years of human history is exceptional in international

6. David Lindenmayer and Mark Burgman, *Practical Conservation Biology*, (Melbourne: CSIRO Publishing 2005), pp. 1–5. See also Libby Robin, 'New Science for Sustainability in an Ancient Land', in Sverker Sörlin and Paul Warde (eds.), *Nature's End: History and the Environment*, (London and New York: Palgrave MacMillan 2009), pp. 188–211.

terms but agricultural science tends to concentrate on science that adapts crops with proven international markets to local conditions, making little reference to the people. Because ecologists value 'biodiversity', they have often been the ones to question whether Australia's local conditions can adapt to European-style agriculture without severe losses. Archaeologists studying Aboriginal Australia in deep time are establishing how people lived sustainably in the land over many generations and traded commodities in a system that was independent of modern European market expectations but their historical work has largely gone unnoticed in the discourses about managing Australia's environments. Since the 1980s, and increasingly, anthropologists and ecologists have been working together with Aboriginal people in developing cross-cultural understandings for environmental and land-management sciences (particularly in areas such as ethno-botany and fire ecology). The project discussed here takes a new approach, and tries to gather more perspectives to make what ecocritic Tom Lynch has described as a 'polyvocal bioregional' narrative.[7]

Science has been strongly implicated in development in Australia. Initially it was British science that established agricultural practices in a 'new continent' and, later, Australia's own scientists pushed agricultural developments further into undeveloped lands. Australia's tropical north, frequently figured as the 'empty north', has been subject to science-led *internal colonialism*, a term used by Sverker Sörlin in the context of a very different 'empty north'. Sweden, Norway, Finland, Canada and Australia are amongst the countries where a scientific establishment of the south has sent out frontier missions to the North (with a capital N). Internal frontier lands and unknown places are particularly favoured sites for science to serve a 'national interest', to stretch the nation beyond the known and into the unknown. In Australia's case, the desert Centre and the tropical North have both been mapped and scientifically explored from the temperate South. They have been 'other' places, away from where the vast majority of Australians live – and the stories of this 'outback' have traditionally been of heroic journeys across country, not understanding individual places.[8]

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7. Sue Jackson, 'Indigenous Values and Water Resource Management: A Case Study from the Northern Territory', *Australasian Journal of Environmental Management* 12/3 (2005): 136–46; Sue Jackson, Michael Storrs and Joe Morrison, 'Recognition of Aboriginal Rights, Interests and Values in River Research and Management: Perspectives from Northern Australia', *Ecological Management and Restoration* 6/2 (2005): 105–9; Tom Lynch, 'Literature in the Arid Zone', in C.A. Cranston and Robert Zeller (eds.), *The Littoral Zone: Australian Contexts and their Writers*, (Amsterdam: Rodopi 2007), pp. 70–92.

8. Sverker Sörlin, 'Rituals and Resources of Natural History: The North and the Arctic in Swedish Scientific Nationalism', in Michael Bravo and Sverker Sörlin (eds.), *Narrating the Arctic: A Cultural History of Nordic Scientific Practices,* (Canton, Mass: Science History Publications/USA 2002), pp. 73–122. The United States has a similar relation with Alaska. See Matthew Berman and Michael Pretes, 'Modern, Postmodern and Northern: A New Approach to the Political Economy of Northern Regions', unpublished paper presented at Western Regional Science Association meeting, Tucson Arizona, February 1994.

The red shift

The arid Australian interior has undergone a dramatic shift in the national imagination in the past century. Just after the Australian colonies had federated into a nation and at the height of one of the driest summers on record, that of 1901–1902, geologist John Walter Gregory undertook a journey around Lake Eyre. His account was published as *The Dead Heart of Australia* in 1906. The white salt lake landscape was apparently 'dead' at the end of one of Australia's most famous long droughts but Gregory was not alone in perpetrating the idea that Australia's heart was dead or dying; it was a colourless, empty place, disappointing to prospective pastoralists. Even as European-style pastoral practices increasingly impoverished the natural biodiversity of desert country, some people began to perceive a different Centre. Zoologist and museum curator Herbert Henry Finlayson recounted his travels in the 1930s with 'man and beast in the heart of Australia' in a book entitled *The Red Centre.* For Finlayson, it was no longer a *dead* heart but a *red* one. Finlayson put people and other living creatures at the centre of his story.[9]

This 'red shift' in thinking was something created by the eye of science. The tourism industry was still to come, but the Red Centre provided a reason to visit. As early as the 1930s, anthropologist Charles P. Mountford started making films of Pitjantjarra people and their country (on the western border between South Australia and the Northern Territory). He was one of the first to capture Ayers Rock/Uluṟu and the Olgas/Kata Tjuṯa on film, some twenty years before the graded road opened up access. Mountford was keen to capture the beauty of Kata Tjuṯa, when he finally reached its centre after tortuous travel across spinifex country that had 'reduced his last pair of strong boots to ribbons'. It was an artist's paradise, 'which made me wish whole-heartedly for a day to spend on nothing else but pictorial photography'. Nevertheless, there was less than a gallon of water in the canteens, so he had to work quickly and a landscape in black and white without features or movement was difficult to render interesting. An attempt to get a view with Aboriginal people and camels in the foreground was foiled by a wildfire. Ultimately Mountford was left with just still photography and colourful prose in his popular account of his camel travels, *Brown Men and Red Sand,* which appeared in 1948. He wrote: 'The picture, in spite of the vicissitudes of its birth … a gem in glowing colour'.[10]

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9. J.W. Gregory, *The Dead Heart of Australia*, (London: John Murray 1906). The term was widely used, for example, in another book by a scientist, Captain S.A. White, *Into the Dead Heart: an Ornithological Trip through Central Australia,* (Adelaide: W. K. Thomas 1914) and H.H. Finlayson, *The Red Centre: Man and Beast in the Heart of Australia*, (Sydney: Angus & Robertson 1946). The preface explains that 'the greater part of the material appeared during 1932–3 in the form of separate articles'.

10. Tom Griffiths, *Hunters and Collectors: The Antiquarian Imagination in Australia*, (Cambridge: Cambridge University Press 1996), especially chapter 8, 'Journeys to the Centre', pp.

The Red Centre as a tourist attraction followed Kodachrome technologies. New colour photography gave the tourists something to do when they arrived and, as this became cheaper, the numbers increased dramatically. The Centre became famous for sunrise and sunset colour. Better roads in the 1960s made it possible for travellers to arrive in private cars. When the road from Alice Springs to Ayers Rock was finally sealed in the 1980s, the Centre became an iconic Australian destination for international and local tourists. No longer is it a featureless, dead black and white landscape. It is alive and blazing with red colour.

An archaeological revolution in understanding desert peoples

Australia's desert peoples had intrigued and fascinated Australian scientists since the Horn scientific expedition to Central Australia, led by University of Melbourne Professor Baldwin Spencer in 1894. The question of how Aboriginal societies survived and prospered in such a hostile and difficult environment became the subject of the next revolution in the history of ideas about the Centre. This one emerged from archaeology and its climax unfolded in the 1980s. The known antiquity of Aboriginal people's occupation of Australia increased steadily over the twentieth century. Important cultural sites at Willandra Lakes were nominated as Heritage sites in the 1970s and these were on the cusp of desert country, in south-western New South Wales, but the prevailing view of archaeologists was that people had moved into true desert country relatively recently, perhaps just 3–6,000 years ago. The theory was that they had colonised the difficult country from the temperate coastal fringe only when good seasons had made this possible.[11]

In the 1980s, Mike Smith was one of a handful of archaeologists trying to find out about the peoples who lived in true Central Australian deserts. The desert is very hard to dig; moving sands can mean fruitless searching for undisturbed layers and digging itself requires considerable specialist skills. Mike acquired himself a grave-digger's certificate to learn to shore up the sand with wooden panels as he dug down, so that he could keep his sites clean. He built up a series of desert sites right across Central Australia that he used to document desert cultures. Mike's first

176–192; see also Roslynn D. Haynes, *Seeking the Centre: the Australian Desert in Literature, Art and Film*, (Melbourne: Cambridge University Press 1998); Michael Cathcart, 'Uluru', in Tim Bonyhady and Tom Griffiths (eds.), *Words for Country: Landscape and Language in Australia,* (Sydney: UNSW Press 2002), pp 206–21; Libby Robin and Ian Donaldson, 'Introduction to Desert Gardens', *Australian Humanities Review*, (July 2005), http://www.australianhumanitiesreview.org/archive/Issue-July-2005/01Robin.html; C.P. Mountford, *Brown Men and Red Sand: Wanderings in Wild Australia*, (Melbourne: Robertson and Mullens Ltd 1948): quotes on pp. 98–100, caption to frontispiece.

11. Stephen R. Morton and D.J. Mulvaney (eds.), *Exploring Central Australia: Society, the Environment and the 1894 Horn Expedition*, (Chipping Norton, NSW: Surrey Beatty & Sons 1996).

ten sites gave him a good sequence of material culture for the period 1,800–3,000 years BP.[12]

Figure 2. Mike Smith's 1986 dig site at Puritjarra (Photograph M.A. Smith)

However, it was Puritjarra, the final site, which he dug for the first time in 1986, that caused the revolution. At Puritjarra, in Australia's Western Desert, he found a 35,000 year old material culture. This meant that he had hit an archaeologically significant site. Such a find demanded a whole new theory of desert cultures and so he collected environmental material as well, so he could make judgements about the landscape in which these Ice Age desert peoples dwelt. Mike Smith was astonished to find that people had survived in desert conditions much tougher than today, with more severe heat, cold and dryness, as they had crossed and re-crossed the desert using this site from both the west and the east. The Centre had not been colonised from the south-east (as it had been by the European Australians). Indigenous Australians had come in from the north and the west.[13]

12. BP – 'before present' – is a technical term used in archaeology that is based on radio carbon dating. It is the number of years before the presence of certain isotopes in the atmosphere associated with the explosion of nuclear bombs (so it is the number of years before the 1950s, rather than the 'present').

13. Smith, *Peopling the Cleland Hills*; Mike Smith and Paul Hesse (eds.), *23º S: Archaeology and Environmental History of the Southern Deserts*, (Canberra: National Museum of Australia Press 2005); Peter Veth, Mike Smith and Peter Hiscock, *Desert Peoples: Archaeological Perspectives*, (Malden, MA: Blackwell 2005).

We are still struggling with the red shift, as the *Strata* project showed. Aesthetic, archaeological and Indigenous ideas can challenge strongly-held settler-Australian assumptions about the Red Centre and how it ought to be managed. Disciplinary diversity is one of the hallmarks of environmental history and, in this project about central Australian deserts, archaeology, aesthetics and non-western traditional knowledge were added to its methods. 'Desert knowledge', a place-based science and humanity of caring for fragile country, is emerging as a new discourse for the arid centre. Landscapes demand a visual appreciation and narrative voice, not just action plans for eradicating weeds. The opportunity that this aesthetic approach offered us was a new way to 'think through the environment'.[14]

Figure 3. Mike Smith (archaeologist), Guy Fitzhardinge (pastoralist and conservationist) and Libby Robin (historian) read local maps together (Photograph: Mandy Martin)

The *Strata* project

The *Strata* project was first conceived as a 'history of ideas'. It aimed to explore the recent revolution in Australian archaeology concerning how Aboriginal people

14. Desert Knowledge Australia, a coalition of scientific and Indigenous interests formed to bring together science and other forms of 'desert knowledge', especially Indigenous cultural heritage and traditional ecological knowledge, was registered as a statutory corporation in September 2003 in Alice Springs. See also Libby Robin, 'Migrants and Nomads', in Tim Sherratt, Tom Griffiths and Libby Robin (eds.), *A Change in the Weather: Climate and Culture in Australia*, (Canberra: National Museum of Australia Press 2005), pp. 42–53.

have lived in Australian landscapes over long periods. New technologies of optically stimulated thermo-luminescence dating and improved carbon dating have shown that people have been living in parts of Australia for at least 60,000 years. Sometimes, however, the revolution is not about how long ago, but *where?* and exactly *when?* and *under what sort of ecological conditions*? The eminent archaeologist, Mike Smith, and I planned a trip together to study one overhanging rock shelter in the Cleland Hills of the western desert country at the southern end of the Northern Territory. Almost right on the Tropic of Capricorn, deep in iron-rich, beehive shaped hills, there is the place that the Ikuntji-Haasts Bluff people know as Puritjarra.

Puritjarra is a rare shelter in rugged country. It is close to reliable water, a place on whose sandy floor people and animals have rested comfortably over many, many generations. The entry to the shelter faces away from prevailing winds and this

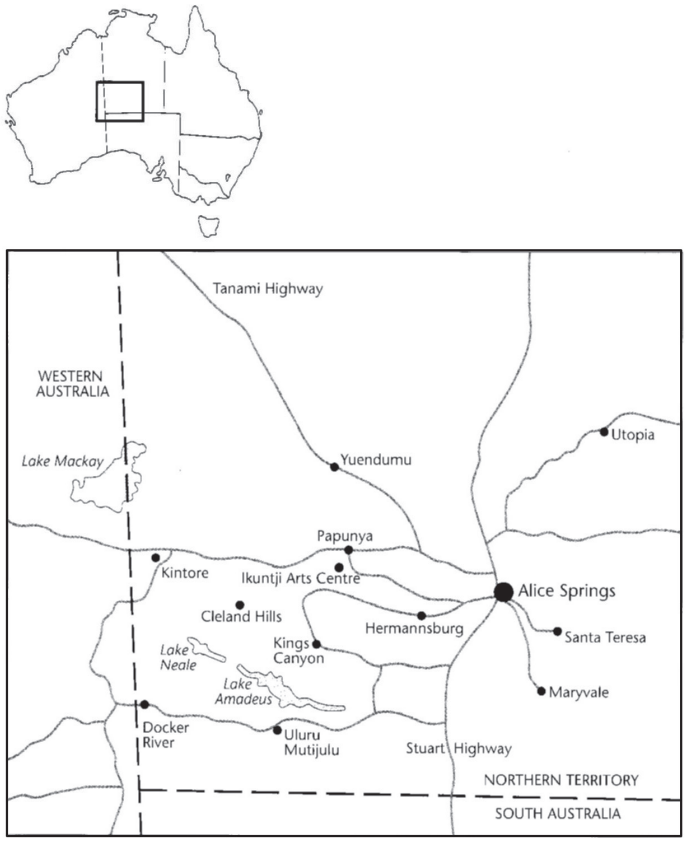

Figure 4. Location of Cleland Hills (Map: Clive Hillaker)

is important both for the comfort of people in storms and the success of archaeologists following several millennia later. The floor of the cave was clean apart from the charcoal of ancient campfires when Mike Smith came upon it in 1986. Many Aboriginal living sites in the arid zone have been buried by Aeolian desert sands. In caves and shelters the sands blow in and make evidence of human occupation hard to find. Shifting dunes also make it difficult to find geological features in this landscape that are constant over time; for example, former and underground water courses have to be reconstructed by modelling from satellite photography. Archaeological finds at this site (charcoals, ochres and other artefacts) revealed that people had been living there at least 35,000 years ago; yet this is remote place had such poor soils and limited water that pastoralism had not been attempted in two hundred years of European settlement, unlike in most of the rest of the Australian arid zone.

Strata aimed to consider the importance of the information emerging from this single rare site to understanding ecological futures under changing and increasingly variable climate conditions. Puritjarra represents one of the harshest and most resource-poor environments in the world and by far the longest time sequence of human occupation anywhere in the Australian desert. This rock shelter that had offered people and animals an oasis of protection, water and food in very rough desert country was also critical to scientific understandings of arid Australia.

As a historian of science I was interested in how a particular place could shape scientific thinking. 'The impact of place on science is inescapable', the Irish geographer, David N. Livingstone, argued in his engaging book, *Putting Science in its Place.*[15]

How do you see such a place? Different eyes will see the same place in different ways, and attend to different aspects of place. I wanted to see this crucial site with the scientist who constructed the knowledge that made it influential. And I wanted to represent what he saw there in physical ways. I was looking for a method to create an aesthetic of science. This was where Mandy Martin, one of Australia's most prominent environmental artists and public aesthetic philosophers joined the team. In a series of environmental projects she has painted many of Australia's most remote arid landscapes, working in partnerships with writers, scientists, landholders and Indigenous people. As the daughter of an ecologist, she is attentive to ecological detail. It was her suggestion that *Strata* should be a collaborative art project, which sought to put together western and Indigenous aesthetics of place in this site layered with very specific archaeological, ecological and historical meanings.

15. David N. Livingstone, *Putting Science in its Place: Geographies of Scientific Knowledge*, (Chicago and London: University of Chicago Press 2003), p. 186.

***Strata*: methods for the past, present and future.**

The Turku conference on *Thinking through the Environment* challenged participants to consider new methodologies for undertaking environmental history. The idea of using art to express environmental ideas about place, to develop a 'co-understanding' of Puritjarra between Indigenous and non-Indigenous artists and between people of different disciplinary backgrounds seemed to be something I could bring from Australia to Finland, where the Northern lands of the Sami are ambiguously between 'wilderness' and 'homeland' – like the Australian desert. Using art as a method in environmental history allowed for the co-understanding of the perspectives of natural and social scientists and, between western and Indigenous people and the products, collaborative creativity, created opportunities for further conversations beyond the actual art.[16]

Figure 5. Mandy Martin working in the Central Australian landscape (Photograph: Libby Robin)

Australian deserts have been understood differently depending on whether the focus was on the deep time history of desert peoples, present ecological management or the ongoing spiritual 'caring for country' that the traditional owners, the

16. On new developments in aesthetic appreciation see Finis Dunaway, 'Seeing Global Warming: Contemporary Art and the Fate of the Planet', *Environmental History* 14/1 (2009): 9–31. Other initiatives in aesthetics and science include the Center for Art+Environment, Nevada Museum of Art (established 2009) See http://www.nevadaart.org/a+e.php.

Ikuntji-Haasts Bluff people, take as their community and personal responsibility. There were multiple aesthetics – not just western scientific and Indigenous. Our initial plan was for collaborative art works to be constructed between Mandy Martin and the Ikuntji-Haasts Bluff artists, but circumstances prevented these artists from travelling from their studio in Haasts Bluff to the shelter, several hours away across rough, unmade roads in difficult conditions. The Ikuntji artists Narputta Jugadai, Daisy Napaltjarri Jugadai, Molly Jugadai, Eunice Jack, Colleen Kantawarra, Alice Nampitjinpa, Linda Ngitjanka and Anmanari Nolan participated in the *Strata* project, but not the fieldwork, electing rather to paint from their 'mind's eye'. They knew the place well, and did not need to be there to paint it. Their paintings captured the place in all the immediacy of May 2004. While they were preparing their work on twelve separate canvases, each 76 x 76 cm, there were several weeks of unusually heavy rain. Most of the Ikuntji paintings captured this event and its effects on the landscape, through clouds and the bush tucker and flowers flowing from such rain in the desert. The works were expansive and the landscape appears very much as a garden decorating their homelands.

By contrast, Mandy Martin's major works of art, three large five-panelled panoramic works of the shelter itself, looked into the site, from further away and closer up. Each centred the 'significant place' in its immediate landscape, capturing the hues and colours of the place with pigments, ochres and soil from the ground itself.

Martin also persisted with the idea of collaborative art, even though the Ikuntji artists were far away. Somewhat to our surprise, each of us at the field site found ourselves challenged to collaborate with her on a smaller five-panelled suite of work that would reflect our respective disciplinary perspectives in the landscape.

Archaeologist Mike Smith undertook a work with Martin entitled 'Palimpsest', a document in canvas of the conversations between archaeological ideas and place. 'Ground Plane' reflected pastoralist Guy Fitzhardinge's concern about the feral animals and plants, traces of distant pastoralism that had found a foothold. Martin and Fitzhardinge together created a work that expressed the shadow of European settlement on this remote place. Martin worked with Jake Gillen to depict his passion for desert plants in 'Puritjarra Flora'. The challenge of the collaborative work undertaken by me with Martin was to find an image for the abstraction of the 'history of ideas'. 'Desert Stepping Stones' was a portrait of the distant blue western outlier of the MacDonald ranges, but it also captured Mike Smith's concept that places like Puritjarra made it possible for people and animals to cross harsh and inhospitable country by providing stepping-stones – 'an archipelago of islands in a sea of desert', as Smith himself expressed it. He was consciously echoing the language of Edward John Eyre, Ernest Giles and other nineteenth century explorers who saw the parallels between the sea and the desert, both in the ripples in the

Figure 6. Mandy Martin and Mike Smith painting together at Puritjarra Rock Shelter, May 2004 (Photograph: Guy Fitzhardinge)

Figure 7. Underpainting in situ for work that became Mandy Martin and Libby Robin's 'Desert Stepping Stones' (Photograph: Libby Robin).

sand and in the fossils from earlier eras when this part of Central Australia was under a shallow sea.[17]

Co-understanding place

By taking 'place' seriously and representing it aesthetically, we found a way to get beyond a simple binary between western scientific knowledge (often portrayed as 'universal') and the local knowledge of Aboriginal people of their own country (sometimes referred to as Traditional Ecological Knowledge [TEK]).[18] Australian Aboriginal peoples prefer story-telling and resist the distinction between nature and culture: country is a place that nourishes, that gives and receives life. Aboriginal knowledge is deeply dependent on place, and meaningless without its specific context. There are no universal 'everywhere' stories. Knowledge cannot be understood without its context in country. In a sense the Australian Aboriginal provides the ultimate example of thinking *through* the environment. Knowledge and place are inextricably linked. Traditional knowledge is not about space, it is about space–time narratives. As anthropologist Deborah Rose, who has written much about Aboriginal understandings of arid and northern Australia, has observed: 'Country has origins and a future.' The inseparability of country and knowledge is often forgotten by western sciences. Even for sciences like ecology that are empirically site dependent tend to understate the interconnectedness.[19]

The history of scientific exploration in Australia has largely ignored Indigenous knowledge, despite the fact that European explorers were frequently aided by Aboriginal guides, who found food and water in inhospitable places, reflecting their specialist knowledge of the country. Since the 1980s, there has been a great deal of re-evaluation of Indigenous agency and many National Parks and conservation initiatives actively seek perspectives from local people. Indigenous knowledge of

17. Smith, *Peopling the Cleland Hills*, p. 15; Ernest Giles ('enhanced by Mrs Cashel Hoey') *Australia Twice Traversed: The Romance of Exploration etc.*, (Victoria Park WA: Hesperian Press 1995 [1889]), p. 42; Edward John Eyre, *Journals of Expeditions of Discovery into Central Australia and Overland from Adelaide to King George's Sound in the Years 1840–1*, (London: T. &W. Boone 1845), p. 26 and online at http://setis.library.usyd.edu.au/explorers

18. Fikret Berkes defined Traditional Ecological Knowledge (TEK) as 'experience acquired over thousands of years of direct human contact with the environment'. It embraces ecology, agriculture, pharmacology and botany (ethnobotany). See Fikret Berkes, 'Traditional Ecological Knowledge in Perspective', in Julian T. Inglis (ed.), *Traditional Ecological Knowledge: Concepts and Cases* IDRC publications (online: http://www.idrc.ca/en/ev-9321-201-1-DO_TOPIC.html), pp. 3–15.

19. Deborah Bird Rose, 'Indigenous Ecologies and an Ethic of Connection', in Nicholas Low (ed.), *Global Ethics and Environment*, (London: Routledge 1999), pp. 175-87, quote 177; George Seddon, *Landprints: Reflections on Place and Landscape*, (Melbourne: Cambridge University Press 1997); George Seddon, *The Old Country: Australian Landscapes, Plants and People*, (Melbourne: Cambridge University Press 2005).

nature has begun to creep into Australian science and land-management practices in practical ways because of community pressure, yet there is still a dearth of ways to talk about this and to enhance such work. The language of dominant natural resource management paradigms makes assumptions about what is 'relevant' to management. Typical executive summaries favour physical science and western environmental tools for quantifying management, which sideline storied and aesthetic responses and tend to disconnect the humans from the land. Humanistic, local and non-western ideas about the connections between people and the environment are emerging through consultative processes but the method of using art to communicate different understandings of environments and environmental ideas is a new one. Art can transcend language barriers and makes seeing rather than telling a primary tool, ideal where English was not the first language of the local people. We did use words as well – but they were the words generated in a project where *seeing* was primary.

Figure 8. Mike Smith and Mandy Martin survey the day's work at sunset (Photograph: Libby Robin)

The term 'sense of place' was popularised in Australia by George Seddon, a polymath scholar who was deeply interested in the scientific dimensions of place. Nevertheless, the growing literature of 'place studies' has tended to focus on political, psychological and spiritual, rather than scientific, aesthetics of place and on stories and narratives rather than art works. Despite the fact that scientific understandings

have been historically important in settler Australians' understandings of landscapes, there have been few tools to critique the distinctive political dimensions of a western scientific view. The criteria for managing the environment often divide into the 'cultural' (or human-centred) and the 'natural' (or scientifically-based) and completely overlook the shared possibilities offered by scientific-cultural understandings.

The *Strata* project's new method went beyond art. While the Puritjarra area is well-documented scientifically in the archaeological literature, archaeology itself has generally been peripheral to environmental management and has rarely informed practice. The art works facilitated new conversations between ecologists and archaeological ideas – and reinforced the idea that environmental management includes the understanding of how people live in landscapes, even the most hostile and remote ones. While Indigenous knowledge systems acknowledge their dependence on country, Western science often differentiates between the knowing and the place, giving priority to knowledge that is independent of place.[20] To bridge that gap, we used our combined knowledge of history, archaeology and art, to give substance to our view that Australian deserts present a rich example of the *spatial construction of knowledge* or, less dramatically, the science of place. In the desert, both archaeology and ecology acquire not just a sense of place but a sense of place in time.

20. Stephen Shapin, 'Placing the View from Nowhere: Historical and Sociological Problems in the Location of Science', *Transactions of the Institute of British Geographers*, New Series 23 (1998): 5–12.

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Desertification – A Significant Problem? Diverse Environmental Literacy in the North Kordofan Area in Sudan

Anu Eskonheimo

Introduction: the study area and the research question

According to estimates by the United Nations, desertification today affects more than 250 million people living in drylands[1] but, from the perspective of natural scientific research, its occurrence is complex in many areas and difficult to verify. This chapter argues that local people's views of their environment can be used to benefit the assessment of the desertification problem and its significance in dry regions.

The term *environmental literacy* is used to describe various actors' conceptions of the physical environment. Environmental literacy develops as a result of a person's interaction with other people and with the physical environment. Although it is an individual attribute to some extent, due to the interaction with other people there is a substantial shared element; hence, it is both social and individual by nature. People who belong to the same groups, such as members of a village community or a research group studying the same environment, are likely to share similar conceptions of it. At the same time, people in divergent groups or even in the same groups may have a plurality of positions and interests in relation to the environment.[2]

1. Secretariat of the United Nations Convention to Combat Desertification, *Explanatory Leaflet: The Problem of Land Degradation*, (Bonn: UN 2005), at: http://www.unccd.int/convention/text/leaflet.php Read on 20 Oct. 2009.

2. Minna Hares, Anu Eskonheimo, Timo Myllyntaus and Olavi Luukkanen, 'Environmental Literacy in Interpreting Endangered Sustainability. Case Studies from Thailand and Sudan', *Geoforum* 37/1 (2006): 128–44.

Figure 1. Map of Sudan with the study area[3]

3. Hares *et al.,* 'Environmental Literacy', p. 134.

The area under discussion is in the centre of Sudan, in the State of North Kordofan (see Figure 1). It stretches from the surroundings of the town of El Obeid about 130 kilometres to the east. The study included farmers who all came from the same village and various groups of nomadic pastoralists who were moving around in the area.[4] The landscape is one of agricultural fields and natural savanna vegetation.[5] Precipitation in this dry region is highly variable: the area suffered from an exceptionally dry period in 1966–1990 including two extremely severe droughts. The mean annual precipitation reached 380 mm in the 1990s but there was high annual variation.[6]

Sudanese government representatives, international development organisations and researchers have been discussing the desertification problem in the area for decades. On a basis of the results of a short-term field study, the Sudanese government and international organisations presented desertification as a major problem in the area in the 1970s. This environmental literacy has since been questioned in geographical and ecological studies conducted in the 1980s and 1990s.[7]

In 2002, I observed the environment of the area and conducted research on how local people viewed the environmental changes that had occurred there in order to add another perspective to the discussion. This chapter is based on that empirical research, which was conducted for a doctoral study for the University of Helsinki. It analyses various perspectives and discussions in order to answer the research question of how significant the desertification problem is to various people in the area under study. It is argued that the methodological approach of comparing various sources of information, including both local environmental literacy and outsider

4. Anu Eskonheimo, *Women, Environmental Changes and Forestry-related Development: Gender-affected Roles of Rural People in Land Degradation and Environmental Rehabilitation in a Dry Region of Sudan*, Doctoral diss., (Helsinki: University of Helsinki 2006), p. 61.

5. Muhamed El Mukhtar Ballal, *Yield Trends of Gum Arabic from Acacia Senegal as Related to Some Environmental and Managerial Factors, Doctoral diss.,* (Helsinki: University of Khartoum 2002), p. 12.

6. Lennart Olsson, *An Integrated Study of Desertification. Applications of Remote Sensing, GIS and Spatial Models in Semi-Arid Sudan*, Doctoral diss. (Lund: University of Lund 1985), p. 105; Yagoub Abdalla Mohamed, Babiker Fadlalla, Alawyia Abdalla and El Amin Abdel Rahman Mohamed, *Indications of Recovery in Biomass Productivity and Soil Organic Matter of Sudan's Sahel Region: A Case Study of Northern Kordofan*, (A paper presented in National Workshop on Dryland Husbandry, organised by Organisation for Social Science Research in Eastern and Southern Africa (OSSREA) at the University of Khartoum, Sudan, November 1995), http://www.ossrea.net/publications/images/stories/ossrea/dryland-husbandry-sudan.pdf; Sudan Meteorological Department, *Rainfall in North Kordofan State 1987–2001*, Unpublished summary of the annual rainfall statistics (El Obeid, Sudan: 2002).

7. Ulf Helldén, 'Desertification – Time for an Assessment?' *Ambio* 20/8 (1991): 372–83; Mohamed *et al*. 'Indications of Recovery'; Lennart Olsson, 'Desertification in Africa – A Critique and an Alternative Approach', *GeoJournal* 31/1 (1993): 23–31.

literacy (natural-scientific knowledge for instance), is beneficial in building up an understanding of the significance and scale of desertification in divergent contexts.

Desertification in North Kordofan as discussed by outsiders

The main viewpoints expressed in the general discussion

The invention of the term desertification has been credited to the French forester Andre Aubréville, who used it to describe the negative environmental changes he observed when visiting some regions in West Africa at the end of the 1940s. As a result of his observations, he became concerned not only about the state of the environment in West Africa, but also about the impact of local people's livelihood activities. He believed that activities such as cutting down trees, cultivation and the practice of burning land in farming systems degraded the forests into savannas and the savannas then turned into deserts.[8] Aubréville's concerns about the desertification problem did not attract much attention in the 1950s and 1960s, but during and after the first great Sahelian drought in 1966–1973 the international community began to fear that it might have caused serious long-term damage to the environment in the affected areas. In this connection, the concept of desertification became widely adopted and used.[9]

The concern about desertification was not, however, based on scientific studies of its occurrence. A rare attempt at measurement was made by Hugh Lamprey, an ecologist and wildlife biologist, who was hired in 1975 by the Sudanese government, the United Nations Environmental Programme (UNEP) and the United Nations Educational, Scientific and Cultural Organization (UNESCO), to conduct a study of desertification in Sudan. Lamprey's study, which took three weeks and comprised aerial surveys and on-ground observation of the environment, covered the area in the North Kordofan State of Sudan that is the subject of this chapter. His report presented alarming findings: the Sahara desert was expanding rapidly, approximately 5.5 kilometres southwards each year.[10] The report had a major influence in international discussion, where its findings were often quoted to

8. Andre Aubréville, *Climats, forêts et désertification de l'Afrique tropicale,* (Paris: Société d'Edition de Géographie Maritime et Coloniale, 1949), pp. 309–10; Michael Mortimore, *Adapting to Drought: Farmers, Famines and Desertification in West Africa*, (Cambridge: Cambridge University Press 2009), p. 14; Jeremy Swift, 'Desertification. Narratives, Winners & Losers', in M. Leach and R. Mearns (eds.), *The Lie of the Land. Challenging Received Wisdom on the African Environment*, (London: The International African Institute in association with James Currey Ltd. 1996), p. 77.

9. David Thomas and Nick Middleton, *Desertification: Exploding the Myth*, (Chichester: Wiley 1995), pp. 28–9; Swift, 'Desertification. Narratives, Winners & Losers', pp. 77–8.

10. Hugh Lamprey, 'Report on the Desert Encroachment Reconnaissance in Northern Sudan, 21 October to 10 November 1975', *Desertification Control Bulletin* 17 (1988): 1–7; Swift, 'Desertification. Narratives, Winners and Losers', p. 78.

emphasise the severity of the problem.[11] The mounting concern about desertification also resulted an international conference, the United Nations Conference on Desertification (UNCOD), which was held in 1977.[12]

Unlike developers with a financial interest in discussing the desertification problem, several independent researchers took a more cautious approach and mentioned the complexities involved in diagnosing and verifying its occurrence. In conjunction with UNCOD, many scientists indicated that they were not sure about the scale of desertification, or about the exact causes.[13] The UNCOD report ended up describing it as the 'diminution or destruction of the biological potential of land that can lead to desert-like conditions'. It was agreed that its main cause was the *increased intensity of land use due to population growth*, which could be exacerbated by drought.[14] Since then, hundreds of definitions have described the process and its causes[15] thereby confusing the discussion of what it means in practise. The United Nations Convention to Combat Desertification (UNCCD), set up in 1994, formulated desertification as *land degradation in arid, semiarid and dry subhumid areas, resulting from various factors, including climatic variations and human activities*.[16]

The UNCCD definition did not include the notion of spreading desert, although desert is an inherent part of the term. Desertification is perceived as land degradation in dry regions and, similarly, this chapter also equates desertification to land degradation in drylands. Land degradation includes degrading processes affecting land, such as erosion, which may occur with variable intensity even in a small area, varying from one agricultural plot to another.[17] This spatial variation in land degradation (or desertification) makes it a complicated and laborious subject

11. Harold Dregne and Compton Tucker, 'Desert Encroachment', *Desertification Control Bulletin* 16 (1988): 16–19.

12. UNCOD, *United Nations Conference on Desertification 29 August–9 September 1977. Round-up, Plan of Action and Resolutions*, (New York: United Nations 1978), at: http://www.ciesin.org/docs/002-478/002-478.html Accessed 20 Oct. 2009.

13. Swift, 'Desertification. Narratives, Winners and Losers', p. 80.

14. UNCOD, *United Nations Conference on Desertification*, at: http://www.ciesin.org/docs/002-478/002-478.html.

15. Michael Glantz and Nicolai Orlovsky, 'Desertification: A Review of the Concept', *Desertification Control Bulletin* 9 (1983): 15–22, Reproduced version by CIESIN; http://www.ciesin.org/docs/002-479/002-479.html; Lennart Olsson, 'Desertification in Africa – A Critique and an Alternative Approach', pp. 23–5.

16. United Nations, *Elaboration of an International Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa. Final text of the Convention*, (New York: UN, 1994), p. 4, at http://www.unccd.int/convention/text/pdf/conv-eng.pdf Accessed 20 Oct. 2009.

17. Andrew Warren, 'Land Degradation is Contextual', *Land Degradation & Development* 13/6 (2002): 453–4.

of study using natural scientific methods. What further complicates matters is that limited and fluctuating precipitation is an integral part of the ecosystems in drylands: dry regions have always been tormented by droughts and variable rainfall that affect the vegetation.[18] The vegetation also seems to have an ability to recover from poor rainfall years during times with increased precipitation; hence, whether affected by desertification or not, vegetation cover increases and decreases in dry regions due to changing precipitation.[19]

In many areas, it is difficult to verify scientifically whether the fluctuations in vegetation are, in fact, related to precipitation changes or whether the decrease in vegetation is also caused by a more permanent decrease in land quality (land degradation). Focusing solely on vegetation to identify desertification seems an inadequate method for many areas, since the vegetation cover is so much affected by rain. Therefore, in many areas, conclusions about its occurrence should be based on studies of soils rather than vegetation.[20] However, even if the focus of research does shift, it requires years of study to be able to determine whether changes in soils – to their nutrient levels, for example – are relatively permanent changes or more short term changes.[21]

Outsiders' literacy of desertification in the study area

As mentioned above, the study area was part of the region that became associated with serious desertification in the 1970s as a result of Lamprey's findings. After Lamprey, a group of geographers from the University of Lund, Sweden, started to challenge his views and published research reports in the 1980s arguing that he had exaggerated the desertification problem. The Lund researchers based their findings on assessing vegetation changes with remote-sensing techniques, field statistics and spatial modeling. They concluded that no clear southward enlargement of the Sahara desert had occurred and that the changes in vegetation had mainly followed the precipitation pattern in the study area.[22] Later, in the 1990s, a group of Sudanese researchers studied vegetation changes in selected sites on the ground

18. United Nations, *Elaboration of an International Convention to Combat Desertification*, p. 4; Thomas and Middleton, *Desertification: Exploding the Myth*, p. 104; Henri le Houérou, 'Climate Change, Drought and Desertification. Review', *Journal of Arid Environments* 34/2 (1996): 133.

19. Thomas and Middleton, *Desertification: Exploding the Myth*, pp. 128–30, 148.

20. Andrew Dougill and Jonathan Cox, *Land Degradation and Grazing in the Kalahari New Analysis and Alternative Perspectives*, (ODI Pastoral Development Network Paper 38c. London: 1995), p. 1, at http://www.odi.org.uk/pdn/papers/38c.pdf Accessed 6 April 2011.

21. See, as an example of such long-term research, Leslie Gray and Philippe Morant, 'Reconciling Indigenous Knowledge with Scientific Assessment of Soil Fertility Changes in Southwestern Burkina Faso', Geoderma 111/3-4 (2003): 425–37.

22. Ulf Helldén, 'Desertification – Time for An Assessment?' pp. 379–80.

and found that the natural vegetation seemed not to be permanently degraded, for it had an ability to 'recover' from poor rainfall years during years of increased precipitation.[23] All these studies concentrated on vegetation changes in the area, rather than on extensive site-specific studies of soils. Hence, although they seemed to verify that Lamprey's conclusions of rapid desert encroachment exaggerated the desertification problem in the area, they nevertheless provided rather general and, in fact, limited information about its occurrence.

In 2002, I conducted another study of environmental changes in the research area by interviewing local people and observing the environment. It was assumed that, although thorough research on desertification would require years of soil-analysis studies, the most severe degradation was observable. Consequently, the author observed the environment in the study area at the end of the rainy season and found some sites affected by degradation or desertification. These sites were characterised by extremely scarce vegetation such as a complete or almost complete lack of trees and bushes and largely destroyed grass cover. They included zones around two sizable towns, areas around water points used by large numbers of animals, an area that had been used intensively by a commercial cultivator and the immediate surroundings of some villages. Observation thus suggested that, in visibly degraded sites, the degradation had been caused by animals, the cutting of trees and the application of unsustainable methods of cultivation.[24]

In addition to the researcher's own observations, the study also focused on the local literacy of desertification and on how environmental changes had affected the local people. Local farmers and nomadic pastoralists (82 people) were interviewed in individual and group sessions where open-ended questions were asked.[25]

Environmental changes from the local perspective

The part of the North Kordofan State included in the study was a relatively small area in the vicinity of the state capital, El Obeid, compared to the significantly larger area assessed by the Lund researchers. The study area was affected by a population concentration of nomadic pastoralists, many of whom stayed longer than previously in the area. The changes in movement patterns were caused by many factors such as the great drought in the 1980s that lead to the deaths of animals, North–South civil war, economic opportunities for animal-related trade in the area (particularly in El Obeid) and the availability of excavated water reservoirs for the animals and wells for the people. The nomadic pastoralists included households with tremendously variable economic statuses: while most owned between ten and fifty big animals

23. Mohamed *et al.* 'Indications of Recovery in Biomass Productivity and Soil Organic Matter of Sudan's Sahel Region: A case Study of Northern Kordofan'.

24. Eskonheimo, *Women, Environmental Changes and Forestry-related Development,* pp. 65–6.

25. *Ibid.* p. 50.

(cattle or camels), a few were extremely wealthy, owning hundreds of large animals (cattle, camels or both). The poorest pastoralists had lost all their big animals and had only had some goats or sheep left. Some nomadic pastoralists also cultivated the land for part of the year but the plots were small.[26]

The sedentary farmers included in the study came from one village, in which the traditional agroforestry[27] system was commonly followed. This system included long fallows without agricultural crops during which *Acacia senegal* trees were grown (the trees also produced gum arabic, which was an important source of income in the area).[28] As far as desertification is concerned, researchers have pronounced local agroforestry to be environmentally sustainable.[29] The poorest farming households did not follow this farming system, however. If they owned any agricultural land, it was so limited that they needed to use it solely for their own food production and, if they had no inherited land, they had to rent a plot by the year from other farmers.[30]

Although the farmers' main source of livelihood was farming, they often had other sources of income; of particular importance were the contributions received from men, who commonly migrated outside the community for several months each year to earn money. They mostly went to the capital of Sudan, Khartoum, and undertook whatever work was available, on building sites or in bakeries for example. Households that did not have adult men, such as the many female-headed households, did not have this significant source of income. With little or no cropland, they had to use the land intensively in order to survive and, without long fallows, the land was likely to degrade.[31]

The poorest farming and pastoral households also had to cut fuel wood for trade in the area to earn additional income. The trees were cut intensively, sometimes even including the trunks. This trade had caused a decrease in the numbers

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26. *Ibid.* pp. 61–66, 87–90.

27. Agroforestry can be briefly defined as a land use system, in which trees and crops are purposely grown in the same farms; see a description of agroforestry in: P.K.R. Nair, 'Agroforestry defined', in P.K.R. Nair (ed.), *Agroforestry Systems in the Tropics*, (Dordrecht: Kluwer Academic Publishers 1989), p. 18.

28. *Acacia Senegal* is a small deciduous acacia tree. It is native to semi-desert regions of Sub-Saharan Africa, as well as Oman, Pakistan, and north-western India. Its product, gum Arabic, is used as a food additive and a cosmetic. The gum is drained from cuts in the bark. Seventy percent of the world's gum arabic is produced in Sudan. Ben-Erik Van Wyk, *Food Plants of the World*, (Portland, Oregon: Timber Press, Inc 2005).

29. Ballal, 'Yield Trends of Gum Arabic from *Acacia Senegal*'; Abdalla Gaafar Mohamed, *Improvement of Traditional Acacia Senegal Agroforestry: Ecophysiological Characteristics as Indicators for Tree-crop Interaction on Sandy Soil in Western Sudan*, Doctoral diss., (Helsinki: University of Helsinki 2005), p. 11.

30. Eskonheimo, *Women, Environmental Changes and Forestry-related Development,* p. 113.

31. *Ibid.* pp. 111, 178.

of trees, which made it even more burdensome to cut firewood for trade or for private use. Most families predominantly used and cut firewood for cooking but the wealthiest were able to purchase charcoal and firewood on a regular basis. The wealthiest pastoral households also hired herdsmen to look for pastures for their animals. Hence, although the environmental impact of large herds was significant, their owners were the least vulnerable to desertification. They did not have to look for pastures themselves and could purchase food and other commodities to meet their everyday needs.[32]

Environmental changes thus affected the people differently, for those who depended most on the environment for survival were affected the most. At the same time, people generally shared concern about the environmental changes; many said that there had been a drastic reduction in vegetation in the area and the farmers also commonly emphasised that their croplands produced smaller crops than before. The interviewees underlined that the main reason behind environmental changes was the decrease in precipitation, which had made it more difficult to make a living in the area. The reduced crop yields provided less income and less food, it took a long time to collect firewood and it was even more difficult to herd animals than before. [33] From the nomadic pastoralists' viewpoint, environmental changes, such as a decrease in the amount of grasses and number of trees, exacerbated the burning problem of the scarcity of common property land in the area, caused by an increase in privatisation of land.[34]

The evidence of local environmental literacy might appear to suggest that desertification in the area is on a larger scale than the studies of vegetation change conducted in the 1980s and 1990s indicated. Comparison with researchers' perceptions is, however, a complicated matter. What is problematic is the perception of a drastic reduction in cropland productivity that was described to have occurred in practically all agricultural fields. Since this study excluded the required several years' soil analysis to assess the possible degradation of soil properties with natural scientific methods, the farmers' perceptions of large-scale cropland degradation could not be assessed against the results of thorough analysis. Such a comparison was, however, made by Leslie Gray and Philippe Morant, who conducted their study of a farming village's croplands for more than eight years in a dry region of Burkina

32. *Ibid.* pp. 15–34.

33. *Ibid.* pp. 136–141.

34. Ministry of Agriculture, *Cultivated Areas, Production and Productivity of Different Crops in North Kordofan*, Unpublished Statistics, (El Obeid: Ministry of Africulture 2002); Omer Egeimi, Mohammed Abdel, Mahmood Abdella and Abdeen Mohammed Abdella, *Towards a Local Peace. SOS Sahel's Experience of Conflict Transformation between Pastoralists and Farmers at El Ain, North Kordofan State, Sudan*, (London: IIED 2003), at: http://www.iied.org/docs/drylands/secur_comm5e.pdf

Faso, Western Africa.[35] They found very little evidence of change in soil properties but when the farmers were interviewed they claimed that the productivity of their croplands had decreased and that this was due to declining precipitation. At the same time, the climatic data for the area suggested that the twentieth century had not seen a decrease in annual average precipitation.[36] In comparison, it can be stated that the farmers in the study area in Sudan had suffered from an exceptionally dry period in 1966–1990, but the 1990s had been characterised by more abundant precipitation. On the whole, the twentieth century had not shown a decrease in annual average rainfall.[37]

The climatic conditions were thus somewhat similar in Burkina Faso and in Sudan. What, then, did the researchers finally conclude about cropland degradation in Burkina Faso and what can be said, based on the available information, about the situation in the farming village under study in Sudan? In the end, Gray and Morant were not able to present clear conclusions about the overall degradation status of the villagers' croplands. They did put forward some interesting ideas concerning the factors that might have affected the farmers' responses, however. They suggested that perhaps the farmers had difficulties describing the changes in the soils that had occurred during the research period of eight years and that the drastic change they referred to perhaps took place over a longer time period. They also thought that the farmers might have compared current land productivity to a situation long ago when there was more recently fallowed land available. Moreover, Gray and Morant's soil analysis concentrated on soil fertility, while the farmers also considered other issues important, such as the appearance of weeds.[38]

Gray and Morant also mentioned that poor soil fertility had been the target of many environmental projects in Burkina Faso. Therefore, it was possible that it was the need to get assistance in raising productivity, rather than any drastic decrease, that had caused the farmers to claim that their croplands suffered from low productivity.[39] The responses may thus have reflected the overall livelihood needs of farmers rather than their environmental literacy of cropland production. This may also have been the case in the area studied in Sudan. The farmers disclosed that most of them still used long fallows – although they had also difficulties in estimating the exact number of years their land was kept fallow. Nevertheless, if most farmers still used long fallows, reduced fallow periods seemed not to explain the reduced crops.

35. See Gray and Morant, 'Reconciling Indigenous Knowledge', pp. 425–37.
36. *Ibid.* p. 434.
37. Olsson, 'An Integrated Study of Desertification', p. 103.
38. Gray and Morant, 'Reconciling Indigenous Knowledge', pp. 434-5.
39. *Ibid.* p. 435.

Some farmers also gave detailed descriptions of the precipitation during the year they were interviewed, but it was difficult for them to describe how the rainfall had diminished over the years. They concentrated on the current situation rather than on environmental developments over the long, linear timeline. Hence, perhaps their cyclical relationship with time combined with the limited rainfall in 2002 explained the widely shared perception among both the nomadic pastoralists and the farmers that precipitation had decreased.[40]

One might wonder whether the Sudanese farmers really believed that precipitation had decreased dramatically and that this had caused the drastic reduction in their croplands. The fact that this question arises reveals some methodological difficulties a researcher of environmental literacy may face when interviewing people: people have various livelihood and other interests and these interests may also affect what conceptions they express about the environment to a Western researcher. At the same time, it is also possible that the local people described exactly how they perceived the changes that had occurred in their croplands. Perhaps the changes in precipitation had, after all, caused the alleged large-scale cropland degradation in the area. This would have occurred owing to the changes in the *manner* in which the precipitation had fallen.

It was mentioned earlier that precipitation had not really decreased in the research area in the twentieth century. However, what is also very important is the manner in which the rain falls: heavy storms are less beneficial to the environment than more steady rain and an environment may suffer from dryness in a year with relatively high precipitation, if it all comes down in one or two particularly heavy bursts. Using annual average precipitation as a measure to describe the development of overall aridity in dry regions is therefore problematic.[41] It is hence possible that the croplands had degraded because of the rainfall: an increase in severity of extreme events such as heavy rainstorms and droughts might have caused increased aridity and soil degradation.

This hypothesis leads to another possibility to be pondered, namely the effect of global climate change on how precipitation has fallen in the study area in recent decades. Global climate change, and particularly its impact on the environment in drylands and elsewhere, is an issue that includes many unanswered questions. Many researchers, nevertheless, agree that climate change is likely to extend the extremes of climate, hence causing even more variability in precipitation. This claim is, however, challenging to verify scientifically. For instance, some carefully conducted studies of the African climate have been unable to verify that global climate change has affected precipitation in the continent. However, it seems that temperatures have

40. Eskonheimo, *Women, Environmental Changes and Forestry-related Development*, pp. 142–4.

41. Mike Hulme, 'Climatic Perspectives on Sahelian Desiccation: 1973–1998', *Global Environmental Change* 11/1 (2001): 19.

risen.[42] If the temperatures in the area under study had also increased, this would have increased the overall aridity, owing to the higher evaporation. If this had occurred, it could at least partly explain why the farmers insisted that productivity in their agricultural fields had decreased.

Conclusions: desertification and its diverse literacy in the study area

Although the exact occurrence of desertification in the study area is still not known, scientific studies of the vegetation suggest that it is not affected on a large scale. At the same time, desertification or land degradation clearly affected some places in the area. The most severe degradation was visible and I was thus able to identify it, having observed some sites in the area. Desertification in such sites is caused by herded animals and the cutting of wood for fuel (particularly for trade). Moreover, intense farming methods had degraded the poorest farmers' croplands and one commercial farmer had also degraded a site by using unsustainable farming methods. The possible impact of climate change on the degradation of the environment, including the widely described degradation of croplands, remains a question that was left unanswered by the study.

The local literacy emphasised that major environmental changes, such as a drastic decrease in natural vegetation and cropland production, had occurred in the area. Local people believed that such changes had been affected by precipitation, whose quantitiy they claimed had fallen over the years. The interviewees raised the issue of livelihood as the most important, stressing the fact that making a living had become harder because of environmental changes.

Local environmental literacy concerning reduced rainfall and wide-scale cropland degradation did not coincide with information received about the still widely used sustainable farming methods with long fallows or with records of mean annual precipitation in the area during the past century. It is therefore possible that the farmers referred to reduced cropland productivity because of their livelihood needs rather than because they had observed a drastic decrease in production. The research area is a dry and harsh environment, where the land generally produces limited crops. Perhaps interviewees hoped that stressing poor productivity would result in some outside support to improve their chances of making a living there. These speculations reveal some problems in studying environmental literacy by interviewing people: the perceptions expressed might be affected by livelihood-related interests.

At the same time, it is also possible that the *manner* in which the precipitation has fallen, has indeed made their croplands more arid, even though the mean annual precipitation did not really decrease in the twentieth century. Furthermore,

42. Mike Hulme, Ruth Doherty, Todd Ngara, Mark New and David Lister, 'African Climate Change: 1900–2100', *Climate Research* 17/2 (2001): 165.

global climate change may have also affected the manner in which the precipitation had fallen but whether this is the case it is not known. If global climate change had caused temperatures to rise in the area under study, it would also have boosted an increase of aridity because of accelerated evaporation.

Many farming families supplemented their earnings from agriculture by other means and particularly by migration of men to work for part of the year outside the community. Since it was the adult men who migrated, female-headed households that did not include men could not receive similar additional income. The poorest households, some of which were headed by females, had to cultivate their small cropland intensively to ensure their immediate survival. Thus, although their livelihood depended most on their croplands, they were obliged to manage them in an unsustainable way in order to satisfy their immediate needs. Among the nomadic pastoralists the households that owned most animals had the biggest impact on the environment but they were less vulnerable to desertification because their financial wealth enabled them to purchase commodities to fulfil their livelihood needs.

All in all, it could be concluded that wealth and the ability to diversify livelihood sources affected how significantly the locals were influenced by desertification or land degradation. In the area under study, desertification was a serious problem particularly for the poorest, who already had to struggle in order to survive. Nevertheless, from the local perspective, the central issue to consider is livelihood rather than environmental change as such. The local people were concerned about precipitation and environmental changes primarily because these changes made it more difficult for them to make their living in the area.

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Thinking Through Memoryscapes: Symbolic Environmental Potency on Mount Kilimanjaro, Tanzania

Timothy Clack

Introduction

Over the last decade there has been some outstanding research into 'perceptions' of and 'perspectives' on African landscapes.[1] A common feature of these accounts, in the main from anthropology and environmental history, is the understanding that landscapes are made not through any process of sedimentation of history but through the continuous reworking of experience and future potentialities.[2] Landscapes are meaningful and are involved in the choreographing of identities and the gathering of cultural knowledge. The environment coordinates behaviour and understandings through processes of priming, memorialising and thinking. In this sense, landscapes are better conceptualised as being found rather than made. Moreover it has also been highlighted that one cannot write about a homogenised 'African perception', as perceptions are, of course, culturally varied and corresponsive. In addition memory and identity are inscribed by social practice.

This chapter will highlight some examples of indigenous memoryscapes on Mount Kilimanjaro as they pertain to the loci of spiritual power, supernatural agency, attachment to land, ritual activities and religious experience. Kilimanjaro lies in the north-east of Tanzania near the international border with Kenya and is

1. Richard Werbner and Terrance Ranger (eds.), *Postcolonial Identities in Africa*, (London: Zed 1996), Terrance Ranger, *Voices from the Rocks: Nature, Culture and History in the Matapos Hills of Zimbabwe*, (Oxford: James Currey 1999), William Beinart and Joann McGregor (eds.), *Social History and African Environments*, (London: James Currey 2003).

2. Ute Luig and Achim von Oppen, 'Landscape in Africa: Process and Vision', *Paideuma* 43 (1997): 8–45.

the traditional home of the Chagga (see Figure 1). The traditional religion of the Chagga posited that the sacred spirit *Ruwa*, which was embodied by the mountain and the sun, pervaded all aspects of the world.[3] *Ruwa* had to be honoured, usually via the intermediaries of the ancestors and spirits, through ritual action including prayers, sacrifices and libations. Chagga traditional religion still pervades the contemporary Christianised religious milieu. The first mission station in *Uchagga* was an outpost of the British Church Missionary Society and was operational from 1885 to 1892. The missionaries were evicted by the Germans and replaced by the Lutheran Leipzig Mission and the Catholic Holy Ghost Fathers. At the time of independence, over 85 per cent of the Chagga considered themselves Christian.[4] Nevertheless, the past informs the present and historic religious attunements resonate throughout the environmental motivations, perceptions and experiences of the Christian indigene.

Dwelling in the memoryscape

The dwelling perspective correctly proposes that landscape is a discovered subject. Human existence involves Being-somewhere.[5] This means the production of place through the inhabitation of spaces by cultural bodies. Space is rendered meaningful through involvement in experience. Landscape relates to experiential space through networks of *de-severance* and *directionality*. De-severance is the process whereby things are recognised as distinct entities in order to facilitate their relational placement. Directionality is characterised by one's involvement with and attachment to things, e.g. emotional closeness. Julian Thomas highlights that certain places are *bodily understood* and thus recede from explicit concern while, through inhabitation, they are ascribed an innate form of closeness.[6] Moreover relationships with places are like relationships with other human beings. Ethnographies inform us that perceptions of, and values attached to, landscape 'encode values and fix memories to places that become sites of historical identity'.[7] Identities concern the conflation of two notions – *memory* and *place*. These are crucial transducers that bring the community into mutual alignment. Indeed landscape provides a context for the negotiation of place, memory and community.

3. Charles Dundas, *Kilimanjaro and Its People: A History of the Wachagga, their Laws, Customs and Legends, together with Some Account of the Highest Mountain in Africa*, (London: Frank Cass 1968).
4. John Iliffe, *A Modern History of Tanganyika*, (Cambridge: Cambridge University Press 1979).
5. Julian Thomas, *Time, Culture and Identity: An Interpretive Archaeology*, (London: Routledge 1996), p. 83.
6. Thomas, *Time, Culture and Identity*, p. 86.
7. Paul Stewart and Anthony Strathern, 'Introduction', in P. Stewart and A. Strathern (eds.), *Landscape, Memory and History*, (London: Pluto Press 2003), p. 1.

Figure 1. Map showing the Kilimanjaro Region in relation to the countries of East Africa.

Landscape can be comprehended as a fusion of culture and nature. Warnings have been put forward that stress the current academic tendency to over-socialise space.[8] The physical landscape has features that must be acknowledged. Of course these will be subjectively made intelligible but nevertheless they will restrict, offer different perspectives, have ecological consequences and so on. Some studies thus dislocate social practice from the ecological and natural milieu, which is misrepresentative.[9] Furthermore, the separation of the cultural and the natural

8. John McGlade, 'Archaeology and the Evolution of Cultural Landscapes: Towards an Interdisciplinary Research Agenda', in P. Ucko and R. Layton (eds.), *The Archaeology and Anthropology of Landscape: Shaping Your Landscape*, (London: Routledge 1999), p. 461.

9. Thomas Benton, 'Biology and Social Theory in the Environmental Debate', in M. Redclift and T. Benton (eds.), *Social Theory and the Global Environment*, (London: Routledge 1994), p. 45.

is a modernist trait that erroneously sets up humanity as the arbitrator of reality. Martin Heidegger refers to this post-Enlightenment conceptualisation as the 'age of the world picture'.[10] The notion of place rectifies such misunderstanding. Place is involved in communication by being referenced by social actors.[11] Landscape has ideological and ontological implications for the way in which we interpret the world.[12] 'Landscape … reminds us of our position in the scheme of nature'[13] and thus it can relate the individual's conception of self with the other. The dwelling is a state of one's in-depth familiarity with place and the building involves the transformation of place through the purposeful addition of meaning. Dwelling and building are fixed locations that maintain identities (of persons and place) by situating memory. Barbara Bender illuminates that, in contrast to the linear narrative of the West, 'memory collapses time into space'.[14] Thus space in essence becomes a landscape of memory. Emotion is involved in this process, as individuals become attached to space and/or responsive to the landscape. In this sense landscapes are the reflection of the cultural group and are thus envisioned in anthropomorphic terms.

Landscape is created through activity both physical and cerebral. Landscape is produced by movement that connects social relations and practice but also other places. For, as Christopher Tilley notes, 'places are read and experienced in relation to others'; thus movement is involved in the interconnection of experience.[15] For, as the individual can move, so too can the landscape. Marilyn Strathern remarks, for example, how the Melanesians make 'places travel'.[16] Heidegger argued that, whilst an individual can physically only be in one place at a time, his or her dwelling is realised as pervading a much more extensive area.[17] Hence dwelling concerns directionality and the distancing of positionality. Indeed the environment is carried around within the cultural subject through memory. Landscape retains its meaning and these place meanings, understandings and obsessions are imposed upon other

10. Martin Heidegger, *The Question Concerning Technology and Other Essays*, (New York: Harper Row 1977), pp. 119–29.

11. Anthony Giddens, *Central Problems in Social Theory*, (London: Macmillan 1979), p. 206.

12. Christopher Tilley, *A Phenomenology of Landscape: Places, Paths and Monuments*, (Oxford: Berg 1994), p. 25.

13. David Cosgrove, 'Geography is Everywhere: Culture and Symbolism in Human Landscapes', in D. Gregory and R. Walford (eds.), *Horizons in Human Geography*, (London: Macmillan 1989), p. 122.

14. Barbara Bender, 'Subverting the Western Gaze: Mapping Alternative Worlds', in P. Ucko and R. Layton (eds.), *The Archaeology and Anthropology of Landscape*, (London: Routledge 1999), p. 35.

15. Tilley, *A Phenomenology of Landscape*, p. 31.

16. Marilyn Strathern, *Partial Connections*, (London: Roman and Littlefield 1991), p. 117.

17. Martin Heidegger, *Poetry, Language, Thought*, (New York: Harper and Row 1971), p. 157.

places. Landscape is thus simply humanised space and hence relational, temporal and specific. Consequently the meaning acquired through agency centres space.

> A centred and meaningful space involves specific sets of linkages between the physical space of the non-humanly created world, somatic states of the body, the mental space of cognition and representation and the space of movement, encounter and interaction between persons and between persons and the non-human environment[18]

Culture, emotion, memory and landscape are all interrelated. The notion of the memoryscape is an expression of the convergence zone that homogenises these concepts. The memoryscape is a refinement of the conceptual *maps of meaning* promoted in the discipline of human geography. This concept champions the idea that cultures are planes of meaning through which individuals sustain intelligibility and comprehensibility. Numerous similar useful metaphors have been taken up by cultural geographers, e.g. 'maps of meaning',[19] the 'geography of the imagination',[20] 'sense of place', 'symbolic space' and 'cartography of taste'.[21] Maps and other cartographic enterprises have been criticised for the power relations they embody in their (mis)representative omissions and inclusions.[22] Of course, memoryscapes or maps of meaning are not the preserve of elite groups because meaning and intelligibility are inherently individual. The memoryscape is thus a hardwired yet subjective phenomenon that is of species-wide potential but is culturally particular in expression. All human beings dwell within a memoryscape.

In the influential paper 'Places of Power and Shrines of the Land', some pertinent distinctions are raised that concern any conceptualisation of the sacred memoryscape.[23] These build on the insight that natural places of power differ from land shrines.[24] The ritual activity associated with nature spirits is conducted where they are believed to dwell and there is usually an absence of land shrines, which relate to ancestor spirits. Eva Colson distinguishes between places of power and land shrines as ritual sites. The possession of knowledge about these sites leads to them acting as foci of identity that convey attachment and belonging to the land. Land shrines contain a relationship to the community as they involve human experience or life-force. Moreover these shrines are deeply rooted in local history

18. Tilley, *A Phenomenology of Landscape*, p. 10.
19. Paul Jackson, *Maps of Meaning*, (London: Routledge 1992).
20. Gavin Davenport, *The Geography of the Imagination*, (London: Picador 1984).
21. Steven Field and Keith Basso (eds.), *Senses of Place*, (Santa Fe: School of American Research 1996).
22. Julian Thomas, 'Archaeologies of Place and Landscape', in I. Hodder (ed.), *Archaeological Theory Today,* (Oxford: Polity 2001), p. 168.
23. Eva Colson, 'Places of Power and Shrines of the Land', *Paideuma* 43 (1997): 47–57.
24. Jan Vansina, *Kingdoms of the Savanna: A History of Central African States until European Occupation*, (London: James Currey 1966), p. 32.

and so are embedded in cultural knowledge.[25] They represent 'the continuity of human life forces, not the power inherent in nature'.[26] In contrast, places of power are landscape features that exhibit permanence and are perceived as being inherently sacred – the loci of spiritual power. Potential sites for places of power seem to exhibit surprisingly little variance. Indeed 'this is so much the case that few raise the question of why these and not others'.[27] Thus all such sites have the potential to engage imagination and so become imbued with sacred meaning. Obviously both shrines of the land and powerful places evoke supernatural potency. Although the phenomenon of the memoryscape conflates places of power and land shrines the distinction is still valid and potentially useful. Communities and individuals respond to these sites in differing ways. Religious meaning is constantly re-articulated or re-invented at these locales.

Heidegger generally considers nature as something assimilated into culture instead of being present-at-hand and having practical uses.[28] Thus nature is always cultural and value-laden. Nevertheless he sometimes reveals another stance on the nature of *earth*. Earth shelters the beings that arise from it, it is the foundation of the world and the medium of dwelling and it offers spontaneity and conceals itself.[29] The concept of earth denotes a more profound way of relating to nature – as not only something to be respected but as something that exists resisting and preceding human manipulation and interpretation.[30] Moreover Heidegger writes of 'the nature … which assails us and enthrals us as landscape'.[31]

> [C]ulture arises from nature, and tries to understand that from which it arises. Since a culture sheds light on people and their surroundings, it is intrinsically opposed to obscurity and tries to illuminate nature. But … nature loves to hide: there are always limits to what we can understand, and nature tends to reassert itself in its mysterious power.[32]

Heidegger also notes that truth is found in sheltering – clearing and unconcealment are grounded in particular beings. These beings, of which earth is one and art another, shelter truth.

> [W]e may glance at a mountain and naively assume that it is just 'there', an object that is given to us. Being and truth are then dimmed down. But if we allow the mountain

25. Luig and von Oppen, 'Landscape in Africa', p. 22.
26. Colson, 'Places of Power and Shrines of the Land', p. 52.
27. Colson, 'Places of Power and Shrines of the Land', p. 49.
28. Richard Polt, *Heidegger: An Introduction*, (London: Routledge 1999), p. 137.
29. Martin Heidegger, 'Building, Dwelling, Thinking', in D. Krell (ed.), *Martin Heidegger: Basic Writings*, (London: Routledge 1993).
30. Polt, *Heidegger*, p. 137.
31. Martin Heidegger, *Being and Time*, (Oxford: Blackwell 1962), p. 100.
32. Polt, *Heidegger*, p. 138.

> to shelter the truth of Being, we can experience its 'thereness' more fully. We will acknowledge all the ways in which the mountain makes a difference in our world.[33]

The mountain and other places within the landscape gather the world and shelter the truth. They are sites that display various dimensions of significance. This significance is the mystery through which the earth and world are presented. David Cosgrove asserts that '[b]ecoming is inscribed in landscape'.[34] In actuality it is Being that is embodied by landscape, through disclosure bought about by the interplay of subject and memory. It is interesting that Heidegger saw the world as becoming a wasteland, denoting indifference, the reduction to unbeings and the oblivion of Being. Therefore true being and care is a historical possibility rather than a universal feature of humanness. This mirrors somewhat the anti-religiosity of the contemporary West. Mountains are particularly good illustrations of striking landscapes that shelter meaning. Mountains are 'natural religious monuments' associated with 'beliefs, myths and legends' practiced through 'rituals, sacrifices, offerings, and prayers'.[35] Indeed Simon Schama writes of the 'authentic mountain experience', the 'scroll of eternity embedded in the rock', and the mountain as 'conceived cerebrally'.[36] Mountains are made intelligible through memory and sensation; thus they are potentially emotive and highly stimulating. If elemental components of religions are founded in memoryscape, it should be feasible to conjecture that religious identities will integrate striking landscape and its inherent meaning into their constitution. The contemporary Chagga, despite missionary activity and the modernising processes of development, are found to incorporate the environment into their religious worldviews. It should be noted, however, that discussion of a homogenous Chagga identity is troublesome. In fact identities are not uniform across the slopes and this relates to the different local histories and their mediation through collective forms of memory and signification. As such the various examples later highlighted should be seen to have their own relative contexts. Nonetheless, individuals do share senses of affinity with other Chagga, particularly in terms of their collective 'belonging' and 'attachment' to the environment and these understandings linked to place have continued, especially over recent decades, to permeate through local dialectical and religious margins and align alien knowledge with local meanings. Thus, when colouring the memoryscape, global and local brushes are required. In what follows that labelled Chagga refers to all of those who dwell on the slopes of Kilimanjaro, whilst particular examples relate to specific localities.

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33. Polt, *Heidegger*, p. 149.
34. Cosgrove, 'Geography is Everywhere', p. 285.
35. John Mbiti, *Introduction to African Religion*, (London: Heinemann 1975), p. 149.
36. Simon Schama, *Landscape and Memory*, (London: Fontana Press 1996), pp. 504, 488, 473.

Physicality of Kibo: reverence and irreducibility

It has been noted that soils, seeds and water will commonly assume cosmological significance.[37] Moreover rock as a material has a permanence beyond other natural and artificial types and therefore offers understandings of the past, present and future.[38] The environment is made intelligible through processes of reverence and vitality. The divine supernatural force that is the traditional deity *Ruwa* is incomprehensible and indescribable. This relates to one valiant attempt to conceptualise the numinous that notes the sacred is awe-inspiring and overpowering.[39] Indeed believing in the sacred is 'like standing at the foot of a towering mountain' that precipitates the feeling and intuiting of awareness, humility, wonderment, reverence and gratitude.[40] The physicality and the presence of *Kibo* (Mount Kilimanjaro; see Figure 2) attach the Chagga to the environment as a coordinating focus. The mountain dominates the landscape and everyone and everything sits in relation to it. Their Being-somewhere corresponds to their position *vis-à-vis* the entity that is the mountain. In this sense the Chagga are intrinsically linked to the mountain through emotional attachment, manifested in bodily responses, perceptual comportment and supernatural experience.

It has been commented that it is impossible to represent the divine symbolically and consequently the Chagga have no images of *Ruwa.*[41] This might seem to contradict the essence of conceptualisations and correlations between the mountain and the divine. However such assertions can be countered admirably with the following remarks made by Paramount Chief Marealle on the opening of an art exhibition:

> There are … so many facets of Kibo that a hundred artists could do the Old Man without finishing Him! I cannot think of a better subject for the brush than that, and beginning there you have the rest of the world on your plate.[42]

37. Paul Shipton, 'Land and Culture in Tropical Africa: Soils, Symbols, and the Metaphysics of the Mundane', *Annual Review of Anthropology* 23 (1994): 347–77.

38. Paul Rainbird, 'Marking the Body, Marking the Land', in Y. Hamilakis, M. Pluciennik and S. Tarlow (eds.), *Thinking Through the Body: Archaeologies of Corporeality*, (London: Kluwer 2002); Paul Taçon, 'Socialising Landscapes: The Long-Term Implications of Signs, Symbols and Marks on the Land', *Archaeology in Oceania* 29 (1994): 117–29.

39. Rudolf Otto, *The Idea of the Holy,* (Oxford: Oxford University Press 1950).

40. Sambuli Mosha, *The Heartbeat of Indigenous Africa: A Study of the Chagga Education System*, (New York: Garland 2000), p. 9.

41. Mosha, *The Heartbeat of Indigenous Africa*, p. 8.

42. TNA/NA/L5/21, 'Tanzania National Archives, Native Affairs L5/21', (Transcript of speech given by Paramount Chief Thomas Marealle on the Opening of Moshi Art Exhibition, 1957).

Figure 2. Photograph of Kibo from a position in the Maharo region of Uchagga. *(Photograph: Timothy Clack)*

The Chagga conceptualise *Kibo* in therianthropic and emotional ways. The mountain choreographs and fixates their identities with its infinite significance, immeasurability, profoundness, irreducibility and numinousness. Through its physicality, the mountain is able to sustain the inhabitants of the slopes. Furthermore, the mountain is understood as offering both basic and spiritual provisions and nourishment in addition to protection and shelter.[43] A specific illustration of moral priming concerns the Kinukamori Waterfall in the Marangu region (3°17'S, 37°31'E). The visually striking falls are the site of historic agency. All local indigenes are familiar with the legend of the ill-fated Makinuka that is embodied in the falls. Makinuka was a young woman who, tradition holds, lived during the reign of Chief Rina of Kibosho. This woman was involved in unchaste relations with a local man. Penalties for such behaviour were particularly harsh, with torture and execution deemed appropriate, so the two of them were fortunate not to be suspected. Nevertheless, Makinuka became pregnant and her swelling began to testify to her recent immoral activities. In due course, her mother cast her from her home. Makinuka decided to kill herself by throwing herself from the top of the falls. Upon reaching the top she reconsidered her action and decided to return home and plead for mercy. Just as she was about to move she became aware she was being stalked by a leopard and, upon nervously backing away, fell over the falls to her death.

43. Timothy Clack, 'Protective Memoryscapes of the Chagga of Kilimanjaro, Northern Tanzania', *Azania* XL (2005): 110–7.

The falls have recently been exhibited in such a way as to maximise tourist potential. Life-size concrete casts of a leopard and a woman have been erected and the adjoining Chagga Cultural Museum is seeing a steady flow of tourist monies and visits. Even prior to these recent amendments, however, the waterfall served as a local moral primer. When one who is familiar with the local traditions views the waterfall, one recalls either consciously or unconsciously the story of Makinuka. Moreover, the falls retain a potency related to the ritual agency of the past. Traditionally the uncircumcised dead were thrown off the top of waterfalls to be consumed by the animals. It is possible that this myth may originate in such practice. It is interesting to note that the name of the falls is derived from its past patriclan affiliation. In the distant past it was the property of a Mtui patriclan elder called Kimori. Indeed the Mtui clan is often referred to as the Kimori or Mmori clan. Hence Kinukamori relates to Kimori Mmori. The site also has other less pleasant connections with the Mtui clan. It was the site where punishments were delivered to convicted clansmen during the period of the precolonial chiefdoms. Moreover it is where Nathaniel Mtui, a powerful local who worked for the German colonial administration, was murdered. The narrative of Makinuka and the connection of Kinukamori with the Mtui patriclan is more than myth – it is a belief based on memory, the collective memory of the social group, which is inscribed upon the landscape. The landscape acts as a priming device that repeatedly expresses the past and, in so doing, binds it seamlessly to the present and future.

Much of the traditional cosmological and ritual belief of the pre-colonial Chagga still impacts upon contemporary perception and is demonstrated in the cultural *habitus*. The memoryscape informs every facet of the Chagga cosmological and habitual world. Through their performance all human activities had otherworldly significance'.[44] Moreover, nothing is inaccessible to spiritual intervention. Hence all ritual symbols were drawn from ordinary objects/categories. Sally Falk Moore lists symbolic themes used in the ritualisation of the Chagga worldview.[45] These comprise the body, including its processes and products, basic foodstuffs, food processing activities, human-made objects and structures, the plants and animals of Kilimanjaro, natural phenomena and natural dimensions. Some of these ritual categories continue to facilitate the employment of the environment in ritualised activity. Furthermore 'all things and processes were interpretable in terms of classifying categories that made supernatural sense out of the natural and cultural worlds'.[46] Thus the mountain, implicated in the cultural world, was, through these symbolic categories, used to make sense of the supernatural.

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44. Sally Falk Moore, 'Part I: The Chagga of Kilimanjaro', in W. O'Barr (ed.), *The Chagga and Meru of Tanzania*, (London: International African Institute 1977), p. 46.

45. *Ibid.* pp. 46–7.

46. *Ibid.* p. 49.

The 'natural phenomenon' was one of the Chagga symbolic classifications used in making sense of the world. Thus the mountain, through its physicality, becomes intelligible in terms of supernatural agency. Furthermore the 'environmental dimension' was another cosmological indicator. Indeed the dualism higher–lower with higher being superior to lower is one such important dimension. The Chagga demonstrate an *occidented* navigation or scheme of alignment – they take their orientation from the mountain and not the sun. This has become bound up with the dimensional opposition up-mountain–down-mountain.[47] It is well-documented that directions are given locally as 'up-slope' or 'down-slope'.[48] In addition, it is customary upon meeting that the individual coming from above – the direction of *Kibo* – gives greeting first because of associations of fortune and honour.[49] Social hierarchy is also similarly expressed. A superior individual should always be offered the higher and more honourable side of the road.[50] Various flora and fauna are incorporated into the cosmological and symbolic world associating the mountain with the supernatural world. For instance to recognise the completion of the transaction/sale of *kihamba* land, the vendor, in the presence of witnesses, will cut some leaves from a banana tree standing on the land in question and give them to the purchaser to take away. Thus the symbolic leaves are part of a performed ritual of land transaction. The *kimanganu* ordeal is a further example of vegetation featuring in the mythological world. The ordeal was formerly a means used by the chief to settle disputes. It required certain subjects to consume an intoxicating and partially poisoning drink made from the dried leaves of certain plants.[51] The concoction was believed to act like a truth drug and, when the subject was questioned, the chief could ascertain guilt or innocence. The ordeal was known to cause prolonged illness, swelling of the sexual organs and sterility in some of those it was administered to. Thus, as Moore notes, 'many an accused person confessed before being subjected to the ordeal'.[52] The elders warn the children to 'be careful to tell the truth for the mountain will tell us if you are being false'. Such panic-mongering amongst the dependent population may well relate to the *kimanganu* ordeal.

It has been noted that in pre-Christian times the *msale* plant (*Dracaena steudneri*) had important 'religious and social significance for the Chagga'.[53] Even

47. *Ibid.* p. 49.

48. Mattias Tagseth, *Knowledge and Development in Mifongo Irrigation Systems*, (MPhil diss., Norwegian University of Science and Technology, Trondheim 2003), p. 14.

49. Dundas, *Kilimanjaro and Its People*, p. 39.

50. *Ibid.* p. 49.

51. Sally Falk Moore, 'Politics, Procedures, and Norms in Changing Chagga Law', *Africa: Journal of the International African Institute* 40 (1970): 321–44.

52. Moore, 'Politics, Procedures, and Norms in Changing Chagga Law', p. 329.

53. Peter Bailey, 'The Changing Economy of the Chagga of Marangu, Kilimanjaro', *Geography* 53 (1968): 163–9.

to this day the plant is considered sacred and is frequently used for demarcating boundaries and as fodder for animals; and it is thought its inherent healing properties will cure certain ailments. The plant is also linked to forgiveness and pardoning:

> If I do you wrong but later come to you with *sale* leaves and break them … and rub them upon your chest then you must forgive me and the wrong must be undone in the eyes of all. For if the bitterness remains then it is you that will die … [and] this is why the Chagga are so forgiving a people.[54]

Msale is a pervasive signifier of death. This is because it plays an important role in death rituals. The Chagga ritual response to death was multifaceted, since death is conceptualised in terms of a communicative vehicle bridging the supernatural and natural world. Moreover, *msale* is encouraged to grow on specific sites associated with death, such as the *mbuoni* or ancestor shrine. It is also noted that traditional abortion practice is conducted with a branch from the *msale* tree being induced into the uterus.[55] This symbolic correspondence between death and *msale* derives from memories of traditional ritual and cultural practice. Moreover the plant *isale la shofu* (elephant *sale*) is believed to deliver, when consumed, a similar prophylactic effect to that of quinine for malaria. The belief may relate to the sacred qualities of *msale*. The medicinal dimensions of *isale la shofu* may be derived from this cultural tradition. For illnesses are frequently understood in non-scientific ways, as embodiments of bad spirits. Thus *isale la shofu* is thought to bring death or life to a bewitched or poisoned body.

In the Chagga cosmology, fortune and misfortune are brought on by im/proper ritualised conduct. *Ruwa* and remote spirits and ancestors control supernatural power. However, the superior spirits tend not to interfere with human affairs. The entities that exist in the spirit world, within the earth, need to be managed and appeased through ritualised human activity. Ritual action is known as *mrumo*. Ritual activity considered *mrumo* consists of petitions, thanksgiving, reconciliation, libation, veneration and adulation. The mountain precipitates and evokes ritual action. In the 1950s it was commented that the elders continued to 'look at Kibo with a contemplative silence' and think 'we know your hidden powers will see us through this day'.[56] This relates to the older traditions whereby, upon rising in the morning, a Mchagga would face towards Kibo and pray towards the mountain in

54. Anonymous Informant (Interview data, MR/Mb8/August 2004).

55. Päivi Hasu, *Death and Desire: History through Ritual Practice in Kilimanjaro*, (Saarijärvi: Gummerus Kirjapaino 1999), p. 479.

56. Thomas Marealle, 'The Wachagga of Kilimanjaro', *Tanganyika Notes and Records* 32 (1952): 57–64.

its praise.[57] Indeed such ritual behaviour has been proposed as contemporary[58] but it seems unlikely that, even amongst the elders, the spitting-rituals are practiced. Nevertheless, the practice is still recognisable in living memory and, as such, coordinates experience and perception.

Traditionality and rituality

In colonial Kilimanjaro the missionary position (excuse the pun) emphasised the relation between property and marriage. During this period the performance of the Christian marriage ritual was only deemed appropriate if the Chagga male had realised cultural expectations of house ownership. Within this house the wife could be placed.[59] Thus the religious potency of the environment was stressed with the understanding that property and fixity relates to a Christianised mode of being. Moreover, according to the missionising project and carried through into contemporary performance, sexual habits are culturally understood through metaphors of space. Women and the land have procreative potential that should be accessed through invocations and rituals. Thus abortions are perceived as the greatest form of sin – such practices are believed to destroy sociality and subsequent reproductivity. Abortions and contraceptives are believed to encourage women to roam around.[60] Roaming in this context is immoral, refers to increased sexual liaisons and contrasts with the Christian ethic of fixed monogamous matrimony. According to customary belief, women should be placed within a house. Indeed the moral female body is sometimes described in terms of a house with the sexual organs being the hearth.[61] The immoral female body is mobile, loose, fast and commercial and is often described in terms of modern transportation.[62]

The Chagga identity manoeuvres between the political strategies of Christianity, modernity and tradition. One does not only define oneself as Christian according to contrasts with the traditional or modern but more so against other religious and ethnic/tribal groups.[63] Thus the culture is syncretistic – having synthetically incorporated exogenous cultural, material and ritual elements over time. The indigenous religions are creolisations, hybridisations or interculturations of

57. Pedro Marealle, 'Chagga Custom, Beliefs and Traditions', *Tanganyika Notes and Records* 64 (1965): 56–61.

58. Mosha, *The Heartbeat of Indigenous Africa*, p. 77.

59. Hasu, *Death and Desire*, p. 367.

60. *Ibid.* p. 394.

61. Martha Emanatian, 'Everyday Metaphors of Lust and Sex in Chagga', *Ethos* 24 (1996): 195–236.

62. Barbara Weiss, 'Buying Her Grave: Money, Movement and AIDS in North-West Tanzania', *Africa* 63 (1993): 19–35.

63. Hasu, *Death and Desire*, p. 406.

multiple other syncretistic cultural entities and forms. The indigenous actor must be recognised as proactively involved in the shaping of his or her religious worldview by creatively and imaginatively striving to make sense of religious attunements, teachings and understandings. Thus, syncretistic processes involve a recasting of indigenous beliefs within a fluid and malleable field of agency, power and value. Lifecycle rituals, for instance, tend to be performed throughout *Uchagga* during the Christmas period.[64] During this period the migrant workforce returns home to perform both Christian and traditional ceremonies. This demonstrates the potency of the traditional rituals – cultural conformity is being facilitated in innovative contexts. Another factor that has been subsumed within indigenous matrices of cultural understandings is the AIDS pandemic. This event is understood in reference to biblical metaphors and evangelical teachings. The Christianised body of the Chagga must be physically and sexually placed within the ancestral environment to avoid judgement. Because there is no bio-medical cure, it is logically perceived that the only protection against AIDS infection is to live the morally upright life espoused by the bible.[65] Essentially those who roam sexually harvest death.

One common instrument of the missionary enterprise concerned the harnessing of traditional potencies and beliefs by recasting areas of mutuality between the traditional and the modern religious understanding. There are multiple examples of this in Chaggaland. The early missionaries, for instance, translated German hymns into the local dialects of Kichagga. This probably related to the indigenous fondness of song and its centrality in both ritual and everyday life. The translation of hymns was given a high priority for similar reasons in the Anglo-Saxon missionary schools.[66] The popularity of such works increased when environmentally specific allusions were included within the hymns, making them pertinent to indigenous experience and perception. For example, the following two extracts are typical of hymns from an indigenous hymn book dating from the early twentieth century. These hymns are still popular on the slopes today and form part of the religious expression of the locale. The following Kimashami text is taken from a Lutheran publication and the translation was accomplished with the assistance of multiple local informants and interpreters.[67]

64. *Ibid.* p. 31.

65. *Ibid.* p. 404.

66. John Comaroff and Jean Comaroff, *Of Revelation and Revolution: Christianity, Colonialism, and Consciousness in South Africa,* (Chicago: University of Chicago Press 1991), p. 241.

67. Evangelical Lutheran Church in Tanzania, *Kitabu kya Fiimbo na Katekisimo ya Kimashami*, (Moshi: Moshi Lutheran Press 1909).

Hymn 265. Meinen Jesum Laß Ich Nicht (My Jesus Leave Me Not)

Nkundye iva Yesu-fo,	I do not want to leave Jesus,
Ankuvika ando akwa.	For He has acted on my behalf.
Kuti shikumwosire	I must embrace Him
sha urovirovi tapu.	Like *urovirovi*.
We ni sa ivaiyaa muu.	You hold so firmly because you are the light of life
Nkundye ira Yesu-fo.	Do not leave me my Jesus.

Hymn 268. Schönster Herr Jesu (The Goodness of Jesus)

Kyaamwi kyashia,	The mountain is the holder of the light,
mmbo kirooye uuwe,	It is beautiful, upright and high,
kikakooya mafishi.	It reaches the clouds.
Yesu nsha torya	But Jesus is more beautiful, above all beauty
Yesu m mwaa torya,	And Jesus is so bright, above all brightness
akee mwaruta mirima.	You make the heart and soul happy.

Essentially these hymns represent the manner in which the local environment and the memoryscape were being recontextualised and adapted within the new cultural and religious project. This incorporation makes the new religion simply a novel rearticulation of traditional awareness and indigenous knowledge systems. Hence the new religion and its practices contained a high degree of familiarity for those undergoing conversion – in other words it was more likely to make intuitive sense. God and Jesus are not alternatives to the sun, the mountain or other elements of the landscape but relate to their potency. The mountain is not the seat of the divine but demonstrates the power of the sacred. The hymns reiterate that the Christianised *Ruwa* surpass the traditional religious foci in every tangible way but do so by juxtaposition with them and thus unavoidably relate to them. Moreover the expression of symbolic concepts such as entanglement, unity and adherence required innovative strategies for ensuring full comprehension. In hymn 265, for instance, a simile is utilised to better facilitate understanding –one is instructed to embrace the divine like *urovirovi*. This form of tangle-weed is very common in the forest belt of Kilimanjaro and all indigenous people are familiar with it.

Perhaps an even more indicative case concerns the missionary architecture. It is worthy of note that churches and missions tended to be sited on ground of high relief, dominating the local landscape. Thus, through their positional highness, they related to the mountain and traditional religious potency. Moreover axial alignments of church buildings are also significant. A pilot study conducted upon the local churches in the Machame and Maharo regions of the mountain focused on their axial relation to the mountain (see Table 1). It is clear that direct and approximate altar–mountain alignment is demonstrated in all but one case. The potency of the landscape was harnessed by the missionaries. Despite the small number of churches

actually surveyed (13) the study raises some potentially interesting questions about the motivations behind local architectural design and setting.

Table 1. Orientation of local churches in the study areas

Church Details					Alignment of altar to Kibo (degrees)		
English name	Kiswahili name	Kimashami name	Village	Religious Denomination	Current	Previous	Closest
Believe - In	Nkwarungo Kusirye-U	Muoamini	Foo	Lutheran	120°	5°	5°
I Am With You	Niko Pa-mosa Nanyi	Shikee-Neeni	Foo	Lutheran	10°	N/A	10°
Jesus Our Saviour	Yesu Kristo Nimwokozi	Yesu Nyi Nkira	Foo	Lutheran	315°	N/A	45°
Church of the Heart	Kamisa La Kiroho	Nyikamisa Lya Mrima	Foo	Pentecostal	15°	N/A	15°
N/A	N/A	Nkwasanu	Nronga	Lutheran	15°	N/A	15°
Continue to Praise	Mtukuze	Arafumin	Nronga	Lutheran	10°	N/A	10°
N/A	TEWO	Kanisala	Nronga	Pentecostal	355°	N/A	5°
He Is the Truth	Ni-Wa Kweli	Mbwa Dede	Wari	Lutheran	355°	N/A	5°
Door to Heaven	Betheli	N/A	Wari	Lutheran	180°	N/A	180°
The First and the Last	Alfa Na Omega	Wa Mwanzo Na Mwisho	Uduru	Lutheran	0°	N/A	0°
Mkuu Parish Church	N/A	N/A	Maharo	Roman Catholic	0°	N/A	0°
Old Mkuu Parish Church	N/A	N/A	Maharo	Roman Catholic	0°	N/A	0°
Kirokomu Parish Church	N/A	N/A	Makiidi	Roman Catholic	180°	N/A	180°

Clearly church altars are aligned with the mountain. Whether intentional or not, and it is highly likely that such building projects were thoroughly applied to the local context to maximise effect, symbolic reasoning for the alignment cannot be escaped. No Chagga would be able to unconsciously or consciously escape its

permeation. The orchestrated positionality of the churches and resultant altar-Kibo axial correspondence related and indeed relates the traditional *Ruwa* with the new missionary deity. As noted, these architectural decisions had further useful performative implications: rituals were choreographed in a manner that maintained some intuitive action based on habitual rehearsal. Moreover the newly introduced practices conformed to a great extent with the local historical, cultural and ritual *habitus*. Traditionally much ritual action incorporated the mountain in some fashion – as a direction, as a point of reference, as a religious symbol and so forth. With conversion came the required performance of new rituals such as prayer, partaking in communion, hymn-singing, genuflection and reciprocated engagement with the rites of preachers, missionaries and evangelists. These rituals incorporated the divine within their practice and, by having the altar aligned with Kibo, adjustment would have been minimal. In many ways one was relating to the numinous in a comparable manner. Previously divine engagement involved the mountain and subsequently it involved the altar. In simple terms one could still pray to *Ruwa* through the mountain while adopting the ritual practices of the new religion.

Conclusion

The environment is found by the subject through worldly engagement. This involves processes of memory, history and dwelling. Thus the memoryscape can be considered a technology for rendering the world intelligible. What the properties of the environment mean to an individual is a function of his or her own being and orientation to the world, which confers a scheme of perception. This scheme is an appropriation or *project for living*.[68] The subject renders the world a landscape or environment through engagement with it. The environment is defined by the subject and for some part emanates from within it. Therefore, in thinking through the memoryscape, the subject can profitably be conceptualised as structural in the sense of environmental coherences and rules. These structures are lived and allow the evocation of abstractions through their incorporation in subsequent history. A syncretistic dynamic exists where the new is made intelligible through the traditions and resonances of the past. In this sense memoryscapes relate to dwellings. Memories, again like histories and pasts, offer feelings of emplacement, rootedness and attachment.

Temporal fixity and being-somewhere results in the feeling of belonging. This sense of belonging or attachment is culturally enhanced and might be manifest in the human preoccupation with boundaries, home-ranges and ethnicities. Undoubtedly, the memoryscape is a manifestation of an innovative 'style of thinking'

68. Timothy Ingold, 'Prologue: Concerning the Hunter and his Spear', in T. Ingold (ed.), *The Appropriation of Nature: Essays on Human Ecology and Social Relations*, (Manchester: Manchester University Press 1986).

that pervades all aspects of the experiential human worldview. The memoryscape is optimally appreciated as a congealed contextual engagement that coordinates both perception and the act of dwelling itself. The meaning of the environment is recapitulated in the memories, myths and cultural perceptions of indigenous (super)natural actors. Cultural identities concern the conflation of memory and place for they are crucial transducers that bring the community into mutual alignment. Being is thus embodied by the environment through disclosure and brought about by the subject and by memory. In simple terms, the environment coordinates behaviour and understandings through processes of priming, memorialising and thinking. Any attempt to understand dwelling, experience or perception is thus doomed from the outset unless concerted efforts are made to think through the environment by exploring concepts like the memoryscape.

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Oral History and Individual Environmental Experiences

Leena Rossi

The individual in environmental history

In an essay published some time ago,[1] I suggested that we should bring an ordinary individual, man or woman, into environmental history because, in the end, it is always the individual who does something for, in and to the environment and who makes decisions about it. Every person has a relationship with her/his environment that is worth studying but so far only prominent figures – environmentalists, artists and academics – have interested scholars. In this chapter I make two more suggestions to contemporary environmental historians. Firstly, we should augment conventional written sources with oral history or interview material, which has become very popular in recent years.[2] Secondly, we should also pay attention to amateur art when studying the individual environmental relationships of creative people.

As my case, I have chosen a Finnish Sunday painter who depicted his cultural and natural environment and I will focus on his experiences of and his relationship with the environment as expressed in his paintings. Works of amateur artists have decorated the walls of thousands of private homes and have occasionally attracted a lot of publicity.[3] However, art historians have mostly excluded non-professional art from their studies because of its low aesthetic quality. Those who have considered

1. Leena Rossi, 'Yksilö ympäristöhistoriaan', in Leena Rossi and Hanne Koivisto (eds.), *Monta tietä menneisyyteen*, (Turku: Turun yliopisto, Kulttuurihistoria 1995), pp. 167–94.

2. In many fields of historical research today, interviews belong to the standard 'tool kit' of students and scholars who wish to produce their own sources.

3. See, for example, Raija Kallioinen (ed.), I*tse tehty elämä – ITE. Suomalaista nykykansantaidetta*, Text by Erkki Pirtola, Pictures by Veli Granö & al., (Helsinki: Maaseudun sivistysliitto and Maahenki 2000); and Erkki Pirtola, *Itse tehty elämä – ITE. Suomalaista nykykansantaidetta*. Pictures by Veli Granö et al., (Helsinki Maaseudun sivistysliitto, Kansantaiteenkeskus and Helsingin kaupunginmuseo 2001).

it art worth studying have called it folk art, naïve art or primitive art,[4] suggesting something less valuable than established pictorial art. Very seldom have the pictures have been explicitly studied from the perspective of environmental history or the environmental relationships of the artists.[5] In my view, ethnologists as well as cultural and environmental historians should study non-professional pieces of art in various contexts because they are an important part of the aesthetics of everyday life. Regardless of their artistic quality, I, as a cultural historian, find the topics that amateur painters depict very inspiring, especially in relation to environmental history.

I will begin with introducing you to 'my man', the person whose environmental experiences I am interested in. I will then briefly review the available sources of information on artists' environmental relationships. Thirdly, I will interpret three paintings. To conclude, in a few words, I will connect this artist's environmental experiences and relationship, as presented in his townscapes, with the recent discussion on living in space and place.

The artist

The individual in my environmental history research was an 'ordinary working man', Frans Lind. He lived all his life in a small industrial town, Varkaus, in Eastern Finland. Born in 1903, he finished his six years of elementary school in 1916 at the age of 13. He immediately started an interior painter's career as an apprentice at the Pirtinniemi shipyard, owned by the A. Ahlström Company. Mr Lind worked for the same company for more than fifty years and was with the building division when he retired in 1968 at the age of 65. He died in 1988. His father had worked as a model carpenter at the same shipyard until his death in 1914, when Frans, the youngest of his six children, was only ten years old. Mr Lind himself married in 1925 and had five children.[6]

In his spare time Mr Lind was amateur artist: painting was his hobby and among his subjects were scenes from his hometown, Varkaus, and its surroundings. He used oils, first the same paints he used at work and later tubes he bought from the local paint shop. He painted his pictures on cardboard, hardboard or canvas. In

4. See, for example, Jean Lipman and Tom Amstrong (eds.), *American Folk Painters of Three Centuries*, (New York: Hudson Hills Press 1980).

5. Timo Myllyntaus kindly brought to my attention the book *Die Natur dem Menschen untertan: Ökologie im Spiegel der Landschaftsmalerei* by Henry Makowski and Bernhard Budarath (München: Kindler 1983), in which the authors combine their knowledge in cultural history and ecology to describe how man has for centuries exploited, manipulated, damaged and destroyed nature. See also Timo Myllyntaus, 'Ympäristöhistorian näkökulma', in Ilmo Massa and Rauno Sairinen (eds.), *Ympäristökysymys: Ympäristöuhkien haaste yhteiskunnalle*, (Helsinki: Gaudeamus 1991), p. 108.

6. Varkaus Parish Registers; Interviews: Frans Lind 16 Aug. 1985, 13 Sept. 1985, and 12 Jan. 1986.

an interview he pronounced very emphatically, in his own thick Savo dialect: '*Minä en ou mikkään taeteilija. Minä oun vuan harrastelija!*' ['I am no artist. I am only an amateur!'][7] He never put his works up for sale: he only made them '*omiks tarpeiks*' ['for my own use'], for home and presents. He considered them '*hättäisen töitä*' ['rush jobs'].[8] His relatives and neighbours were well aware that he was an amateur, not a professional artist, but they appreciated his works particularly because several buildings he had depicted were later demolished.[9] Although as a worker he could be called 'an ordinary man', his hobby made him special among his co-workers – very few of them 'made art' and he could not talk about his hobby with them.[10]

Mr Lind painted pictures of *private homes* and *public buildings*, *townscapes* or scenes of his hometown and more or less *natural landscapes*.[11] He was not very productive: during his lifetime he only produced a few dozen environmental paintings. Still, they are worth studying for what they tell us about an 'ordinary' individual's experiences of his surroundings and environmental relationship.

Oral sources in studying environmental experiences

Nobody has direct access to the sensations and perceptions or experiences of another human being. However, words, tones and pictures may help us to get an inkling of other people's individual experiences. We historians even believe that we can develop a credible conception of the environmental experiences of dead artists by reading their books or poems, by listening to their compositions or by looking at their drawings, paintings and sculptures.[12]

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7. Interviews: Frans Lind 13 Aug. 1985; Leena Rossi's picture files of Frans Lind's works compiled in 1985–2005. After each interview with Mr Lind and other interviewees I discussed the pictures and wrote down the details. My information accumulated gradually.

8. Interview: Frans Lind 17 Aug. 1985.

9. Interviews: Elias Rossi 7 Sept. 1985, Kyllikki Autio 17 Jul. 1986, Leena Mustonen 25 Nov. 1986.

10. Interview: Frans Lind 17 Aug. 1985.

11. See also Leena Rossi, 'Sunnuntaimaalarin maisemat', in Riitta Laitinen (ed.) *Tilan kokemisen kulttuurihistoriaa,* (Turku: k&h 2004), pp. 231–77. According to Lucy Lippard, the word 'landscape' can mean either a scene framed through viewing (a place) or a scene framed for viewing (a picture). Lucy R. Lippard, *The Lure of the Local: Sense of Place in a Multicentered Society*, (New York: The New Press 1997), p. 8. Here I understand 'landscape' only as a picture.

12. See, for example, Jukka Ervamaa, 'Taideteokset ympäristöntutkimuksen lähteinä', in Leena Arkio and Kalevi Pöykkö (eds.), *Asuminen ja ympäristö*, (Helsinki: Gaudeamus 1975), pp. 19–32; Jukka Ervamaa, 'Taiteilijoiden Suomi', in Kai Linnilä (ed.), *Maakuntien Suomi 3*, (Helsinki: Tammi 1998), pp. 928–52; Jukka Ervamaa, 'Näkymä ikkunastani – Magnus von Wrightin Helsinki-aiheisia teoksia', in *Volare. Intohimona kuvataide*, Taidehistoriallisia tutkimuksia 26 (Helsinki: Taidehistorian seura 2003), pp. 72–101; Hannes Sihvo, 'Suomalaista maisemaa sanamaalarien kuvaamana', in Anneli Ilmonen (ed.), *Löytöretki maisemaan*,

I imagine that in some cases our interpretations based only on the particular pieces of art, as well as our familiarity with the art of the period, could bring us rather close to the artists' interpretations of their original experiences. However, I also suspect that in many cases our interpretations are insufficient at best or downright mistaken. We therefore need other contemporary source materials connected with the works of art: public art critiques and artists' personal documents, such as diaries, letters and other writings. Luckily, in many cases there is at least some written documentation.[13] Unfortunately, Frans Lind did not produce any personal written documents.

However, there is one more potential source that could be used in studying contemporary persons and their environmental experiences – oral history interviews. I argue that, in certain cases, personal reminiscences are irreplaceable. The most significant aspect of these interviews is that the scholar–interviewer and the narrator–interviewee together produce the source material. During the discussion the scholar can immediately ask the artist to specify her/his answers, interpretations and explanations and, on the other hand, the interviewee can correct the interviewer's interpretations, if he or she finds them distorted or mistaken.[14] As the Italian oral historian Alessandro Portelli says, oral history is never final and finished: new interviews always give new information and the stories are never told twice in the same form.[15]

Mr Lind died in 1988 but when I first began my research in the 1980s he was still in very good mental and physical health. He lived alone in his house and almost every day ran errands in the centre of Varkaus on his bicycle, covering several kilometres each time. I interviewed him 26 times between 1985 and 1987 and each interview lasted about two hours. I also conducted fourteen additional interviews with his children and in-laws, neighbours and acquaintances: most of them owned one or more of his paintings and they all knew about his hobby. I tape-recorded the interviews on cassettes or open-reel tapes and transliterated them the same or the next day. Unfortunately, because of a shortage of tapes, I had to reuse them

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(Tampere, Tampereen taideyhdistys 1984), pp. 17–24; Allan Tiitta, 'Suomalaisen maiseman hahmottuminen kirjallisuudessa ja kuvataiteessa', *Terra* 94 (1982): 13–26.

13. Peter Wild, Donald A. Barclay and James H. Maguire (eds.), *Different Travellers, Different Eyes: Artists' Narratives of the American West 1820–1920*, (Fort Worth: Texas Christian University Press 2001).

14. For more on interviews see e.g. Stephen Caunce, *Oral History and the Local Historian*, (London and New York: Longman 1994); Robert Perks, *Oral History. Talking about the Past*, (London: The Historical Association 1992); Alessandro Portelli, 'What Makes Oral History Different?' in *Luigi Trastulli and Other Stories: Form and Meaning in Oral history*, (Albany, N.Y.: State University of New York Press 1998); Leena Rossi, 'Kulttuurihistoriallisista muistitetohaastatteluista', in Leena Rossi (ed.), *Ihmisiä ja elämää Kirjakkalan, Mathildedalin ja Teijon vanhoissa ruukkikylissä*, (Turku: k&h 2003), pp. 17–38.

15. Portelli, 'What Makes Oral History Different?' p. 55.

several times and now I only have one interview on cassette left.[16] I can therefore no longer check the details against the original recordings.

Mr Lind had lived in my neighbourhood since my childhood and we therefore knew each other. I also knew about his artistic hobby and I had even seen him paint pictures. To us children he was '*Ranssi-setä*' ['Uncle Ranssi']. Our long acquaintance made it easy for me to approach him and to ask him to participate in my research. First he said that his life was not worth studying but eventually he agreed to co-operate, when I explained that scholars were now interested in ordinary peoples' lives and that many workers had been interviewed in several industrial communities, including his hometown of Varkaus. He said it was difficult for him to refuse '*ku sinä out nuapurin tyttö*' ['because you are a neighbour's daughter']. However, he asked me not to publish anything before his death that would make people disturb him. After a while he began obviously to look forward to the interviews because they gave him an opportunity to talk about cherished memories and perhaps they made him feel respected, important and necessary.[17]

At first, I interviewed Mr Lind as a painter who had depicted the built environment in his hometown, Varkaus, and its surroundings. I had planned – but this plan did not work out – to write a monograph about him and his paintings from the perspective of environmental changes.[18] I was also interested in everyday life in working-class families and wanted to gather reminiscences about that as well. Every one of the 26 interviews contains descriptions of daily routines from the 1900s to the 1980s: family, work, housing, food, leisure and festivities, social relationships, local people and infrastructure, as well as changes in these. Nineteen interviews covered various aspects of his painting hobby and his pictures. Here I refer to nine interviews with him, and three with other persons.

Having earlier carried out dozens of ethnographic interviews among workers and their families for various institutions, I assumed that I knew well enough what to ask about daily life.[19] I therefore did not use fixed lists of questions. The interviews were fairly unstructured or half-structured, concentrating on certain themes, and I let the discussion flow as was natural and convenient. If Mr Lind was willing and eager to talk about a certain topic I allowed him to talk about it and only asked him for more details. Whenever possible, I asked him about his

16. See also Leena Rossi, 'Sunnuntaimaalarin maisemat,' in Riitta Laitinen (ed.), *Tilan kokemisen kulttuurihistoriaa*, (Turku: k&h 2004), 233.

17. Leena Rossi's field notes 1985–1987.

18. I gave a paper on this topic in Hungary in 1986. See Leena Rossi, 'Amateur Artist as an Interpreter of Urban Environment', in Attila Paládi-Kovács and Zsuzsanna Szarvas (eds.), *Village and Town. The second Finnish-Hungarian symposium on Ethnology Budapest–Nozsvay August 25–31, 1986*, (Budapest, Hungarian Ethnographical Society 1987), pp. 177–84.

19. I interviewed workers for the Department of Cultural Studies, Ethnology, at the University of Turku and National Board of Antiquities and historical Monuments, Helsinki, as well as for my own studies.

painting hobby and pictures. We discussed what, how, when, where and why he painted. We talked about the topics and contents of his pictures, as well as about the creation process, which lasted several years in some cases. I asked him about the meaning and importance of his hobby to him but I did not directly ask about the meanings in each picture or of the depicted objects. However, he revealed some meanings spontaneously and I can read about them in the transliterated interviews.

With my questions, I probably made his painting hobby appear more important in Mr Lind's life than he admitted. Although making pictures – and being alone and undisturbed while he painted – had obviously given him satisfaction, he considered his hobby a '*joutavanpäeväne sivuharrastus*' ['unnecessary secondary interest']. He regarded his occupation at the Ahlström engineering works as a bread-and-butter job, by means of which he maintained his family, the most important thing in his life. Nevertheless, on the basis of what he said about gradually deteriorating eyesight from his youth to the 1970s and finally losing his sharp sight at the time of his retirement, I assumed that painting was meaningful to him. He said that he did not have time to paint when he could see and, now that he had time, he could no longer see.[20] The regret in his words was audible.

Interpreting Frans Lind's urban landscapes – three examples

Mr Lind drew and painted pictures, most of them natural or urban landscapes. He first made a sketch on the spot and then painted the picture. He always painted something on the spot, but most of the work he did at home.[21] Here I take three examples (A, B, C) of his urban landscapes or cityscapes depicting certain scenes in Varkaus, with a view to interpreting them as expressions of his environmental experiences and relationship. I have chosen these particular paintings because the scenes are very familiar to me from my childhood. Two of them (A and C) are cityscapes with streets, buildings and some vegetation and one (B) is a picture of a tall building behind a wood.

I will first consider the townscapes, which contain both natural and man-made elements, and describe them without any other background information about the motifs depicted apart my general knowledge of the Finnish culture, nature and climate in the twentieth century. I will not analyse or evaluate the pictures artistically or aesthetically. I only try to explain what Mr Lind's townscapes represent. Although art historians are the scholars who most often look at and analyse visual representations, art historical information is not necessary in reading images. Even laymen understand pictures on some level by using their earlier

20. Interviews: Frans Lind 14 Aug. 1985 and 8 Sept. 1985.

21. Interview: Frans Lind 13 Aug. 1985.

experiences, values and knowledge.[22] While interpreting paintings depicting their own cultural milieu, people can use their environmental literacy, particularly the reading part of it, which means individuals' ability to perceive (see, hear, smell, taste, feel, etc.) and interpret the essential elements in their environment.[23] Secondly, I will add my observations to my knowledge of Mr Lind's life and Varkaus. I lived there for eighteen years altogether in the 1940s, 1950s and 1960s and often used the same routes and visited the same places as Mr Lind did. Thirdly, by adding the interview material to the interpretations, I hope that I can convince the audience of the importance and value of oral history.

(A) 'Arpinmäki' or 'Karttunen's bookstore'[24]

The first impression of this horizontal winter cityscape is of the whiteness of the snow covering the ground and the darkness of the vehicles. It is a cloudy but not particularly cold winter's day. The setting is obviously a town or a village. A street with a pavement on the opposite side runs across the bottom of the picture from right to left, and then bends towards the background. In the street two dark cars are moving away from and a greyish green omnibus is approaching the onlooker. In the distance on the left another vehicle is obviously coming closer. The vehicle models could be from the 1930s or 1940s. Five pedestrians, some of them probably children, are walking along the pavement on the opposite side of the street. There seems to be some sand sprinkled on the road or perhaps the snow has partly worn away or melted. What especially strikes the eye is the dark vertical pole slightly to the left of the centre of the picture with a bus stop sign and street sign with the text 'Ahlströminkatu' ['Ahlström Street']. The pole cuts the picture into two unequal parts.

A yellow wooden house with two small chimneys dominates the right-hand side of the picture on the opposite side of the street. It has white corner boards and an open veranda with high steps leading to it. There is also a sign above the large display window, though the text is not readable. A picket fence runs from the front left-hand corner of the building toward the back yard. The colour and architecture of the house suggest the turn of the twentieth century: however the

22. Gillian Rose, *Visual Methodologies: An Introduction to the Interpretation of Visual Materials*, (London: SAGE 2001), p. 23; Sari Kuuva, *Content-Based Approach to Experiencing Visual Art*, (Jyväskylä: University of Jyväskylä 2007), pp. 30, 31, 36.

23. Minna Hares, Anu Eskonheimo, Timo Myllyntaus and Olavi Luukkanen, 'Environmental Literacy in Interpreting Endangered Sustainability: Case Studies from Thailand and the Sudan' *Geoforum* 37 (2006): 129. The writing part of the environmental literacy, which means using information from the environment to conserve, maintain and co-exist with the environment, is not valid here.

24. Mr Lind used both names, 'Arpinmäki' [Arppi's Hill] or 'Karttusen kirjakauppa' [Karttunen's bookshop].

Figure 1. 'Arpinmäki' or 'Karttunen's bookstore'. Frans Lind painted this winter streetscape in his hometown of Varkaus in the late 1940s (43 x 53 cm, oil on cardboard, signed F. Lind, no date), documenting the cultural environment very faithfully. The painting decorated his living room and was moved from one wall to another if a new painting required space.

showcase window could have been installed later. Behind the snow-covered roof is the top of a coniferous tree, probably spruce.

In the middle of the picture, between the house and the winding street, are several leafless birch trees and some bushes. The tops of coniferous trees, probably pine, are also visible on the skyline. Further along Ahlströminkatu on the other side stands a smallish light-green structure with a conical roof. It must be a kiosk, which were still common in Finland in the 1940s. Near it there are signs warning about a railway level crossing with single rails, though none is visible. In the distance on the left is a fairly large three-storied building – obviously made of stone. To the right of this, partly hidden by birch trees, is a row of half a dozen two-storied buildings, probably on a crossroad. These buildings, which look more or less functionalist in style, could have been built in the 1930s.

The vertical dark-brown pole running from the top to the bottom of the picture is a peculiar detail. There are several similar posts standing at regular inter-

vals along the left side of the street, so it could be a lamppost or a telephone pole, although no wires are visible. The signature 'F. Lind' is to be seen at the lower right-hand corner of the picture but there is no year. Judging from the newer buildings and vehicles, it could have been painted in the late 1930s or the 1940s.

How can we interpret this information? What does it tell us about the motives and purposes of the painter? Why did Mr Lind paint this particular picture and from this particular angle? We can only guess. He could have found the scene or parts of it beautiful. Maybe the clean whiteness of the snow fascinated him. Perhaps it represented something new and exciting or familiar to him, or Ahlströminkatu might have been significant to him for one reason or another. The yellow building might have had a special meaning for him or it may have been an essential aspect of local history or daily life. It is also possible that the motor vehicles and traffic fascinated the artist. We cannot say whether the traffic was heavy or not by local standards. The above are only guesses and our interpretations remain meagre.

We might also ask why Mr Lind did not do certain things. Why did he not simply leave out the pole that obviously disturbs the picture, although making it mystifying? Why did he not focus only on the yellow building if he found it so beautiful? We cannot give any definite answers to these questions.

How does my local knowledge help? What could I add to the interpretation of the painting? I know that Mr Lind actually finished the picture in the late 1940s, since I saw it in my early childhood and it was new then. Ahlströminkatu was the main thoroughfare in Varkaus from the 1940s until the 1960s and Mr Lind walked or cycled along it every weekday on his way to work and back home. The yellow building was a bookshop and it was still called Karttunen's bookshop although it had a new owner. Later on, in the mid-1950s, the building was demolished. The functionalist stone buildings in the background included the drawing department of the Ahlström Company, a branch of the KOP bank, retail alcohol shop ALKO and some other commercial buildings along Mikkelintie (Mikkeli Road, later renamed Kauppakatu). They were built in the 1930s and some of them remain standing today. The green kiosk sold sweets, beverages, tobacco and reading material. It disappeared in the early 1950s and a larger one was built next to the Ahlström building in the background.

The railway level crossing on Ahlströminkatu was used very seldom and was often snow-covered in winter. The nearest car is a taxi. Although taxis were rather large and buses were smaller than today in the late 1940s this one seems to be too big and the bus too small. I also remember adults enthusiastically discussing the vehicles and their size in the picture. The emptiness of the street could be explained by the fact that there was usually very little traffic in Varkaus in the middle of the day. It was in the morning before 7 o'clock and in the afternoon just after 4 o'clock that large crowds of workers walked or cycled in the streets and there were a lot of children around before and after school hours.

The most significant addition I can make to the interpretation with my local knowledge is that this particular view was not new to Mr Lind – on the contrary, it was very familiar to him. Still, I cannot say why he painted it or what kind of meanings it had for him. Of his motives and purposes I could only make the same guesses as anyone else. I cannot explain why the pole divides the picture.

What does oral history add to the analysis of the painting? Mr Lind told me that, in the late 1940s – he did not remember the exact year – he had been refurbishing the company club building in the park by Ahlströminkatu. He wanted to depict the streetscape and in order to sketch it he had to come close to the road. During his lunch break he quickly drew the outlines, standing behind bushes to avoid being disturbed by curious passers-by. He finished the picture at home.[25]

He said that he wanted to depict the scene exactly as he saw it from the spot where he made the sketch. He used his imagination when he added the pedestrians and the vehicles, in an attempt to make it look like typical lunchtime traffic in Ahlströminkatu. He agreed that the bus was not perhaps quite to scale. Of the shop he told me that Mr Björklund owned it when he painted the picture but that his old schoolteacher, Mr Karttunen, had originally owned it and he often called in. He also said that the building was '*hyvän näköne*' ['handsome']. When I asked about the dark pole, what it was and why he had put it in the picture, he said that it was a lamppost and he had painted it because it happened to stand exactly there in front of him.[26]

The urge to create with his brush and to document his environment as faithfully as possible seems to have been one of Mr Lind's motives for painting this particular scene – and others. His determination to avoid public attention restricted the view he could see and depict. If there had been no passers-by he could have chosen another perspective. The connection with his old teacher also adds a nostalgic tone to the painting. I understand it more as nostalgia for bygone people than for lost buildings because the shop was still firmly in place in the 1940s.

(B) 'The Orthodox Church'[27]

This colourful picture, horizontal again, depicts a built-up environment in a village or town on a slightly cloudy summer's day. The sky takes up about a third of the area. On the left is part of a yellow two-storey wooden building with a red brick roof and white corner boards. It looks like certain buildings Finnish factory owners erected to house their workers during the first decades of the twentieth century,

25. Picture Files, 'Arpinmäki'.

26. Interview: Frans Lind 12 Jan. 1986; Picture files, 'Arpinmäki'.

27. Mr Lind did not give a special title to this painting. He only spoke about it as a picture of 'se kirkko ja ne talot' [that church and those other houses] or 'Marin mökin kuva' [the picture of Mari's cottage]. Here I call it 'The Orthodox Church'.

Figure 2. 'The Orthodox Church'. Frans Lind depicted the buildings at the crossing of Asemakatu [Railway Station Street] and Relanderinkatu [Relander Street] in Varkaus (43 x 53 cm, oil on hard-board; no signature, no date) in the late 1950s and the newly finished Orthodox Church was one of them. At the time of the interviews this painting hung on the wall of his living room.

accommodating several families. In the middle of the picture are five small wooden cottages on a gentle slope among the pine trees and bushes. Three of them are red, obviously painted with the red ochre that was very common for smaller houses and outbuildings up to the twentieth century, especially in the countryside. The yellow cottage was most probably painted with yellow ochre and the whitish one with oil paint and both colours were rather common on dwelling houses both in towns and in the country. The windows indicate that two of the buildings, one red one and the whitish one, are dwelling houses. The others are outhouses, wood shelters, barns and saunas and date from the end of the nineteenth century or the beginning of the twentieth. They clearly belong to 'ordinary' or working-class people.

On the right-hand side of the picture, on another small hill, stands a white stone building, a church. Only the bell tower and a gallery with low steps up the

side are visible. A path with patches of grass on both sides leads to the gallery. The bells and the cross on top of the tower indicate that the building is an Orthodox Church although we cannot see the main body. A gravel road or street runs between the church and the other buildings up the hill. It seems to continue to the left but also to curve to the right, parallel with the church. Along it there also runs a narrow raised pavement, fenced off from the grass, with very low and narrow wire-connected posts.

The composition of the painting is a little awkward because none of the buildings is clearly in focus. It looks like part of a larger picture or a snapshot. The perspective on the buildings is not consistent either: the red cottage appears to have been seen from a slightly different angle, as if the painter had stood on a lower level while depicting it.

Anyone familiar with the Finnish culture would say that the church could stand either in the countryside or in an urban centre. However, the raised pavement indicates an urban setting, and the two-storey dwelling house reveals that it is an industrial town. Judging by the fact that the church is Orthodox and by its architecture we know that the painting must have been made in the early or the mid-1950s when several new churches were built for Orthodox Karelian evacuees.

What can we now say about the environmental experiences of Mr Lind and his motives for painting this particular picture? He may have found the view beautiful because of the colours or forms or he might have wanted to document the variety of local architecture. Perhaps he frequently used the road and could see the particular buildings. An outsider could speculate that Mr. Lind might have been a member of the Orthodox congregation or otherwise interested in the religion. Perhaps he or somebody he knew lived in one of the buildings. We could make several equally good guesses but it is difficult to explain the odd composition.

Could I, with my personal and local knowledge about Mr Lind and Varkaus, add anything to the interpretation of this painting? I know that the scene is of Varkaus, at the crossing of Asemakatu and Relanderinkatu, although the crossroad is not quite clear in the painting. I also know that Mr Lind passed the place every day in the spring, summer and autumn when he cycled along Relanderinkatu to work or back home. He walked and used a shorter route in the winters and therefore would not see the crossing snow-covered unless he diverted a couple of hundred metres from his usual route. These circumstances partly explain the season but of course it was warmer to work outdoors in the summer.

I also know that Asemakatu was widened in the early 1950s by carving though a sandy ridge, thus forming two hills and leaving some of the old wooden buildings almost hanging above the street. I remember people wondering what would happen to them. A couple of years earlier, just after the street was widened, Mr Lind had painted a streetscape along Asemakatu but from the opposite direction and that painting showed clearly how awkwardly situated the old workers' cottages

were. I knew that in Varkaus, an industrial town, the people who lived in the cottages must be workers and their families but I did not know any of them personally.

The two-storey wooden building, Ahola 2, was built by the Ahlström Company during the First World War, in 1916: behind it, on Relanderinkatu, stood a twin building, Ahola 1. The Orthodox Church was completed in 1958. The local people found it somewhat exotic because there were no Orthodox Christians in town before Karelian evacuees settled there after 1944. I had learned that Mr Lind was a relatively inactive member of the Lutheran congregation and that he was not interested in any other religious group. Before I interviewed him I did not know if he had any connections with the wooden buildings that were demolished in the late 1950s or early 1960s.

The composition of the painting puzzled me most and I thought there must be a reason for it although I could not find it. I wondered why Mr Lind had not depicted only the church, or the two-storied Ahola buildings? As a child I found both impressive. These small cottages were just like any other old cottages to me; there were still plenty of them around. If they were important to him, however, why did he not depict them without the newer and bigger buildings? I assumed that he painted the picture because he found the buildings beautiful and interesting in some way.

What did the interviews add to my analysis and interpretation of this painting? Mr Lind told me that he lived in Ahola with his mother and brothers for a couple of years in the early 1920s.[28] He also said that an old worker's widow, Mari Hägglund, had lived in the red cottage next to Asemakatu up until the 1950s. He had known Mari since his childhood. Mr Kauhanen the tailor, whom he also knew, had lived in the white wooden house. The outhouses had belonged either to Mrs Hägglund or to Mr Kauhanen.[29]

When we were discussing this picture, Mr Lind said that he had been in a hurry to depict the old buildings before they were demolished: '*Kiirehin mualoomaa, ennen ku purkavat poes nuo vanhat puurakennukset.*' He did the sketching and painting from the woods called '*Aseman metikkö*' [The railway station woods] on the opposite side of Relanderinkatu, in order to avoid passers-by seeing him and coming to stare at his work. It would have been difficult for pedestrians to get close to him because there was no pavement on that side of the street. The view he painted was what he could comfortably see from his hideaway.[30] I imagine that he could not depict all the buildings from the same angle and one spot: this would explain the inconsistent perspective. He always attempted to avoid publicity when he was painting and he also believed in being true to nature and to the proportions

28. Interview: Frans Lind 12 Sept 1985.

29. Interview: Frans Lind 13 Aug. 1986; Picture files, 'The Orthodox Church'.

30. Picture files, 'The Orthodox Church'.

he saw.[31] This might explain the 'photographic cropping' of the scene. However, he never took photographs, although his three sons did.

Why did he want to paint those old cottages before they were demolished? Unfortunately, I did not directly ask him but in this case too he must have had a strong urge to paint and document the cultural environment. He had personal memories of living in one of the buildings, and of old Mari and the other occupants of the cottages. One could say that, again, he had nostalgic feelings connected with the social and built environment of his childhood and youth. I also suggest that he – consciously or subconsciously – wanted to pay homage to the old workers or his own social class.

(C) 'The Water Tower'[32]

In the middle of this vertical painting stands a newly built, huge apartment block towering up into a partly cloudy spring or summer sky. It is obviously more than ten storeys high, although the lowest floors are hidden behind trees. The beige upper part of the otherwise white building probably contains a water tank because it has no windows. The block stands behind pine and spruce trees that barely reach to the middle of it. Given its size, construction, and material, it seems to be out of place in the woods. In the foreground, among and under the trees, are three wooden cottages, one yellow with a red roof and two grey ones with blue and grey roofs. These are typical old abodes of workers or poor country people. However, it is obvious that this kind of water tower-cum-apartment building cannot be situated in the countryside: it has to stand on the edge of a town with a public water system. The architectural style is that of the 1950s.

Is it possible to say just by looking at it why Mr Lind painted this picture? He must have known the function of the building. Perhaps he was fascinated by developments in architecture and infrastructure and wanted to document the arrival of modernity in his hometown. He may have admired the huge size of the tower and wanted to highlight it by putting it against the small old wooden cottages. Perhaps he found the new building quite absurd in its surroundings and wanted to document that. At least he found it interesting enough to depict.

I cannot say anything more about the motives of Mr Lind but I can give some information about the elements in the picture. The high building is indeed a combined water tower and apartment building.[33] It was completed in 1954, with

31. Interview: Frans Lind 17 Aug. 1985.

32. Lind always spoke about the picture of the water tower.

33. The combination of water tower and apartment block is not very common. See Ismo Asola, *Vesitorni – yhdyskunnan maamerkki. Water Tower – Landmark of the Community*, (Helsinki: Suomen Rakennusinsinöörien Liitto RIL, Association of Finnish Civil Engineers 2003). In her paper 'Monstrous and Monumental Water Towers: from Engineering to Urban Design', Paivi E. Spoon discussed the numerous forms of elevated tanks in the USA and presented

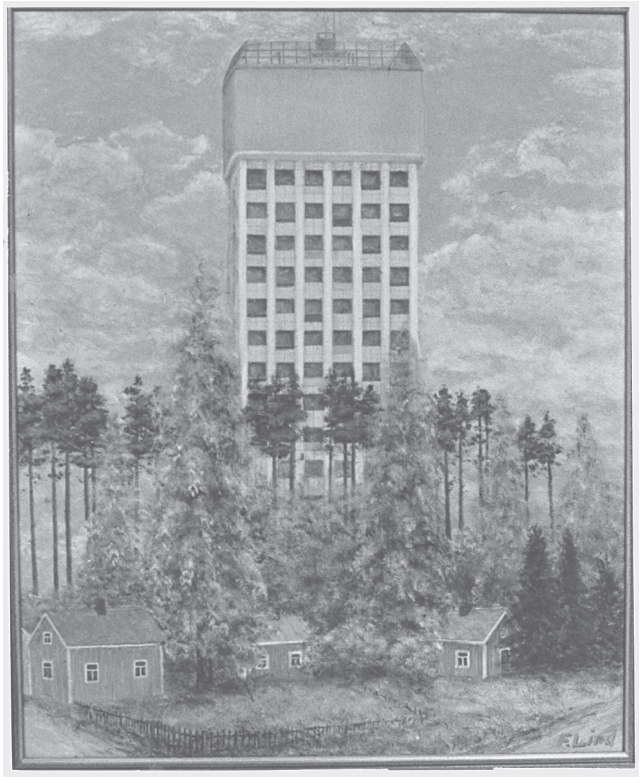

Figure 3. 'The Water Tower'. The fifty-metre-high Water Tower apartment block in Varkaus was completed in 1954 and in 1958 Frans Lind hurried to paint the picture (45 x 30 cm, oil on hardboard) before the workers' cottages in the woods near it were demolished. He gave the painting to his youngest son as a wedding present.

its façade facing towards Varkaus' main road during the 1950s, Mikkelintie, which was a continuation of Ahlströminkatu and led ultimately to the city of Mikkeli. At that time it was the highest apartment block in the Nordic countries. There were a few old workers' houses left in the woods around the tower. It was still countryside at the beginning of the twentieth century, about two kilometres from the centre of the Varkaus industrial community, where no inexpensive land was available for

no apartment towers. The paper was published in the conference proceedings edited by Ilkka Hautamäki, Petri Juuti, Tapio Katko and Eija Vinnari, *5th IWHA Conference Tampere, Finland, Pasts and Futures of Water, 13–17 June 2007*, (Tampere: International Water History Association 2007).

workers to build their cottages. Beyond the community border they could construct their houses without any official control. It is possible that Mr Lind even saw the cottages being built. Soon after he had painted this picture, all the cottages were destroyed to make way for more tower blocks.

The water tower in Varkaus was not on Mr Lind's daily route between home and work, and he had to make a detour of half a kilometre to paint this particular picture. The angle of vision indicates that he must have stood on the marketplace. It was always empty in the late afternoon: there were no sellers or stalls around and, after the working day, hardly any people either: he could sketch and paint without anybody disturbing him.

Oral history, however, could add something to the story. When I discussed it with him, Mr Lind told me that he was not as interested in the new water tower as in the old workers' and craftsmen's cottages next to it. Again he said that he had painted the picture because of the cottages, before they were demolished. He also told me about the families who had lived in them and how, as a child, he had visited '*Tina-Antti*' ['Tin Andrew'] who was a drunkard and whose mouth was black from quid. He still tin-lined the copper pots and pans that were common in every household.[34]

It is clear from the interviews with Mr Lind that it was not the new that attracted him, but the old. In two of the pictures discussed here the new had reminded him of the fact that the old might soon disappear. Moreover, again, his experience of this part of his environment was connected with his childhood and social class. The painting could thus be seen as filled with nostalgia, a tribute to the old workers.

'The Water Tower' is unlike Mr Lind's other works in that he did not normally seek motifs further away from home and only painted the scenes that were on his daily routes or near the building in which he worked.[35]

A wider understanding of environmental experiences

With the above three examples of Frans Lind's townscapes I have illustrated how the paintings could be analysed and interpreted on three levels. Firstly, I used only general knowledge of Finnish culture and nature, which gave me a fairly narrow idea of his environmental experiences and relations, largely based on guesswork. Secondly, by adding my personal and local background knowledge to the analysis, I could gain a slightly better understanding of the pictures. Even then, much of the interpretation still rested on guesswork: familiarity with the local may well have made me blind to certain details.[36] Thirdly, I combined my general and personal

34. Picture files, 'The Water Tower'.

35. Picture files, 'The Water Tower'.

36. Therefore it would be interesting to compare my interpretation with one given by another scholar without any background knowledge about Finnish culture or Varkaus. This person

background knowledge with my oral history material and this gave me a much richer idea of his environmental relationship. At least in these three cases, the oral history proved to be very valuable because it revealed unexpected facts.

According to what he said in the interviews, Mr Lind had several explicit intentions when he depicted his physical environment. He tried to copy the scenes as faithfully as possible. He painted exactly what he saw – in some cases this resulted in slightly unconventional compositions and gave the pictures a naïve or primitivist nuance. Moreover, he wanted to preserve in his paintings certain buildings that he considered to be in danger of demolition. It is, of course, possible that he also had other, implicit intentions.

It is interesting that, neither in the pictures analysed above nor in any of his others, did Mr Lind depict special social events or past times. With the exception of the first one, 'Arpinmäki', he did not even paint human figures. There are hardly any people in his other works either. Although he seems mainly to have been interested in his physical environment, his works did not lack personal or social aspects: on the contrary, almost every building in his pictures is connected with people he knew or had known.

Usually artists sign their works. Mr Lind only signed his when he considered them finished, which in some cases, never happened. He signed some before he gave them away.[37] Two of the three considered here are signed 'F. Lind', but with no date. 'The Orthodox Church' lacks any markings and it would be impossible to identify the artist by the painting only. When he did sign his works, he wrote 'F. Lind' or 'Frans Lind' in the lower right-hand corner but he did not usually add the year and many works lack any markings. This indifference about signing their pictures seems to be common among amateur artists.

In my investigation I have found certain scholars' notions especially relevant and I want to mention them. Individual scholars use various terms synonymously when they write about physical surroundings: they speak about the environment, the landscape, territory, space, and place. However, when it is a question of individual environmental experiences there is a consensus that environmental relationships develop through 'the simple fact of living', or through experience, as Kent C. Ryden put it in his book, *Mapping the Invisible Landscape*, in which he writes about the meanings embedded in the environment. Of course, a deeply felt sense of place also rests in tradition, shared experiences and stories about them. People tend to project their own feelings onto their physical environment.[38]

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might look at the pictures with unprejudiced eyes and see things that I did not see. Of course, it is also possible that (s)he would give more or less inappropriate interpretations.

37. Picture files.

38. Kent C. Ryden, *Mapping the Invisible Landscape: Folklore, Writing, and the Sense of Place*, (Iowa City: University of Iowa Press 1993), pp. xv, 66, 67, 99, 111.

Yi-Fu Tuan writes about 'topophilia', or 'the affective bond between people and place or setting'. He suggests that, from childhood, humans come to know places though engaging all five senses (sight, sound, smell, taste and touch) and the terrain of our childhood seems to penetrate our lives and memories most intensely.[39] Lucy R. Lippard also notes that the land 'can be experienced kinetically or kinesthetically, as well as visually. It is not only textures and sensations, but also smells and sounds that we recall.'[40] E. V. Walter expresses the same idea in saying that a place is 'seen, heard, smelled, imagined, loved, hated, feared, revered, enjoyed, or avoided'.[41]

Most scholars add a social dimension to the environmental relationship: Michael Dear and Jennifer Wolch, for example write: 'Social life structures territory … and territory shapes social life.' According to them, space is not only supported by social relations but also produces and is produced by them. Henri Lefebvre also links the physical to the social in decisive ways.[42]

Returning to Mr Lind, I would claim that he gained his 'sense of place', 'topophilia', 'topographical intimacy', or 'place attachment' 'by virtue of the simple fact of living'[43] or by moving about and using his senses, mostly his vision. His class, work, gender and age also probably helped to define the area in which he could most easily move.[44] The three pictures I have discussed here reveal that his environmental experiences had not only aesthetic, but also social and nostalgic aspects.[45] He did not systematically or consciously document his man-made environment but I suggest that the documentary or historical aspect became evident as soon as the buildings were demolished. I could not detect aspects of his environmental relationship merely by looking at the pictures and in my interpretation I used my personal and local knowledge and especially the oral history created in the interviews with the artist.

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39. Yi-Fu Tuan, *Topophilia: A Study of Environmental Perception, Attitudes, and Values,* (Englewood Cliffs: Prentice Hall 1974), p. 4; Yi-Fu Tuan, *Space and Place: The Perspective of Experience*, (Minneapolis: University of Minnesota Press 1977), pp. 79–84.

40. Lippard, *The Lure of the Local*, p. 34.

41. E. V. Walter, *Placeways: A Theory of the Human Environment*, (Chapel Hill: University of North Carolina Press 1988), pp. 142–43.

42. Michael Dear and Jennifer Wolch (eds.), *The Power of Geography,* (Boston: Hyman Unwin, 1990), p. 4. See also Henri Lefebvre, *Production of Space*, transl. by Donald Nicholson-Smith, (Oxford: Basil Blackwell 1991).

43. Ryden, *Mapping the Invisible Landscape*; Tuan, *Topophilia*; Lippard, *The Lure of the Local*.

44. Interestingly, Dolores Hayden states in her book that gender, class, race, ethnicity, sexual preference and age, define territories. Dolores Hayden, *The Power of the Place: Urban Landscapes as Public History*, (Cambridge, Mass: The MIT Press 1995), p. 23.

45. In my article about the Sunday painter's landscapes I suggested these aspects of the human environmental relationship: sensuality, aesthetics, emotionality, nostalgia, progress, sociality, information, economy, possession and spatiality (or kinesthetics). Of course, there may be others. Rossi, 'Sunnuntaimaalarin maisemat', pp. 269–71.

Environmental history in general implies the study of the relationship between man and nature on the global level but we should not forget the built environment or the local and individual levels. All available sources are necessary in this research and, on the individual level, oral history is irreplaceable.

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PART III

Indigenous Peoples and the Pressures of Modernisation

~ 9 ~

Ancestors' Wisdom or Desktop Reindeer Management? The Role of Traditional Ecological Knowledge in Contemporary Reindeer Herding

Helena Ruotsala

Points of departure

In his book *Ihmiset ja eläimet. Humanistin eläinkirja* [Human Beings and Animals. An Animal Book of Humanists] Antero Järvinen states, 'the fells are scared to death of the reindeer'. According to him, reindeer are no longer an essential or wanted part of the fell landscape in Lapland because they disturb nature with their behaviour; they roam after food and eat the vegetation. Järvinen, in common with many scientists, sees modern reindeer herding as a threat to nature, especially in nature reserves, which he and others believe should be preserved as scientific laboratories in which they can study rare flowers and vegetation.[1] Reindeer herders, for their part, wonder why some small plants are much more important than their reindeer, which are the basis of their livelihood.

Reindeer herding has been of great significance to the people living in the harsh conditions of the northern regions and it has played a decisive role in guaranteeing the viability of these sparsely-populated areas. Although it is a traditional source of livelihood in the northern parts of Finland and Scandinavia, it is a relatively young practice. Small-scale herding, whereby families have a small number of tamed reindeer for use more in transportation and as a decoy animal than for food, is, however, hundreds of years old. The advent of large herds, 'reindeer capitalism', needing different pastures at different times of the year, occurred in western parts of Finnish Lapland, over the Köli mountains, during the seventeenth and eighteenth centuries. Unlike in Sweden and Norway, for historical reasons, reindeer herding

1. Antero Järvinen, *Ihmiset ja eläimet. Humanistin eläinkirja*, (Helsinki: WSOY 2000), p. 60.

in Finland and Russia is not a privilege of the Sámi. Finnish colonists who settled in Lapland adopted small-scale reindeer herding from the local forest Sámi. In fact most of the reindeer owners and herders in Finland are Finnish but the significance of the practice is more pronounced in northern parts of the region, where most of the herders are Sámi. Reindeer herding is also regarded as one of the most important ethnic symbols of the Sámi, although only a minority of them have ever been herders. (Figure 1)

Figure 1. Children follow and learn from their parents in reindeer herding. Juuso and Risto Autto, calf marking in Ruskisrova, July 1995.

Reindeer herding is a natural source of livelihood and herders have had to adapt to both external and internal transformation in recent decades. Deep structural changes took place after the 1960s with the advent of the market economy. Today it is a highly mechanised profession, which makes full use of technical equipment and rational methods of animal husbandry. The increased costs brought by technology and adaptation to the modern way of life have changed the nature of reindeer herding and families need to have larger herds to cover the costs of everyday life. There have been many environmental changes and other interest and user groups, one of which comprises scientists and nature protectors, have moved into the same areas with needs that conflict with those of the reindeer herders.

My aim in this chapter is to discuss the various forms of and changes in traditional environmental knowledge related to reindeer herding. There are a cou-

ple of concepts that have been used instead of or even as synonyms for traditional ecological knowledge. Indigenous knowledge is regarded as all the knowledge and practices of the people indigenous to a geographic area. Together with ecological knowledge, the concept of environmental knowledge is also used. By traditional environmental or ecological knowledge I mean here knowledge and practices that have a particular focus on the natural world and other subsets of knowledge such as spiritual connections between people and animals. A body of traditional ecological knowledge may develop over generations, or it may be specific to people who have arrived in a region. Tim Ingold and Terhi Kurttila discussed the meaning of traditional knowledge and came up with two alternative interpretations of the concept. Where indigenous knowledge is opposed to science, it appears in the guise of MTK (modern traditional knowledge), which is enframed in the discourse of modernity and is embedded in the modernist framework of the state apparatus and the other. The other interpretation, LTK (local traditional knowledge), is used in the everyday life of local inhabitants. The modernist understanding rests on a genealogical model of transmission that separates the acquisition of knowledge from environmentally situated practice.[2] Traditional ecological knowledge as discussed in this chapter belongs to the latter interpretation.[3]

The importance of traditional ecological knowledge is still significant, despite technological development and other changes, because it is through this that the reindeer herder is able to control the *reindeer forest*, *tundra* or *taiga*, his or her own working environment. I have studied reindeer herding in two different ecological areas and societies, in Finnish Lapland and the Kola Peninsula in Russia.[4] The reindeer herders' association, *paliskunta*, of Kyrö is situated in the fringe area of Sámi and Finnish Lapland. The majority of the reindeer herders are Finnish and the Sámi reindeer herders speak Finnish as their mother tongue. The herders of Kola belong to three ethnic groups – the Sámi, the Komi and the Nenets – although the number of Nenets is very small. Russians also work as reindeer herders.

We experience, observe and treat our environment in many different ways. We might take an activity-based approach and divide it into living, working and free-time environs. If we take the work environment as a case in point, namely that in which the individual is working, her/his realm of knowledge and environ-

2. Tim Ingold and Terhi Kurttila, 'Perceiving the Environment in Finnish Lapland', *Body and Society* 6/3–4 (2004): 188–96; See also Ellen Bielawski, 'Indigenous Knowledge', in Mark Nuttal (ed.), *Encyclopedia of the Arctic*, Volume 2 G–N, (New York & London: Routledge 2005), pp. 950–55.

3. See also discussion on environmental literacy, for example Minna Hares, Anu Eskonheimo, Timo Myllyntaus and Olavi Luukkanen, 'Environmental Literacy in Interpreting Endangered Sustainability. Case Studies from Thailand and Sudan', *Geoforum* 37/1 (2006): 128–44.

4. Helena Ruotsala, *Muuttuvat palkiset. Elo, työ ja ympäristö Kittilän Kyrön paliskunnassa ja Kuolan Luujärven poronhoitokollektiiveissa vuosina 1930–1995*, (Helsinki: Finnish Antiquarian Society 2002).

mental experiences forms part of the essential research materials. This subjective information – a compilation of knowledge received through enculturation, one's own experience, impressions, values and beliefs – influences the use of the environment and is also reflected in how the individual relates to it. If we grow up in a particular environment we receive as a 'legacy' the knowledge of how to benefit from the resources it has to offer. We also receive the cultural knowledge of how to experience, appreciate and interpret our own living environs and we see our environment or landscape through our own cultural filter. To outsiders, such as hikers from the south, Lapland's fjelds, *tunturit* in Finnish, mainly provide aesthetic experiences or a feeling of victory in conquering the top of the fjeld. To the local reindeer herders who have worked, sweated, and frozen there, however, they have another meaning (see Figure 2). Empirical experience has a decisive role and this is only revealed through personal experience and knowledge.[5]

Visitors and local inhabitants experience place and landscape in different ways and this has been studied in human geography, for example, within which landscape is an important concept. A landscape could be understood as an area that is limited by certain criteria, a subject of protection or planning or personally as part of one's subjective experience of the world.[6] Ethnological studies emphasise the fact that the landscape is both in our minds and a physical reality and that we have to study the relationship between the physical and the mental landscape.

Is the reindeer forest a wilderness?

Outsiders and reindeer herders also refer to the same places and areas differently on the linguistic level. While local people talk about reindeer forests and the different pastures, tourists and bureaucrats speak about the wilderness. How does the wilderness differ from the reindeer forest? Wilderness is a culture- and value-bound concept that has several, sometimes conflicting, meanings depending on the group concerned. It is connected to Lapland through both tourism and academic research although the concept does not belong to the vocabulary of the reindeer herders, especially the Sámi. Wilderness studies exclude culture outside the wild, almost tamed wilderness.[7] Human beings with their traditional functions belong to the

5. Matti Sarmela, 'Ekologia ja kulttuuri', in Tapio Nisula (ed.), *Näköaloja kulttuureihin. Antropologian historiaa ja nykysuuntauksia*, (Helsinki: Gaudeamus 1984), pp. 91–115; E. A. Anderson, *Ecologies of the Heart. Emotions, Belief and the Environment*, (New York: Oxford University Press 1996), p. 96.

6. E.g. Pauli Tapani Karjalainen, '3 näkökulmaa maisemaan', in Maunu Häyrynen and Olli Immonen (eds.), *Maiseman arvo[s]tus. Seminaari maiseman havaitsemisesta ja arvottamisesta Lahden Mukkulassa* 1.–2.9.1995, Kansainvälisen soveltavan estetiikan instituutin raportteja n:o 1, (Lahti: Kansainvälisen soveltavan estetiikan instituutti 1996), pp. 8–13.

7. Jarkko Saarinen, 'Erämaa muutoksessa', in Jarkko Saarinen (ed.), *Erämaan arvot: retkiä monimuotoisiin erämaihin*, Metsäntutkimuslaitoksen tiedonantoja 733, (Rovaniemi: Metsäntut-

Finnish wilderness but opinions differ on who really belong to it, who can use it and how it can be used.

In the 1980s the Wilderness Law provoked discussion and research on the constitution and use of wilderness areas. There were two contrasting interpretations of what a wilderness comprises, the local and the translocal. In Lapland there have been strong demands regarding limiting or even forbidding local and traditional ways of using the wilderness, such as reindeer management, hunting and fishing, in the name of environmental protection. On the whole, the concept of the wilderness could be considered ethnocentric and without history because it does not incorporate those who have already used it and rather emphasises the integrity and uninhabited nature of the area. It has a different significance to the local inhabitants because the areas now classified as wilderness once belonged to the traditional Sámi villages, *siidas*. They were neither uninhabited nor separate places but constituted cultural environments in which human traces were visible. The use of this wilderness is an essential part of everyday life: it has been 'lived space'. At the same time, more attention is now being paid in environmental planning to the significance of the locality and local needs and the need to take local voices into consideration has been emphasised. Most of the demands are aimed at the Finnish Forest and Park Service, which controls the majority of the Lappish wilderness areas.

The core question in this discussion of the wilderness concept – whether it is local or translocal – concerns to whom these areas belong, who may use them and for what purpose. Can the different purposes be prioritised as stated in the first section of this paper? The classification of nature utilisation restricts the activities of local people. Local practices that do not conform to natural sources of livelihood, tourism or industrial use, are classified as recreational use and, in this context, local and other users are not regarded as separate groups. The important criterion in this discussion has been so-called uninhabitedness and the need to preserve has arisen from tourism. For the tourist the wilderness offers either silence or service. The silent wilderness in particular belongs to the tourist or environmentalist and, according to one report, more than half of tourists say they are being disturbed when they meet other people, especially those who use vehicles such as snowmobiles, four-wheelers or helicopters.[8] The majority of these vehicle users are local inhabitants – reindeer herders, fishers, hunters or the staff of the border-guard detachment. Various fa-

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kimuslaitos, Rovaniemen tutkimusasema, 1999), pp. 77–93; Roderick Nash, *Wilderness and the American Mind*, 3rd ed., (New Haven: Yale University Press 1982), p. 233.

8. Liisa Kajala, 'Perinteet ja nykyaika – erämaasuunnittelun haasteita Käsivarressa', in Jarkko Saarinen (ed.), *Erämaan arvot: retkiä monimuotoisiin erämaihin*, Metsäntutkimuslaitoksen tiedonantoja 733, (Helsinki: Metsähallitus 1999), pp. 115–22; Jarno Valkonen, 'Erämaa, paikallisuus, hallinta', in Jarkko Saarinen (ed.), *Erämaapolitiikka: pohjoiset erämaat arjen hallinnan ja tutkimuksen kohteena*, Metsäntutkimuslaitoksen tiedonantoja 827, (Rovaniemi: Metsäntutkimuslaitos, Rovaniemen tutkimusasema 2002), pp. 43–55.

cilities, including cottages, saunas, hiking routes, bridges and campfire places, are built to suit the needs of tourism or environmental protection.

The tourists who arrive in Lapland and its wilderness make their journeys in both space – from South to North – and time, because Lapland is seen as 'the past in the present'.[9] A modern reindeer herder who uses modern technology, dresses in gore-tex clothes, drives all-terrain vehicles and lives in a modern house does not fit the tourists' romantic picture. Meeting this modern nomad in the wilderness may inspire disappointment. Although reindeer herders use this environment for their daily living, their actions do not fit the picture the tourists have of them.

Opinions about the wilderness differ and the locality alone does not define its extent. Local opinions are not usually seen as viable in term of its use or definition. The silent wilderness or the wilderness as a tourist area are self-evident alternatives and for these purposes it is justified to control the activities of local users. Conservation requires concrete acts of evident value: whose needs take precedence? For example, the cabins or bases that were built for reindeer herders, hunters, fishers and hikers are now being pulled down in order to limit the unwarranted use of wilderness areas but, as an act, this is more telling: it could be regarded as an act against the local users who have lost another of their shelters or bases.[10]

Visions of the reindeer forest

The reindeer herder's working environment, the reindeer forest, can be described from two perspectives. The starting point is that the environment sets the limits within which a human being makes her/his cultural choices. Thus we can see how the environment affects reindeer herding in different ecological areas such as the forest/taiga or the tundra.

Firstly, we might evaluate what the environment means to the reindeer herder, what different work activities it sustains and what exploitable resources it contains. The relationship between that individual and the environment is two-fold: the environment is influenced by how the individual exploits it on the one hand – i.e. the material aspect – and, on the other hand, it exerts a cognitive and symbolic influence – i.e. the spiritual and intellectual aspect. It is not necessary, nor is it desirable, to distinguish these two positions, the material and the symbolic or spiritual, but there are examples of how the reindeer herder's traditional ecological

9. Seppo Knuuttila, 'Kansanomainen maailmankuva', in Juha Manninen *et al.* (eds.), *Maailmankuva kulttuurin kokonaisuudessa. Aate- ja oppihistorian, kirjallisuustieteen ja kulttuuriantropologian näkökulmia*, (Oulu: Pohjoinen 1994), pp. 165–223.

10. Valkonen, 'Erämaa, paikallisuus, hallinta', pp. 43–55.

knowledge may be inconsistent with her/his actual ecological behaviour, which in turn may be in conflict with nature's carrying capacity.[11]

Secondly, reindeer herders do not use their environment alone and other parties – actors and users – must also be taken into account. One might ask what needs they have in their relationships with each other and with reindeer herding. Are their activities in harmony or in conflict with the environment? At the same time, we could also use various other labels, such as the productive environment, the recreational environment or the experience environment, and question the relationships between them.

It cannot be denied that profitable reindeer herding requires specialised knowledge of the environment, as well as a sense of responsibility for it. The work of the reindeer herder is guided by her/his knowledge in this respect. Different environs require different kinds of knowledge in terms of how to manage and use them. This means that the reindeer herder must be a professional in order to be able to exploit the natural resources around him or her. This need does not change even if the environment changes. Knowledge comes only through adapting to change and, in this crucial situation, research also comes from the outside. The herder must be able to react and make decisions based on her/his professional skills in new circumstances.

Different conditions, sudden changes in the weather and climate change have put new demands on reindeer herders and their environmental knowledge. In the winter of 1996–1997, for example, they had to make decisions that influenced how the reindeer would survive the harsh conditions: should they enclose them with fences and, if so, when? Where should these fences be made? Where would they get extra food and how should it be given to the reindeer, some of which were already in a weakened state? Another important skill they had to learn was how to cope with the media attention and the blame that was placed on them whenever a predator happened to make a kill, whenever overgrazing occurred or whenever reindeer starved. According to the OECD environmental review, for example, the largest threat to ecosystem and forest biodiversity in Lapland is over-sized reindeer herds.[12]

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11. Tim Ingold, 'Culture and the Perception of Environment', in Elisabet Croll and David Parkin (eds.), *Bush Base: Forest farm. Culture, Environment and Development*, (London: Routledge 1992), pp. 39–56; Darrel Addison Posey, 'Introduction: Culture and Nature – the Inextricable Link', in Darrel Addison Posey (ed.), *Cultural and Spiritual Values of Biodiversity. A Complementary Contribution to the Global Diversity Assesment*, United Nations Environment Programme, (Nairobi: Intermediate Technology Publications/UNEP 1999), pp. 3–18; Igor Krupnik, *Arctic Ethnoecology. Native Whalers and Reindeer Herders of Northern Eurasia*, (Hannover: Dartmouth College, University Press of New England 1994), pp. 233–39.

12. OECD *Environmental Performance Reviews: Finland*, [Anonymous], (Paris: OECD 1997), pp. 98, 142. See more in such articles as Jaakko Tahkolahti, 'Suden taposta epäilty mies vangittiin Inarissa', *Helsingin Sanomat* (2 Feb. 2001), A11; 'Karhun salakaato Inarissa on suurempi uutinen kuin miestappo Hämeenlinnassa 2000', *Lapin Kansa* (7 June 2001), (http://www.lapinkansa.fi/lehdet/uusi/uutiset/main_uuti22.html. Printed 7 June 2001.)

Traditional environmental knowledge in reindeer management

Reindeer herding, as well as other natural sources of livelihood in the north, has been based on the scope of the area in question and on high mobility. These factors, in turn, have set special demands on the acquisition of environmental knowledge. As stated above, different environments require different information about how they are controlled and used.

Cognitive maps can be used to clarify individual use of and mobility in the environment. These maps contain the internal models, images and experiences that direct human action. Members of a community who do not know or have maps have learned to control their environment from memory, with the help of experience. They construct their environment as a network of places in a hierarchical relation to each other. The information is comprehensive. The precondition for knowing the environment and finding the way is going and moving yourself. The terrain is taken into possession and is mapped mentally by going there.

Hugh Brody said of a hunter-gatherers' area that 'this was a place with no beginning and no end. Sometimes the world of the hunter-gatherer seems boundless, reaching seamlessly into the distance and the very distant past.' According to Anna-Leena Siikala, the sphere of activities in natural sources of livelihood is widely perceived and directions, significant places and connections such as paths, roads and water courses are more important than its borders. The paths and roads – as well as waterways – serve as routes connecting places important for maintaining life. They also form an area that is loosely known as more strongly perceived space.[13]

Reindeer herders and other people who earn their living from natural sources of livelihood, manage this area cognitively and they know how to move there, whether that is over a mountain, across tundra, in a forest or along a waterway, but the authorities are not satisfied with this information. They need maps to control the area. If there are no maps available, they have to make them.[14] Maps also have an impact on and can change a landscape because they are used as tools for designing projects that change the environment, such as building waterways and natural parks, tree felling and land sales.

Traditional ecological knowledge and the efficient utilisation of wide areas form the basis of reindeer management. Because the reindeer's annual habits become familiar over the years, the herders have learned to follow them and the reindeer's natural instincts in their work. For example, the reindeer move to traditional calving areas during the spring time; they stay in certain areas without being herded

13. Hugh Brody, *The Other Side of Eden. Hunters, Farmers, and the Shaping of the World*, (New York: North Point Press 2000), p. 107; Anna-Leena Siikala and Oleg Uljashev, 'Henkien maisema. Pohjoishantien pyhät paikat ja niiden rituaalit', in Ildikó Lehtinen (ed.), *Siperia Taigan ja tundran kansoja*, (Helsinki: Museovirasto 2002), pp. 155–84.

14. See the symbolic maps of the Kola peninsula in Michael Robinson and Kassam S. Karim-Aly, *Sami Potatoes. Living with Reindeer and Perestroika*, (Calgary: Bayeux Arts, Inc. 1998).

(*palkia)* during certain seasons; they move against the wind and form herds in order to protect themselves from the mosquitoes (*tokkautua)*; and in the autumn they have their rutting season (*rykimäaika)*.

The significance of local environmental knowledge has not disappeared despite the fact that reindeer management and the environment in which it is practised have changed. Different environments require different information about governance and usage. The reindeer herders also have to control their environment when driving a snowmobile or a four-wheeler or travelling by helicopter, as they did earlier when they were on foot, driving with reindeer or skiing. When engine power is used, the nature of environmental observation changes because the vehicle moves quickly and makes a lot of noise. If it makes extra turns or even gets lost, it is easy to go back to the right route. When people walked or skied, they observed the terrain in a more detailed fashion, as if it were closer. The time used for travelling also has significance as far as the depth of observation is concerned. You experience the environment with your own body and thus the means and modes of transport affect individual experiences and observations. The smell of the petrol that fuels the snowmobile smothers the scents of spring and the noise of the engine drowns the voices of the environment.

The new high-technology vehicles – the snowmobile, the all-terrain motorcycle and the four-wheel drive – have distanced their drivers, more symbolically than concretely, from the environment because they offer a fast and direct route 'to nature'. Helicopters offer a different perspective on the environment from the air. The landscape goes past more quickly than when using skis or on foot. What is more, the noise of the engine might scare the animals. Drivers of four-wheel drive vehicles do not need to find dry routes over the swamp because these vehicles can move over wetter places but the traces remain for a long time. Account should also be taken of environmental changes –new roads and routes, water regulation, felling and forest cultivation. One retired reindeer herder emphasised the importance of knowing the terrain and changes in it. People learn to move over the terrain only by doing so. He said that felling and cultivation could change a landscape beyond recognition and that it was important to keep in mind the features of the terrain when walking or skiing there.[15] Younger reindeer herders may not remember place names if they are following older reindeer herders over unknown terrain, because a snowmobile or a four-wheeler is fast and noisy and it is easy to forget to ask or give the names. It is also true that some people know better how to walk in nature and to read the environment than others. Even though the older men guide the younger, not all learn to manage in nature.

Knowledge related to natural resources is of two kinds, which differ in spite of the fact that both, in principle, are based on the systematic collecting, classification

15. TYKL tutkimusarkisto 1.6.27/9 (TKU/TYKL-arkisto = The Archives of Turku University, Ethnological Department: interviews and field notes made by Helena Ruotsala).

and handling of empirical observations. Furthermore, and sometimes contradictory to the academic scientific or Western knowledge, 'data', that the authorities and researchers produce, there is traditional knowledge and local environment knowledge on which local people base the activities that give them their livelihood. The task of this knowledge is to secure the continuity of the community. Even though only a few community members are experts in terms of environmental knowledge, it is holistic and social: it belongs to the whole community.[16]

However, not everything is conceived with others in mind. Environmental knowledge may remain hidden because the information signifies power. The best berry-picking and fishing spots, nesting areas and sacred places are often kept secret. The reindeer herders' knowledge also differs from the environmental knowledge of others, as their neighbours who work in other professions do not need that information. Some environmental knowledge is tacit, knowledge gained by following the signs of nature and the animals' behaviour. The senses of sight, hearing, smell and touch are all important in tacit knowledge. Moreover, knowledge related to the weather can prove strategic and vital if one needs to know about potential changes in advance. Snow has to be experienced so as to be able to recognise and feel its composition and quality. This knowledge cannot always be explained and has to be acquired by trial and error. One young reindeer herder I interviewed found it difficult to explain how to choose a breeding reindeer or a female reindeer that would use its bells in the herd:

> You see it when you look at the reindeer. I can't explain it. You see it. The good reindeer cows. It's just like a leader reindeer. I can't say; you will learn it by doing it. You will learn to know your own reindeer. I have a good visual memory.[17]

There are different kinds of environmental knowledge. A successful reindeer herder has many kinds, but visual memory is an important part, especially in terms of identifying individual reindeer and various signs. The knowledge of the terrain and of reindeer pastures is wider. The expert in reindeer marks or in the terrain is not necessarily skilled in the reindeer forest because the physical labour and ability demand different skills. Some people are more skilled than others in animal handling, in teaching reindeer to follow by leading them (*laijistaa)* and how to become good driving reindeer (*ajokas).* They identify which reindeer could become good leaders of the herd and which would make better followers. Some herders are

16. Einar Eythorsson, 'Tradisjonell kunnskap og forvaltningsutfordringer', in Audhild Schanke (ed.), *Naturressurser og miljøverdier i samiske områder. Forvaltnings- og forskningsutfordningar*, (Guovdageaidnu: Sami Instituhtta 2001), pp. 20–28.

17. TYKL tutkimusarkisto 1.6.27/14.

good at recognising the ear-marks, thanks to their good eyesight and memory, and others are physically stronger for working in the reindeer forest.[18]

Every reindeer herder's ability, skills and work in the reindeer forest are the result of long training. They acquire concrete skills and abilities and also feelings and sensitivity in an intuitive learning and operating process; they learn to receive and read the feedback given by the environment. David G. Anderson uses the concept of *sentient ecology* in referring to the environmental relation of Evenki hunters and herders. When the Evenki are moving around and are active on the tundra, they are aware of the fact that the environment and the animals respond to them. Hugh Brody, for his part, recalls how the Dunne-Za, like other hunter-gatherer peoples, use dreams to locate both the animals they kill and the routes along which they must travel to find them. Their dream system allows memory, intuition and facts to intermingle.[19]

Traditional ecological knowledge versus scientific data

As mentioned above, the fragmentary quality of scientific knowledge is regarded as the essential difference between it and traditional environmental knowledge. The following features are often considered typical of the latter: 1) it is often classified in a different way from so-called scientific knowledge; 2) it is usually unwritten; 3) its definitions refer to everyday life and everyday use; 4) it often refers to time and place but in a different way from scientific knowledge; 5) it is holistic and social in that it belongs to the whole community, even if only some members are experts; 6) it is learned by practising and by imitating other members of the community; 7) its features may be mythological. Several anthropologists have pointed out how, in spite of the different nature of the two categories of knowledge, scientists like to use traditional ecological knowledge as data to analyse, describe and measure numerically or geographically. This implies the reduction of traditional ecological knowledge to codifiable data.[20]

In spite of the numerous studies on traditional environmental knowledge, it is still worth considering the power relations and questioning whether these studies have really had any significance to the 'owners' of traditional environmental

18. Robert Paine, *Herds of the Tundra. A Portrait of Saami Reindeer Pastoralism*, (New York: Smithsonian Institute 1994), pp. 22–4.

19. David G. Andersson, I*dentity and Ecology in Arctic Siberia. The Reindeer Brigade Number One*, (Oxford: Oxford University Press 2000), pp. 116–7; Hugh Brody, The Other Side of Eden, p. 126.

20. Julie Cruikshank, 'Uses and Abuses of "Traditional Knowledge": Perspectives from the Yukon Territory', in David G. Andersson and Mark Nuttal (eds.), *Cultivating Arctic Landscapes. Knowing and Managing Animals in the Circumpolar North*, (New York/ London: Berghahn Books 2004), pp. 17–32; Einar Eythorsson, 'Tradisjonell kunnskap og forvaltningsutfordringer', pp. 20–4; Addison Posey, 'Introduction: Culture and Nature – the Inextricable Link', p. 9.

knowledge. Is this taken further in earnest, as the basis of the reports and studies and of various decisions, or does the monopoly of mainly natural scientists still prevail? Paul Nadasdy, who has studied First Nation communities, points out the unequal power relations between studying and using environmental knowledge. He argues that there are still many different opinions about its role. At one extreme, it is held that it is only used for the purposes of political intrigue, invented by the native people to enable them to snatch control of environmental resources from trained scientists. The same opinion is also held by those for whom including such knowledge in their research plans is merely an entrance ticket to fieldwork in communities of indigenous people.[21]

The same unequal power relations are also evident in the discussions and procedures surrounding the area ecological plans of the Finnish Forest and Park Service. These plans are based, in part, on discussions in which the local people could take part and put forward their needs and views. According to the reindeer herders, these opportunities were of no practical significance because their views have not been taken into consideration in the plans. When the plans are discussed, the reindeer herders and other locals can only influence the details, regarding the timing of felling, for example. The important principal questions, concerning actual cuts and financial goals, for example, are left outside the discussions.[22]

Changing weather

The current climate change is a global process with very local effects. Successful reindeer management requires the young reindeer herders to learn to identify nature's signs, to predict the weather and to follow seasonal variations in the environment.[23] They have to know how to move around in different environments in different seasons under different conditions. Things look very different in thick fog (*murkku)* from in clear air. Knowledge of nature's signs and being able to predict the weather facilitate work and may even be life-saving. If a southerly wind blows on hard snow (*hanki*), it means that a thaw is on the way. Jumping reindeer predict snowfall (*pyry)*. By following nature and the weather, the reindeer herder knows where to find the reindeer in a northerly wind, from which fell tops to collect them for the summer calf marking and where to begin to collect them together in the autumn after the rutting season. Reindeer-herding work is based on the fact that

21. Paul Nadasdy, *Hunters and Bureaucrats: Power, Knowledge, and Aboriginal-State Relations in the Southwest Yukon*, (Vancouver/Toronto: UBC Press 2003).

22. Kaisa Raitio, *Ristiriidat ja valta saamelaisalueen maankäytössä ja sen suunnittelussa,* (Unpublished MA thesis in conservation science, Dept. of Limnology and Conservation, University of Helsinki 2000), pp. 59–60.

23. See also Marjut Huuskonen, *Stuorra-Jovnnan ladut. Tenonsaamelaisten ympäristökertomusten maailmat*, (Helsinki: Finnish Literature Society 2004).

human beings have learned to utilise the animals' behaviour. For example, during the mosquito season (*räkkä*), the reindeer gather in high mountain areas where the wind makes them less bothersome. Quite how this happens cannot be fully explained through the theories of the natural sciences. Human beings have learned to utilise this natural phenomenon. Still, it is the weather that indicates where the reindeer are to be found:

> The weather. If the sun shone, they went up on the mountain and if it rained they were resting in a spruce copse … That was how it happened, it depended on the weather. They searched where the wind was coming from … The reindeer wanted to move against the wind when there were a lot of mosquitoes (*räkkä*).[24]

The herders used to forecast the weather for the next few days according to nature's signs but today they prefer to follow media broadcasts. Following and documenting climate and weather changes is an important aspect of the reindeer herder's environmental knowledge. Middle-aged and older herders have many years of experience during which they have followed the changes towards milder winters and cooler summers. There were several snowy winters in the 1990s and thick snow with mild temperatures is bad for calves. Almost a metre of snow fell over two or three days in late winter 1996 and reindeer were not able to dig for food under it. They had to be fed in fenced enclosures or on their pastures. Fewer than half the females gave birth the following summer. The following reindeer-herding year was bad in Kyrö because in the early winter of 1996 it snowed on unfrozen ground, the unfrozen lichen under the snow went mouldy and nearly all the reindeer had to be moved to feeding enclosures or be fed in the forest. According to the herders, the reindeer smell mouldy lichen and do not start digging for it. In snowy winters they need to be in really good condition to be able to dig the lichen from under the thick snow.[25]

At first the reindeer herders were not taken seriously and their expertise was questioned because their reindeer were starving. Then natural scientists began to study climate change as the herders and other local inhabitants perceived it – mild winters with a lot of snow have become common. This is called the NAO phenomenon (North Atlantic Oscillation) because the location of low and high pressure in the North Atlantic affects the severity of the winter. When west winds dominate, the winters are mild and rainy and when east winds dominate, they are cold with little precipitation. The weather variations caused by the NAO phenomenon explain, at least to some extent, the lean years of reindeer management at the end of the 1990s.[26]

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24. TYKL tutkimusarkisto 1.6.27/9.

25. TYKL tutkimusarkisto 1.6.27/66.

26. Timo Helle, Ilpo Kojola and Mauri Timonen, 'Lumipeitteen vaikutus Käsivarren porolukuihin: mikä on Pohjois-Atlantin säävaihtelun (NAO) merkitys?' *Suomen riista* 47 (2001): 75–85.

Reindeer herding vocabulary

The link between language and culture is important on many levels. Language says a lot about an environment, its resources and uses. Memories, new meanings and reality are all re-produced with the help of language and the traditions connected to the profession are transformed through oral narrative from one generation to another. When the younger generations on the Kola Peninsula stopped speaking the Sámi or Komi languages of their forefathers, they lost their traditional environmental knowledge of reindeer herding.[27] It used to be common for reindeer herders to be bilingual or even to speak three languages: the Sámi reindeer herders also knew Komi and Russian and the Komi knew Sámi and Russian. Of course, the Sámi language –in fact there were four different varieties or dialects on the Kola peninsula and three in Finland – is still preserved in place names, even though Sámi is no longer used even as a working language on the tundra. Language may also be preserved in symbolic, political or ceremonial use, in spite of the fact that it is no longer used for communication and is not understood.

The danger is that as language loses its richness and disappears, cultural diversity will diminish and may even disappear too. Luisa Maffi has remarked that, even though much attention has been paid to traditional environmental knowledge and the use of natural resources, and though language holds a key position in the creation, storing and transfer of such knowledge, not enough effort is made to protect small and endangered languages. The disappearance of languages and cultures or ethnic groups and their traditions is not considered as serious as the impoverishment of the biodiversity of nature. However, linguistic, cultural and biological diversity are dependent on each other and the preservation of linguistic and cultural diversity should be included in biological protection programmes. Several studies show how indigenous communities and other ethnic groups are like reservoirs that preserve traditional knowledge about rare, endangered and indigenous species, their properties and possible uses, about which even the biologists are ignorant.[28]

The scope of the lexicon covering sources of livelihood shows their importance. Classic examples include the terminology for ice and snow used by the Inuit and the Sámi. Reindeer herding communities have a rich vocabulary covering terrain, nature and weather conditions; and reindeer management. In Sweden and

27. When the Komi and the Nenetsi arrived in Kola at the end of the 1880s it was evident that the Nenetsi could no longer speak their own language.

28. Luisa Maffi, 'Language, Knowledge, and Indigenous Heritage Rights', in Luisa Maffi (ed.), *On Biocultural Diversity. Linking Language, Knowledge and the Environment*, (Washington: Smithsonian Institute Press 2001), pp. 412–32; Tove Skutnabb-Kangas, 'Linguistic Human Rights in Education for Language Maintenance', in *Ibid*. pp. 397–411; Andrew Pawley, 'Some Problems of Describing Linguistic and Ecological Knowledge', in *Ibid*. pp. 228–47; Gary P. Nabhan, 'Cultural Perceptions of Ecological Interactions. An "Endangered People's" Contribution to the Conversation of Biological and Linguistic Diversity', in *Ibid*. pp. 145–56.

Norway too, we can perceive the abundant effect of the Sámi language in reindeer herding terminology. The different periods in the reindeer-herding year are reflected in Sámi in the names of certain months. May is *miessemánnu*, the month of calves, because the calves are born in early May in the first snow-free places in the mountains. August, *borgemánnu*, took its name from the reindeers' new coat. October is *golggotmánnu*, in other words the rutting season of male reindeer. These names may have varied according to the area, but there were thirteen of them at one time. Furthermore, the influence of the Komi and Nenets languages is also visible in reindeer-herding terminology on the Kola peninsula. The terminology in Russian is extremely stratified and interesting: *árkan*, for example, which means lasso in Russian, is an old loan word from Turkish; the Nenets equivalent was *tínchyah, tynzja*, which has been taken into dialects of Russian as a synonym for *tynzéj*.[29]

The vocabulary of snow

As one might imagine, there are hundreds, if not thousands of precise terms and descriptive epithets for snow, ice and similar natural phenomena in the Sámi languages and northern dialects. It is hard to estimate the exact number of them but, according to Israel Ruong, there are several hundred different terms for snow in Sámi languages. Ruong classifies them as follows: 1) amounts of snow, 2) its composition, 3) its bearing capacity, 4) its surface, level and slide quality, 5) expressions for being covered with snow, 6) untouched snow and tracks in the snow, 7) hoarfrost, frost and other coverings of ice and snow on plants and trees, 8) the melting and disappearance of snow, 9) ice, 10) the appearance of (patches of) unfrozen land, 11) places where the snow remains in the summer, 12) different kinds of winter pasture, including expressions for the surface quality of the snow.[30]

The reindeers' eating and moving possibilities depend on the properties, amount and quality of snow. A human being, a ski stick and a reindeer may be used as a measure when speaking about the amount of snow: there may be snow all the way to the knees or a reindeer's stomach.[31] Given the nature of reindeer management, the herder must be able to distinguish between the different weather conditions. He must also know how to indicate the quality of the snowfall – is it *räntä, pyry, raesade*, *maatuisku, lumikuuro, myräkkä* – or what kind of snowstorm or

29. I am grateful to Tapani Salminen, Ph.D., University of Helsinki, for this information.

30. Israel Ruong, *Samerna*, (Stockholm: Aldus akademi 1982), p. 17; Rolf Kjellström, 'Samerna och landskapet', in Ingvar Svanberg and Håkan Tunón (eds.), *Samisk etnobiologi. Människor, djur och växter i norr*, (Nora: Nya Doxa, 2000), pp. 59–70; see also Nils Isak Eira, *Bohccuid luhtte. Gulahallat ja ollásuhttit siidadoalu*, (Guovdageaidnu: DAT 1994), pp. 54–77.

31. TYKL tutkimusarkisto 1.6.27/13; T. I. Itkonen, *Suomen lappalaiset vuoteen 1945,* Osa II, (Helsinki: WSOY 1984), p. 478; Yngve Ryd, *Snö – en renskötare berättar*, (Stockholm: Ordfront förlag 2001), pp. 38–41.

blizzard it is and whether it covers the trees or not? Does the wind transport snow to where drifts and dunes are formed? Snow knowledge was more important when people were still using skis and reindeer (Figure 2), but nowadays it is enough to know where to drive the snowmobile so as not to fall in the water during the early winter or late spring when the ice is melting.

Figure 2. The fields of Pallastunturi are a traditional area for reindeer herding. Reindeer were used as transport animals until the 1960s.

I conducted fieldwork in both winter and summer and could observe seasonal variations in reindeer herding. During the winter I even asked the reindeer herders in Kyrö which terms for snow they knew. Some of them could remember about ten different words describing its quality or condition and others even fewer. Some of these words belonged to the standard language – *hanki, kinos, nietos, sohjo, tykky* and *umpinen* – while others, such as *sevä*, were special. *Sevä* means a layer of frozen snow on the ground below the snow layers, which acts as an ice sheet. This snow formation causes poor grazing conditions. As Yngve Ryd, who has published a book containing snow terminology used by reindeer herder Johan Rassa from Jokkmok, points out, this kind of work would require several hundred discussions with the same informant during a work period lasting many years. His book contains over 300 words describing snow and ice.[32]

32. Ruotsala, *Muuttuvat palkiset*, pp. 339-40; Ryd, *Snö – en renskötare berättar*, p. 9.

In spite of the technological developments, the new tools and other changes in reindeer management, the effect of snow is still considerable: it is both an advantage and a threat. *Sevä, takkala, nuoska* and *hanki* tell of its properties and this is vital information for reindeer management in that it indicates how the reindeer can dig its food from under the snow and how the herder can move in the reindeer forest. It is extremely important to know what lies under the snow and whether it fell on unfrozen ground: 'The earth's surface became bad when the snow came and the ground was wet. Then everything froze, ice layers were formed. It was very difficult then.'[33]

The role of traditional ecological knowledge

Language changes all the time and reindeer-herding language will also adapt to changes in reindeer herding and its conditions. The continuity of reindeer management and the reindeer forest means different things to different groups. For reindeer-herding families and also for some of the local population it means that their livelihood will continue to be sustained by natural resources. From the point of view of the environmental authorities and scientists, it means the continuity of biodiversity and the conservation of natural diversity. Thirdly, there is the tourists' desire to keep Lapland 'unchanged', conserved or preserved with no new technology or development.

The reindeer herder still knows the individuals in her/his herd in terms of their sex and age, the quality or position of the horns, the colour or quality of the fur and the form of the body and by their character or other special features. The names for these features vary in different parts of the reindeer-herding area.

The significance of traditional environmental knowledge was especially high when herders still used reindeer or skis and walked in the reindeer forest. With the advent of motor vehicles, such as snowmobiles, motorcycles and even aircraft and helicopters, its significance has diminished but that of technical know-how has been emphasised. If a snowmobile breaks down in the terrain, you must know how to repair it or how to leave the wilderness area without any help. Terminology related to nature is becoming less rich, while language related to technology will become richer as the way of life changes. Today's reindeer herders perhaps cannot discuss the quality of snow as vividly as their fathers did but they do know machine and EU terminology. Those herders who were born in the 1950s, 60s and 70s are able to discuss fluently the Acts on Reindeer Husbandry and the different measures of support and EU directives that affect reindeer management. The know-how behind this vocabulary is important because the reindeer herder must know how to speak the language used by the rest of society. Likewise, feeding in enclosures and distress feeding, which have increased, have changed the content of information

33. TYKL tutkimusarkisto 1.6.27/15.

in this context. More and more state support measures are directed to reindeer management, which in turn is being subjected to increasingly tight control. It is not enough, though, for the reindeer herders to know desk-top reindeer herding and the terminology associated with it, because they still believe that they get their living from the reindeer forest, not from Brussels. Without knowledge of nature and of the traditional environment, reindeer herders cannot practice their source of livelihood in its current form.

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Identity Politics and Alliance Building between the Sami Delegation and Conservationists in the Kessi Forest Dispute

Jukka Nyyssönen

Introduction

The rights of indigenous people, aims of conservation movements, industrial vested interests and the utilisation of natural resources have clashed in various parts of the world. The conflict over logging in Kessi, located in eastern Inari, marked the introduction to forest disputes in the Sami home area, located in northernmost Finland. The area is multi-ethnic: it hosts three Sami groups (Aanaar, Northern and Skolt Sami, distinguished by language, means of living and the origin and length of their settlement of Inari) and a majority population of Finnish extraction. These Sami groups belong to indigenous Sami people, an ethnic minority living in the most northern parts of Finland, Norway, Russia and Sweden. Fishing and hunting have been the main sources of livelihood among the Sami population for centuries. However, in Finnish Lapland, an important change took place in the nineteenth century as the state of Finland claimed ownership of the lands outside private estates. A long process of industrial mobilisation based on the utilisation of timber resources embarked, while reindeer herding, forestry, services and, most recently, tourism started to provide increasing shares of the Sami income.[1]

The Kessi logging conflict was part of a series of Finnish disputes over forestry and the conservation of the environment, which began in the 1970s with the criticism of forestry efficiency. Disputes were local but they mobilised national and, in the case of Kessi for example, international actors. Ideologically, they marked

1. For example, Jukka Nyyssönen, 'Murtunut luja yhteisrintama, Inarin hoitoalue, saamelaiset ja metsäluonnon valloitus 1945–1982', (Lic.Phil. diss. University of Jyväskylä, 2000), *passim.*

the growing international, national and local disbelief in industrialisation and modernisation, the motor of which, in Finnish imagery, was the wood-processing industry. In Kessi, the Forest and Park Service [*Metsähallitus*], the regime responsible for forestry on state-owned land in Finland, ran a campaign in support of the loggings, which gained wide support from the local community. Parts of the Sami community, including the Sami Delegation,[2] the local conservationist front and national environmentalist and conservationist organisations were against the loggings. The Finnish environmental movement had radicalised and fragmented and environmental thinking had become part of everyday life. Environmentalists were also innovative in their choice of civil-disobedience actions – confrontations with the local people were sometimes heated. The Kessi controversy saw the introduction of two new aspects into the forestry disputes – a connection between forestry and reindeer herding and the landownership question regarding the Sami home area. The dispute was one of the few occasions on which the Sami question truly became a national issue in the Finnish media and it also marked the beginning of the ongoing series of disputes between Sami reindeer herders and the Forest and Park Service.[3]

The loggings in Kessi were in compensation for the Koilliskaira nature conservation project, which was a matter of dispute during the 1970s and resulted in the establishment of the Urho Kekkonen national park in south-eastern Inari in 1982. Under the different administrative procedure that was adopted, the Sami Delegation of Finland was asked for statements during the planning phase. This was exceptional in forestry matters in the state-owned lands of Inari, where the Forest

2. The Sami Parliament of Finland *(Saamelaiskäräjät* in Finnish, *Sámediggi* in Northern Sami) is the representative body and highest political organ for people of Sami heritage in Finland. The parliament consists of 21 elected mandates. Its predecessor, the statute based Sami Delegation, was founded in 1973. The Finnish Parliament stipulated a law, The Sámi Parliament Act, in 1995 and the first *Sámediggi* was elected next year. The Sami people have corresponding self-governing parliaments also in Norway and Sweden. In this text I use the term Sami Delegation, which is the correct term given the period of time dealt with here. See http://www.samediggi.fi/index.php?lang=english Read on 21 Oct. 2009.

3. Timo Järvikoski, 'Ympäristöliike suomalaisessa politiikassa', in Ilmo Massa and Rauno Sairinen (eds.), *Ympäristökysymys, Ympäristöuhkien haaste yhteiskunnalle,* (Helsinki: Gaudeamus 1991), p. 168; Ilmo Massa, *Pohjoinen luonnonvalloitus, Suunnistus ympäristöhistoriaan Lapissa ja Suomessa*, (Helsinki: Gaudeamus 1994), p. 28; Jukka Nyyssönen, 'Luonnonkansa metsätalouden ikeessä?, Saamelaiset ja tehometsätalous', in H. Roiko-Jokela (ed.), *Luonnon ehdoilla vai ihmisen arvoilla? Polemiikkia metsien suojelusta 1850-luvulta 1990-luvulle*, (Jyväskylä: Atena 1997), pp. 114–20; Mika Pekurinen, 'Elämää metsässä ja metsästä, Metsäkonfliktien kahdet kasvot', in H. Roiko-Jokela (ed.), *Luonnon ehdoilla vai ihmisen arvoilla? Polemiikkia metsien suojelusta 1850-luvulta 1990-luvulle*, (Jyväskylä: Atena 1997), pp. 56–63; Esa Väliverronen, *Ympäristöuhkan anatomia, Tiede, mediat ja metsän sairaskertomus*, (Helsinki:Vastapaino 1996), p. 49.

and Park Service could in practice decide independently about loggings.[4] The lost battle in Koilliskaira made it determined to log in Kessi, as the area reserved for loggings in Inari had diminished significantly.[5] The area is not densely settled, but it is a pasture area for the predominantly Skolt-Sami herding cooperative of Vätsäri and incorporates a nearby reindeer round-up area.

This chapter concentrates on official Sami identity politics and the Sami imagery held by the nature-conservation movement in Finland. Was the alliance building between the two parties successful? Were the self-representations of the official Sami movement legitimised in other discourses and, if not, why not? Are there lessons to be learned? My primary sources were the statements given by the Sami Delegation during the dispute in 1987–1990, and newspaper articles and pamphlets produced by conservationists and environmentalists. My method was to consider representations of the relationship with nature and the kind of self-imagery used. The variables that I looked for were the qualifiers or definitions that placed the Sami in relation to nature (how the Sami livelihood and the people themselves were represented on the scale of ecological sustainability).

I have also tried to respond to the criticism posed by radical ecologists that environmental history loses its environmentalist edge if one takes the linguistic turn seriously. The theoretical framework adopted is modestly constructivist, as I do not hold the controversial premise that nature is only a linguistic construction. Nature, like the environment, is and can be reproduced in language but it still has a physical existence,[6] which, among other things and in the final analysis, gives subsistence to the creators of these representations. Environmental disputes are not only disputes over resource use – they are also discursive disputes over hegemony in defining the environment, sustainability and collective identities. It is the last-mentioned aspect – identity politics in the forest dispute in Kessi – that I am discussing here. My starting-point is modestly constructivist also in relation to the concept of identity and I acknowledge that identities are processes that are constructed and negotiated. I am not an advocate of the most extreme constructivism: collective

4. Jukka Nyyssönen, 'The Environmental Sustainability of the Property Right Regimes in Inari – The Performance of Forest Government and Reindeer Herding Co-operatives', in S. Jentoft, H. Minde and R. Nilsen (eds.), *Indigenous Peoples: Resource Management and Global Rights*, (Delft: Eburon 2003), p. 266.

5. Jukka Nyyssönen, 'Mikä on ihminen suhteessa metsään? Tapaus Kessi identiteettipoliittisena kiistana', in H. Roiko-Jokela (ed.), *Metsien pääomat*, (Jyväskylä: Minerva Kustannus, 2005), pp. 252–7.

6. On the linguistic turn and the way 'everything is conveyed in language', see Elisabeth A. Clark, *History, Theory, Text, Historians and the Linguistic Turn*, (Cambridge, Mass.: Harvard University Press), pp. 17–8 *et passim*; See, on the discussion concerning environmental history, Riitta Laitinen, 'Kulttuurihistoria kohtaa ympäristöhistorian', in K. Immonen and M. Leskelä.-Kärki (eds.), *Kulttuurihistoria, Johdatus tutkimukseen*, (Helsinki: SKS 2001), pp. 402–10.

identities are both invented and culturally conditioned and not just in the sense that they assume different meanings in different historical contexts but also in that they are based on socio-historical process of intra-group negotiation. One cannot choose one's identity regardless of one's socio-cultural anchors, nor are identities totally conditioned by biology or race.

The chosen cultural markers of one's ethnic identity, such as being a member of an ecologically sustainable ethnic group, have to be recognised by the group itself before they can be mobilised in identity politics.[7] I am critical of representational strategies based on the premise of identities conditioned by nature, however. The pitfalls of this kind of essentialism are discussed at the end of this chapter. I also intend to meet the demands of applicability in the context of environmental history.[8]

Alison Brysk defines identity politics as political processes launched in order to gain status, legitimatisation and recognition as an ethnic group, for example. Domestic and transnational group mobilisations are based more and more on ascriptive characteristics and 'imagined communities' and not so much on the class positions of the group claimants. Identity politics and claims of status are increasingly voiced in global and transnational arenas, where disparate actors seek to frame their identities as 'tribal' or indigenous.[9] In the case in point, the Sami movement applied the global discourse of indigenousness, such that the legal status of international law (that of being an indigenous people of a given region) is being claimed through self-representation or judicial argumentation. The chapter traces the tension between the legalist approach ('The Sami are rightful claimants of the land, the ownership of which was never handed over') and a more 'primordial' imagery ('The Sami have a warm relationship with nature, which gives them identity'). A key question concerns the aspects of the global discourse on indigenousness chosen by the Sami and other actors. How could the environmentalist movement have succeeded better in alliance building?

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7. Stuart Hall, 'Cultural Identity and Diaspora', in J. Rutherford (ed.), *Identity, Community, Culture, Difference*, 2nd printing, (London: Lawrence and Wishart 1998), pp. 223, 225; Jerome M. Levi and Bartholomew Dean, 'Introduction', in B. Dean and J. M. Levi (eds.), *At the Risk of Being Heard: Identity, Indigenous Rights and Postcolonial States*, (Ann Arbor: University of Michigan Press 2002), pp. 4–5; Laitinen, 'Kulttuurihistoria kohtaa ympäristöhistorian', pp.402–10; Trond Thuen, *Quest for Equity, Norway and the Saami Challenge*, (St.John's, Newfoundland: ISER 1995), pp. 4–5, 7.

8. Alfred Crosby, 'Foreword', in T. Myllyntaus and M. Saikku (ed.), *Encountering the Past in Nature, Essays in Environmental History*, (Helsinki: Helsinki University Press 1999), pp. xi–xvi; Yrjö Haila, 'Monitieteisyys on ympäristötutkimuksen vahvuus', *Helsingin Sanomat* (14 Aug. 2005).

9. Alison Brysk, *From Tribal Village to Global Village, Indian Rights an International Relations in Latin America*, (Stanford: Stanford University Press 2000), p. 17.

The identity politics of the Sami Delegation

As Lars Andreassen writes, nature conservation could be a threat to Sami ownership and usage rights or a guarantee against further encroachment from outside.[10] Rhetoric suggesting that nature conservation is hostile to Sami rights has surfaced only recently in Finland. In the post-war period the Sami were mostly supportive of conservation projects, as reindeer herding was protected in conservation areas and restrictions on use of and moving around in the areas were not as strict as they were in Norway. On the other hand, fear of restrictions on utilising the wilderness areas has long been on the agenda in Lapland, shared by both ethnic groups, the Sami and the Finns; protection of the traditional means of living and protection of reindeer from predators are major concerns and the local Sami have been most anxious to maintain their access to fuel wood. The issue of land-ownership would shortly be introduced to the Sami agenda and was potentially opposed to conservation-interests but, since most of the protests against conservation had come from the 'colonialist', the Forest and Park Service and local loggers, they would have made strange allies in opposition.[11]

The Sami adopted three different strategies in the dispute. The official Sami front, the Sami Delegation, focused on claims regarding ownership and other economic rights while radical self-representations based on a warm relationship with nature were avoided. The Sami resistance to logging expressed in unofficial forums was more radical. In brief, criticism in freer forums was built on sharpened tools of self-representation (reindeer herding as a promoter of Sami culture), sharpened judicial reasoning (accusations of colonisation) and sharpened environmentalist rhetoric (accusations of ecological colonisation and questioning the rationale behind the Western relationship with nature).[12] The cultural and economical domain of the Sami had been changed into a forestry reserve and indigenous people were faced with a colonialist economy.[13] The third strategy was to support the loggings in Sami areas in order to secure employment, a position taken up most visibly by the Skolt Sami from the village of Nellim. This chapter focuses on the first-mentioned strategy, adopted by the Sami Delegation.

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10. Lars Andreassen, 'Makten til å kategorisere, Samepolitikk og vern av natur', in A. Schanche (ed.), *Dieđut* 2/2001, *Naturressurser og miljøverdier i samiske områder: forvaltnings- og forskningsutfordringer*, (Kautokeino: Sami Instituhtta 2001), p. 146.

11. Andreassen, 'Makten til å kategorisere', pp. 139–42, 147–8; Nyyssönen, *Murtunut luja yhteisrintama*, pp. 253–7; Nyyssönen, 'The Environmental Sustainability', p. 266; Håkan T. Sandersen and Terje Olsen, 'Verneprosesser, ressursforvaltning og samiskhet – fjordresurser og forvaltningsutfordringer i Tysfjord', in A. Schanche (ed.), *Dieđut* 2/2001, *Naturressurser og miljøverdier i samiske områder: forvaltnings- og forskningsutfordninger*, (Kautokeino: Sami Instituhtta 2001), pp. 127–8.

12. See e.g. *Sápmelaš* 1–2/1988, 'Luondduvárit ja olmmoš'.

13. *Kansan Tahto* (12 May 1987).

The working group for forestry in the Paatsjoki region (in practice, Kessi) issued a report suggesting logging of 2.4 million cubic metres in 1982. In 1987, the Sami Delegation stated in a memorandum to the Finnish Minister of the Environment, Kaj Bärlund, and the Minister of Agriculture, Toivo T. Pohjola, that logging of that magnitude (almost 100 cubic metres per hectare) would equal clear cutting. The Sami Delegation estimated that the loggings would be carried out by normal, heavier methods and that there would be no change to using lighter means and technology.

The Sami Delegation referred to ecological research on the effects of logging on pasture and the amount of lichen. According to the research, the amount of lichen in the pastures reduces and growth slows down for decades after the logging cycle has ended. As the forest ecosystem is disrupted, the reindeers' access to nutrition is restricted. Changes in the micro-climate in logging sites hinder winter grazing, as the snow cover freezes. The research quoted by the Sami Delegation also pointed out how the natural routes of the reindeer from one pastureland to another are disrupted because of logging, ploughing and road building. Moreover, the new roads would also give fishermen and hunters of other ethnic groups free access to the traditional lands and waters of the Sami.

Further, the Sami Delegation referred to the unresolved question of land ownership and to the right to practice the traditional Sami livelihood. The loggings would be carried out in the area of Inari *Siida*,[14] of which the forefathers of the Sami had ownership that had never been terminated or annulled. This issue had never been impartially investigated or lawfully settled between the Sami and the state of Finland and thus ownership of this so-called state land still rested with the Sami. Land ownership included the right to practise undisturbed the traditional 'Lapp means of living' – fishing, hunting and reindeer herding.

Another typical strategy was to refer to Article 27 of the International Convention on Social and Political Rights, which Finland had ratified and which was used successfully by the Sami Rights Committee in Norway in 1984.[15] The Sami Delegation pointed out how Article 27 was interpreted in Swedish and Norwegian law so as to prohibit actions by the state that would assimilate the Sami population into the majority and to oblige the state to give the Sami special status in the legislation.

The special treatment mentioned in the Convention implied that the Sami should have the power to decide over matters of intellectual culture and their tra-

14. Lapp- or reindeer village, *siida* in northern Sami, refers both to the area and the people living in the autonomous area of the *siida*. It is a governmental area for practising the Lapp means of living (hunting, fishing and reindeer herding) with negotiable borders and was the main feature in community organisation in most of Finnish Lapland until the end of the 19th century. Nyyssönen, 'The Environmental Sustainability', p. 252, footnote 8.

15. Thuen, *Quest for Equity*, pp. 47–8.

ditional land use, which constituted the basis of the Sami physical culture and way of life. The loggings should be given up for the time being until the land ownership question was settled and ratified by legislation.[16] The self-representation was toned down: reference to a close relationship with the land was replaced by emphasis on the judicial aspect.

The Sami Delegation took a firmer standpoint on the unclear land ownership question in a statement dated 20 June 1989 for the bill presented by the Wilderness Committee, which was nominated by the Finnish Parliament.[17] As long as this remained unresolved, the discussion of nature conservation and logging would be pointless. The argument of cultural protection was reiterated. The Sami Delegation presented the wilderness areas as 'safe areas' for traditional livelihoods, which had to be protected from conflicting interests and excessive outside use. It stated that these areas should be reserved for the means of living practised by the Sami and for the use of other local people and again mentioned the protection of the indigenous culture provided for in the International Convention. A new feature in this statement was a reference to the 1979/1980 Annual Report of the UN Human Rights Committee, which contained the demand that the legislation of ratifying countries should protect land areas used by ethnic minorities and prevent others from claiming them. There had to be restrictions on movement around such areas and the natural resources had to be reserved for the indigenous people. The Sami culture was represented as being threatened, which meant that positive limiting action was necessary. The proposed Wilderness Law would not sufficiently ensure the survival of traditional means of living, which were protected by the above-mentioned conventions and by Sami ownership. Finally, the Sami Delegation demanded involvement in the preparation of the Wilderness Law, as well as in the planning of land use in the Sami area.[18]

The Working Committee of the Sami Delegation considered another proposal for its statement for the Wilderness Law, drafted by the Livelihood Committee. Here, the Sami were represented as people who depended for most of their subsistence on 'wilderness-nature' – reindeer herding, forestry and fishing as well as other 'organic' means. They consequently proposed that the wilderness area should be reserved for the Sami means of living and for nature conservation. This self-representation allowed the Sami to enter into modernisation and exploit the working opportunities created by the Forest and Park Service. The proposal

16. Memorandum: Maa- ja metsätalousministeri Pohjolalle, ympäristöministeri Kaj Bärlundille, 22/9/1987, Inarinjärven itäpuolisten metsien hakkaaminen, Statements, motions, iniatives 1985–1987, The archive of the Saami Parliament, Inari.

17. *Erämaakomitean mietintö* / *Ödemarkskommitténs betänkande* (KM 1988:39), (Helsinki 1988).

18. Annual report 1989, Appendix 6: Ympäristöministeriölle: Lausunto Erämaakomitean mietinnöstä, 20/6/1989, The Archive of the Saami parliament, Inari.

contained mainly practical, concrete protective measures,[19] which were shortened and quoted in the final statement that was approved by the Working Committee. Reference to land ownership was prioritised. The self-representation of a 'natural people' and the demand for exclusive usage rights was removed from the final statement. The choice of terminology also highlighted the disengagement from the imagery of ecological soundness: 'organic means of living' was substituted by the judicial term 'Lapp means of living', the traditional means of living practised within the boundaries of the Lapp villages, the old judicial form of Sami social organisation before the nineteenth century.

The statement of the Sami Delegation was presented to the Legal and Economic Affairs Committee of the Delegation of Finland at a hearing in Saariselkä on 20 September 1990. It differed from older versions in references to 'preventing the destruction of nature' and the ongoing preparation of legislation on Sami issues. These laws had to be finalised before the Wilderness Law was passed. The logging did not promote the aim of preserving 'wilderness-nature'. The Sami Delegation continued:

> The means of living of the Sami form of culture is traditionally based on the sustainable utilisation of nature. Traditional Sami use has not changed the wilderness character of the areas. It is the judicial system and the state administration that have created opportunities for the commercial exploitation of the area, and for the destruction, spoiling and poisoning of nature. Legislation is therefore needed above all, to protect nature from Finnish society and its economy and structures.[20]

The Sami Delegation represented the Sami relationship with nature and their means of livelihood as more sustainable than modern Finnish practice. What is noticeable is the cautiousness of the representation. The *traditional* land use of the Sami has been sustainable and the landscape has not changed as a result of it. The Sami Delegation did not present statements about contemporary Sami land use and it was the forms of industrial land use that they argued constituted the real problem. Bolder comment was heard the previous year in a statement about

19. The department used the term 'luontaiselinkeinot', which I have translated as 'organic means of living'. Department meeting minutes 2/89, meeting 20/6/1989, Minutes, C.a.; Annual report 1989, Appendix 20, Elinkeinojaosto, Lausunto erämaakomitean mietinnöstä, Ympäristöministeriölle 27/4/1989, The Archive of the Saami Parliament, Inari.

20. Annual report 1990, Memorandum: eduskunnan laki- ja talousvlk:lle hallituksen esityksestä Eduskunnalle erämaalaiksi 42/1990, vp. Saariselällä 20.9.1990, The archive of the Sami Parliament, Inari. The original: 'saamelaisten kulttuurimuotoon kuuluvat elinkeinot ovat vanhastaan perustuneet luonnon kestävään hyväksikäyttöön. Saamelaisten perinteisellä alueiden käytöllä ei ole muutettu alueiden erämaaluonnetta. Vasta valtayhteiskunnan oikeusjärjestys ja hallinto ovat luoneet edellytykset saamelaisalueiden luonnon liiketaloudelliselle hyväksikäytölle sekä luonnon tuhoamiselle, pilaamiselle ja myrkyttämiselle. Lainsäädäntöä tarvitaan siis ennen kaikkea luonnon turvaamiseksi suomalaista yhteiskuntaa, sen taloutta ja rakenteita vastaan.'

the planned change to the Nature Conservation Law: 'Sami land-use forms do not threaten the realisation of conservation aims.'[21]

The delegation also referred to the protection of culture and to studies conducted by Kaisa Korpijaakko (later Korpijaakko-Labba) on judicial history in which Sami land ownership was verified with reference to official procedures. The Sami Delegation threatened to take the matter to the UN Human Rights Committee if their livelihood and land ownership were not sufficiently secured. It was claimed that the Sami region was in the process of being turned into a state-owned wilderness area without compensation.[22] The choice was clear. The Sami Delegation appealed systematically to international conventions of human rights. Their self-representation relied on the global discourse of rights. Another striking feature in the statements was the kind of knowledge that was referred to: it was based on scientific studies of the law, of judicial and settlement history and of pasture and forest ecology, not on the traditional knowledge of the indigenous people.[23] There was no reference to the warm relationship with nature, to the identity 'given by the wilderness' or to its significance.

The Sami movement in Finland – a trade-off between institutionalisation and internationalisation?

In order to explain this choice in Sami identity politics, one has to look at the earlier history of Sami political mobilisation. Hydropower projects in Sodankylä had aroused fierce Sami criticism from the early 1960s onwards. The first signs of opposition to forestry in Inari emerged in the early 1970s. Before this the forestry question had been of marginal interest to the official Sami movement in Finland, although its consequences for reindeer herding were a matter of concern among the reindeer herding Sami. The growing criticism of forestry in the late 1980s marked the beginning of a series of disputes in the whole Sami area. The escalation of the conflict was due to many factors. The Kessi Forest dispute was preceded by the most intensive and consistent loggings in the history of forestry in Inari, which had brought reduction of, or at least frequent short-term disturbances in, the pastures. Conservationist and even environmentalist thinking had achieved national acceptance and publicity and both supporting and opposing attitudes towards nature

21. Annual report 1989, Appendix 2: Lausunto luonnonsuojelulain muuttamisesta, Ympäristöministeriölle 2/3/1989, The Archive of the Saami Parliament, Inari.

22. Annual report 1990, Memorandum: eduskunnan laki- ja talousvlk:lle hallituksen esityksestä Eduskunnalle erämaalaiksi 42/1990, vp. Saariselällä 20/9/1990, The Archive of the Saami Parliament, Inari.

23. See, for an earlier example of an article criticising the Alta hydro-power project, based on studies on cost efficiency and ecological consequences, Pekka Sammallahti, 'Alattiojoen rakentamisen ympäristövaikutukset', in I. Massa (ed.), *Energia, kulttuuri ja tulevaisuus*, (Helsinki: SKS 1982), pp. 183–91.

conservation had radicalised on both sides. All these aspects and opposing interests concentrated on the forest as land and the problem was formulated in two ways. Was the Kessi reserve for forestry or pasture-land, timber stock or the basis of the Sami culture? Another aspect was legal: who owned the land?[24]

The second phase of Sami political mobilisation in Finland, commencing in the late 1960s, brought radicalisation to the movement and the landownership question was introduced to the repertoire, as the notion of state land belonging to Sami became prevalent.[25] Alongside the radicalisation, two significant and contradictory changes occurred in the Sami political space in the 1970s: institutionalisation and internationalisation. The new movement had become more professional as the educational level of the activists had risen. After the establishment of the Sami Delegation (1973) and the consequent institutionalisation, the Sami movement had to adjust its politics to the majority political culture. The Sami, in tandem with other indigenous people of the world, began to exploit the political opportunity created by the pressure exerted on nation states by the conventions of international law.[26]

Internationalisation led to the most radical self-representations, which the Sami borrowed from the global Indigenous Peoples Movement they had just joined. According to Nils-Aslak Valkeapää, they had been evicted, chased away to a marginalised area that could not provide them with a livelihood. Westernisation had corrupted 'the Sami way of thinking and the realities of life … and the Sami have had to adopt many things foreign to their culture'. The alienation from nature brought by Westernisation had made it impossible for them to practise their life form that was deeply integrated into and based on nature. In 1980, Nils-Aslak Valkeapää drew the deepest distinction between the Finns and the Sami in his representation based on differences in 'philosophy of life'. The Sami did not own the land since that was not possible. Nature ruled over human beings and reindeer herding was 'not work … [but] a part of life, part of nature'.[27] The Sami were a people not divided by national borders, but integrated by nature. Of the Sami in Finland, Valkeapää probably had the closest ties to the Indigenous Peoples Movement, at least with the cultural exchange that went on between indigenous people in the 1970s.[28]

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24. Nyyssönen, *Murtunut luja yhteisrintama*, pp. 284, 286.

25. Veli-Pekka Lehtola, *Saamelainen ääni, Saamen radio 1947–1997*, (Helsinki: Yleisradio 1997), pp. 51–2.

26. Veli-Pekka Lehtola, 'Kansain välit - monikulttuurisuus ja saamelaishistoria', in I. Seurujärvi-Kari (ed.), *Beavvi Mánát, Saamelaisten juuret ja nykyaika*, (Helsinki: SKS 2000), p. 194; Compare Seija Tuulentie, *Meidän vähemmistömme, Valtaväestön retoriikat saamelaisten oikeuksista käydyissä keskusteluissa*, (Helsinki: SKS 2001), pp. 65, 67, 97–8.

27. Nils-Aslak Valkeapää, 'Saamelaistaiteesta', in J. Helander, M. Mykkänen, E. Nickul, T. Salo and L. Sammallahti (eds.), *Bálggis, Polku, Sámi Čuvgehussearvi 1932–1982 – Lapin Sivistysseura*, Sámi Čuvgehussearvi doaimmahusat 44, (Helsinki: Sámi Čuvgehussearvi – *Lapin Sivistysseura* 1984), pp. 51–2, quotation p. 51.

28. *Lapin Kansa* (6 Nov. 1975); *Lapin Kansa* (26 Jul. 1977).

These radical self-representations were only partially legitimised in Sami conferences, which were a semi-official, transnational Sami arena organised by the Nordic Sami Council. The resolution from the 1976 conference used the rhetoric of the Sami in a process of losing their (potential) rights. The resolution still relied on the self-representation of the indigenous people as a natural sustainable people. By the time of the Tromsø conference in 1980, the change was evident. Nils Henrik Valkeapää spearheaded the Finnish Sami opposition by referring to his own studies and demanding a firmer and more matter-of-fact judicial substantiation of the land ownership claims. 'Political programmes' were not enough; only litigation would be effective. Land ownership based on immemorial usage rights could be settled only with reference to the inheritance of the Sami, who were now legal claimants, legal subjects, and not indigenous people living close to nature: indigenousness was being transformed from a cultural emblem into a judicial status.[29]

In practice, both imageries co-existed in the years to come but the Kessi dispute was exceptional in the sense that the 'primordial' imagery, the fruit of internationalisation, was toned down considerably. The national, institutional frame and expectancies tied the hands of the official Sami movement. As a result of the change in political status from unofficial, unrecognised interest-group-based resistance to institutionalised resistance the Sami had a chance to influence societal development on the national level. On the discursive level, the strategy had to be changed in order make them appear equal political actors. If expectations were not met and political propositions were ignored or not taken seriously, it was because they appeared as unrealistic, incoherent and untrustworthy. There was a shift to professionalism and a concentration on official procedures as a result of institutionalisation. The argument for the shift was the need to raise the profile of the movement and to appear as a trustworthy actor meriting being taken seriously. This shift in strategy occurred at the expense of international and global connections.[30]

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29. *Lapin Kansa* (15 Jun. 1976); *Lapin Kansa* (23 Feb.1980); *Helsingin Sanomat* (17 Jun.1980); *Kaleva* (20 Jun.1980); *Kaleva* (17 Aug.1980).

30. Bjørn Bjerkli and Per Selle, 'Samisk offentlighet og makt', in B. Bergli and P. Selle (eds.), *Samer, makt og demokrati, Sametinget og den nye samiske offentligheten*, (Oslo: Gyldendal Akademisk 2003), pp. 26–7; Bjørn Bjerkli and Per Selle, 'Sametinget – Kjerneinstitusjon innenfor den nye samiske offentligheten', in *Ibid.* pp. 58–9, 83; Lydia Heikkilä, 'Ympäristöuhka vai perustuslaillinen oikeus? Poronhoitoa koskeva puhe ympäristönhallinnon kontekstissa', in L. Suopajärvi and J. Valkonen (eds.), *Pohjoinen luontosuhde, Elämäntapa ja luonnon politisoituminen*, Lapin yliopiston yhteiskuntatieteellisiä julkaisuja, B. Tutkimusraportteja ja selvityksiä 43, (Rovaniemi: University of Lapland 2003), p. 119; Ulf Mörkenstam, 'The Power to Define: The Saami in Swedish Legislation', in K. Karppi and J. Eriksson (eds.), *Conflict and Co-operation in the North*, (Umeå: Kulturgräns Norr 2002), pp. 115–6.

The imagery of Sami in nature conservationist statements – the pitfalls of representing indigenous people

Emphasising the cultural aspect of the forest to the Finnish people was old strategy within the nature-conservation movement and it was often used in the series of forest disputes during the 1980s and 1990s.[31] Another strategy was to forge an alliance with the local people. In Kessi, the nature conservationists, who were sympathetic to the Sami cause and had connections with the local movement in Inari, drew a parallel between the conservation of Kessi as a wilderness and the threatened Sami culture and the future of the traditional means of living. With their focus on reindeer herding and hunting they followed only one of the strategies of Sami identity politics.[32] Sami representations in the environmentalist pamphlet *Kessinhammas* were an exception. The environmentalists had established contacts with Sami society and the articles dealing with Sami questions were written by Esko Aikio, an environmentally radical member of the Sami Delegation. Building his argument on the statements of the Sami Delegation, Aikio referred to the binding international conventions and the unsettled land ownership question. The pamphlet also embraced the traditional approach to the Sami problem: it was a matter of cultural survival, which was not possible without preserving the traditional means of living. It seems that as far as (Finnish) nature conservationists and environmentalists were concerned, the Sami were people living in close connection with the land and could survive only in relation to the land. In comparison to Sami self-representations, this representation is quite essentialist, partly due to the ongoing discussion of the Wilderness law, in which the representation of the Sami was similar to that promoted by nature conservationists – a people gaining their subsistence mainly from traditional means of living. Thanks to quotations from the Sami Delegation, the legalist and 'primordialist' approaches were used side by side in *Kessinhammas*.[33]

It seems that the presentation of the Sami drafted by the nature conservationists, with its stress on Sami culture and its close connection to a traditional, nature-bound livelihood, was an out-of-date, romantic picture of a reindeer-herding people living in mountains untouched by modernisation. The environmentalist movement was active in another political field, that of the newly emerged, unofficial civic activism, whereas the main Sami political action took place in the official political hierarchies of the Finnish state. This gap resulted in dysfunction in terms of modes of action, instances addressed and representations of the Sami. In addition, the representation of the Sami as 'natural people' turned out to be short-lived and it was not shared by the whole conservationist front.

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31. Timo Järvikoski, 'Ympäristöliike Suomessa', *Ympäristö ja aika*, *Historian ja yhteiskuntaopin opettajien vuosikirja* XX (1991): 173–4.

32. Pekurinen, *Elämää metsässä ja metsästä*, p. 58.

33. *Kessinhammas*, Nov. 1989.

Pentti Linkola, a radical Finnish environmentalist and a participant in civil disobedience actions in Kessi, trashed the representation.[34] He criticised the Sami reindeer herders and the romanticising imagery cultivated of them, according to which reindeer herding was being deprived by forestry. He claimed that the marks left on and the stress caused to nature by forestry and reindeer herding did not differ significantly. Reindeer herding, although more sustainable than forestry, was also mechanised and had left marks, fences, boundaries, waste and snowmobile trails, all of which were unacceptable to Linkola. The lichen pastures were exhausted by over-large stocks and he found in reindeer herding the same despotism over nature as in forestry,[35] which was a logical standpoint in his uncompromising biological world view and thinking. His break from both – the front demanding Sami rights and nature conservation – is evident. Implicit in extreme environmentalism is that human beings, including the Sami, are 'foreign' and hostile to their environment[36].

Prior to the dispute, the ecological reputation of the Sami in the Finnish public sphere was reasonably good and in any case better than that of the Forest and Park Service, whose poor reputation was cemented back in the 1970s. The statements made by Linkola denote the emergence of a new counter-discourse in the public discussion. The questioning of 'the natural people' imagery began during the dispute. The discourse was launched by a new force in Finnish politics, the environmentalists, supported by the collapse of the herders' reputation in the Finnish media.[37]

Both strategies, referring to the indigenousness of the interest group and disengaging from 'primitive' connotations, have their pitfalls. On the one hand, the alliance between the Sami and the environmentalist movement was considered dangerous on the part of the Sami in Norway – it was feared that the Sami would be forced to adopt the paternalistic imagery used by Western societies when referring to their relationship with nature and the distance from the majority societies. The Sami movement risked being encapsulated in the 'Noble Savage' imagery, based on Western nature–culture dichotomy. It must be also said that the environmentalist movement and the Indigenous Peoples Movement gave the Sami movement in

34. http://en.wikipedia.org/wiki/Pentti_Linkola Accessed 20 August 2010.

35. Pentti Linkola, 'Ihminen ja Kessi', in T. Osala (ed.), *Pohjoinen erämaa Kessi-Vätsäri*, (Vaasa: O & G Kustannus 1988), pp. 156–7.

36. Eivind Torp, '"Rädda vargen – skjut en same"', in A. Schanche (ed.), *Dieđut* 2/2001, *Naturressurser og miljøverdier i samiske områder: forvaltnings- og forskningsutfordninger*, (Kautokeino: Sami Instituhta 2001), pp. 108–9.

37. This was due to a parallel, yet separate, scandal involving reindeer-meat marketing. See Helena Ruotsala, *Muuttuvat palkiset, Elo, työ ja ympäristö Kittilän Kyrön paliskunnassa ja Kuolan Luujärven poronhoitokollektiivissa vuosina 1930–1995*, Kansatieteellinen Arkisto 49, (Helsinki: Finnish Antiquarian Society 2002), pp. 253–7.

Norway strength and new arguments.[38] Internal discussion within the Sami elite of the pre-industrial and essentialist connotations of indigenous identity was underway in Finland too.[39] At worst these perspectives categorise the Sami as people untouched by and not capable of development. On the other hand, institutionalisation usually leads in the opposite direction: the indigenous claimants are seen as 'inauthentic'. Public goodwill erodes, as the symbolic power derived from the indigenous, oppressed position is lost.[40] The minority risks being judged by the same standards as the majority, while lacking a similar set of political power tools.

The imagery of closeness to nature is an example of self-representations loaned in part from dominant Western discourses. 'Primitive' features were long considered inferior to those of civilised, cultured nations in Western thinking. In the era of enlightenment, the wilderness was bound up with the majority representation of Sami identity and gave legitimacy to the colonisation of the '*terra nullius*'. There was a need to cultivate both: the 'empty land' and the uncivilised Sami. The age of romanticism changed this, as nature and the wilderness were seen as a temple of God and the people living in close connection with nature as avoiding the duality and sharp distinction between nature and man. The problem with such self-representation is that modernising features in the culture are easily seen by the majority as 'unnatural' and fraudulent, both against nature on which the expectation of lightest possible use is placed and against the romanticising and stereotypical expectations of the majority. The 'fraud' committed by the modernising Sami becomes even bigger as nearly every form of land use becomes misuse. The breakthrough in environmental thinking in Finland meant that the wilderness became appreciated and gained strong positive connotations but only in relation to the intrinsic value of nature itself. The aggressive majority representations of the Sami as hostile to their own environment have been seen as an effort to cope with unfulfilled expectations and the crisis of modernity, as the old concepts do not correspond with the new fluidity of the Sami identities. In this case, postmodern scepticism and value relativity worked against the Sami movement.[41]

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38. Henry Minde, 'Urfolksoffensiv, folkerettsfokus og styringskrise: Kampen for en ny samepolitikk 1960–1990', in B. Bergli and P. Selle (eds.), *Samer, makt og demokrati, Sametinget og den nye samiske offentligheten*, (Oslo: Gyldendal Akademisk 2003), p. 106.

39. The evidence is mixed in terms of whether the 'traditional' elements used in making rights claims are efficient or not. The 'authenticity' of the tribe might be expected and used to deny claims and in many cases the traditional law is not recognised by the courts. See The Honorable Robert Yazzie, 'Indigenous Rights from an International Perspective', in E. G. Broderstad (ed.), *Samiske rettigheter – utfordringer lokalt, regionalt, nasjonalt og internasjonalt*, (Tromsø: Senter for samiske studier 1998), p. 103.

40. Levi and Dean, 'Introduction', pp. 2–3.

41. Britt Kramvig, 'I kategorienes vold', in H. Eidheim (ed.), *Samer og nordmenn, Temaer i jus, historie og sosialantropologi*, 2nd impression, (Oslo: Cappelen akademisk forlag 2002), p. 126; Veli-Pekka Lehtola, 'Aito lappalainen ei syö haarukalla ja veitsellä, Stereotypiat ja saame-

Even more crucially, the hostile counter-discourse gained popularity in Finnish legislative organs. During the dispute and the process of negotiating the Sami Law, the resisting forces used stereotypical imagery of the Sami as being incapable of taking care of their environment and, according to Seija Tuulentie, even racial characteristics were used as an argument.[42]

Conclusions

The dispute ended in a compromise, the establishment of 'wilderness areas', often interpreted as a defeat for the Sami as limited logging was allowed in the region. The major item on the Sami agenda, the land-ownership question, was not touched upon. Why was this? The limited success of the Sami in the dispute could be explained by the lack of a national Sami interest organisation, a role that the Sami Delegation as a democratic organ could not assume, as well as by the stronger counter-discourses. In particular, the environmentalist discourse penetrated Finnish society in a way that ethnically-specific minority discourses had never done. Moreover, neither of the Sami approaches was legitimised by the majority. In crude terms, there was very little understanding in the majority imagery of the legal approach challenging Finnish national territoriality, whereas the ecologically-inspired Sami self-representations were criticised for lacking correspondence with the real state of affairs in the pastures. In this transition period, the effectiveness of Sami politics and bargaining for rights was too dependent on the goodwill of the majority and this is still the case today. The bankruptcy of 'strategic essentialism' ('The Sami as natural people') in postmodern conditions of greater freedom to articulate formerly politically incorrect representations ('The Sami as hostile to their environment') is noticeable. The successful use of essentialisms requires a more friendly and 'progressive', rather than a relativistic and nihilistic discursive, field.

Are there lessons to be learned, apart from the most obvious one that the majority imagery of the Sami with their traditional means of living does constrain them in primitive 'otherness'? Essentialist thinking backfires in many cases, as it gives actors the tools to curb indigenous claims of protection (also of the environment): the splits in the indigenous front are highlighted and used against its claims, giving an excuse to question alleged sustainability, or to guilt-trip the people for their modernisation efforts. Moreover, expectations of indigenous sustainability, as well as the strategy of entering disputes behind environmentalist discourse with its

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lainen kulttuurintutkimus', in M. Tuominen, S. Tuulentie, V-P. Lehtola and M. Autti (eds.), *Pohjoiset identiteetit ja mentaliteetit, osa 1, Outamaalta tunturiin*, (Rovaniemi, Inari: University of Lapland/Kustannus-Puntsi 1999), pp. 15–6; Audhild Schanche, 'Meachhi - den samiske utmarka', in S. Andersen (ed.), *Diedut* 1/2002, *Samiske landskap og Agenda 21: kultur, næring, miljøvern og demokrati*, (Kautokeino: Sámi Instituhtta 2002), pp. 156–8, 160.

42. Tuulentie, *Meidän vähemmistömme*, pp. 211–5.

mode of self-legitimisation through scientific speak and established management procedures, are both deeply embedded in Western hegemonic discourses. On the local level, these discourses marginalise and de-legitimise the local perspective and interpretation of reality and create social agencies from these premises. On many occasions, as reindeer herders enter disputes, the institutionalised environmental negotiation processes reproduce the agency and status of the powerless, 'primitive' Sami.[43]

Does the linguistic turn take the edge off the argument and does it diminish the applicability of environmental history? No, it does not, since identity is indeed power. Negotiating a strategy of identity politics with wished-for allies should be a matter of great concern to the environmentalist movement. A lesson to be learned from what seems to have been a failure in alliance building in the Kessi dispute should be to avoid age-old, paternalising imagery, however dominant in the majority imagination. Furthermore, the expectation of automatic solidarity between environmentalists and the Indigenous People's Movement should be abandoned. This expectation is based on the illusion of the omnipotence of the environmentalist discourse, not necessarily shared by different groups of participants in the conflicts. Being conscious of the constructivist starting point of 'reality' as a culturally bound construction, giving room for many possible realities, gives the environmentalist movement 'natural relativity' (Heikkilä), freedom of articulation and the possibility of avoiding monoculturalist *eco-colonialism*.[44] Entering disputes should be done in full knowledge of the loss of rules in post-modern and hybridised conditions, in which the legitimacy of many Western grand narratives, including that of indigenous peoples as agents of sustainability and sustainable growth, is becoming increasingly weak.

Moreover, the linguistic turn helps us see the profoundness of the connectedness between human beings and nature: it is not only a question of being connected to nature in an ecological sense, as the human being is threatening his/her environment at an increasing rate – it is also a question of the power of definition. Whether one chooses to represent Arctic nature as vulnerable or robust or as an environment in the process of being destroyed, for example, has consequences in terms of resource use and the environment. Discourse about the environment/nature thus binds human beings to nature. The linguistic turn helps us to escape the separation created by the human being–nature dichotomy and makes us aware of our ever-deeper dependence on the physical, natural environment. On the negative side, this means that nature, and the destruction thereof, may be hidden behind speculative, time-consuming language games. Environmental struggles have indeed

43. Lydia Heikkilä, 'Saami Reindeer Herding Confronted with Modern Environmental Management', in L. M. Andreassen (ed.), *Dieđut* 5/2004, *Samiske landskapsstudier, Rapport fra et arbeidsseminar*, (Kautokeino: Sámi instituhta 2004), pp. 145–8.

44. Heikkilä, *Saami Reindeer Herding*, pp. 139, 149.

also become sites of articulation and representation, as well as of exact measurement and impact assessment. There is still a long way to go in uniting these two strategies.

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PART IV

Managing Flood Catastrophes

~ 11 ~

Reconstruction and Analysis of the Flood Catastrophe along the River Neckar (South-West Germany) in October 1824

Jochen Seidel, Paul Dostal, Katrin Bürger, Florian Imbery and Mariano Barriendos

Introduction

Recent floods in Central Europe, in particular the Elbe flood of 2002, have raised public awareness of and discussion about climate variability and future climate change and their impact on flood events. This prompted an initiative from the German Federal Ministry of Education and Research (BMBF) for the 'Risk Management of Extreme Flood Events' (RIMAX) to avoid or mitigate the adverse impact of floods in the country.[1] The research project 'Analysis of Historical Floods for a Preventive Risk Management of Extreme Floods' (Xfloods), conducted at University of Freiburg from 2005 to 2008, was part of this initiative, with a special focus on historical extreme floods in the Federal State of Baden-Württemberg, located in south-west Germany. The aim of the project was to analyse and reconstruct flood events that occurred in south-west Germany from the sixteenth to the nineteenth century and to apply this knowledge to recent flood-risk management. Data revealing information about these events were extracted from historical records such as local annals and chronicles and were supplemented by instrumental observations that have been available since the middle of the eighteenth century. A major focus of the project was placed on the analysis of an extreme flood in October 1824 along

1. Bruno Merz and Jens Didszun, 'Risikomanagement extremer Hochwasserereignisse', *Umweltwissenschaften und Schadstoff-Forschung, Zeitschrift für Umweltchemie und Ökotoxikologie* 17/4 (2006): 191–192.

the Neckar River in south-west Germany, which was one of the most severe flood events of the last 500 years in this river basin.

Study area

The basin of the Neckar River is situated in south-west Germany in the Federal State of Baden-Württemberg (Figure 1).[2]

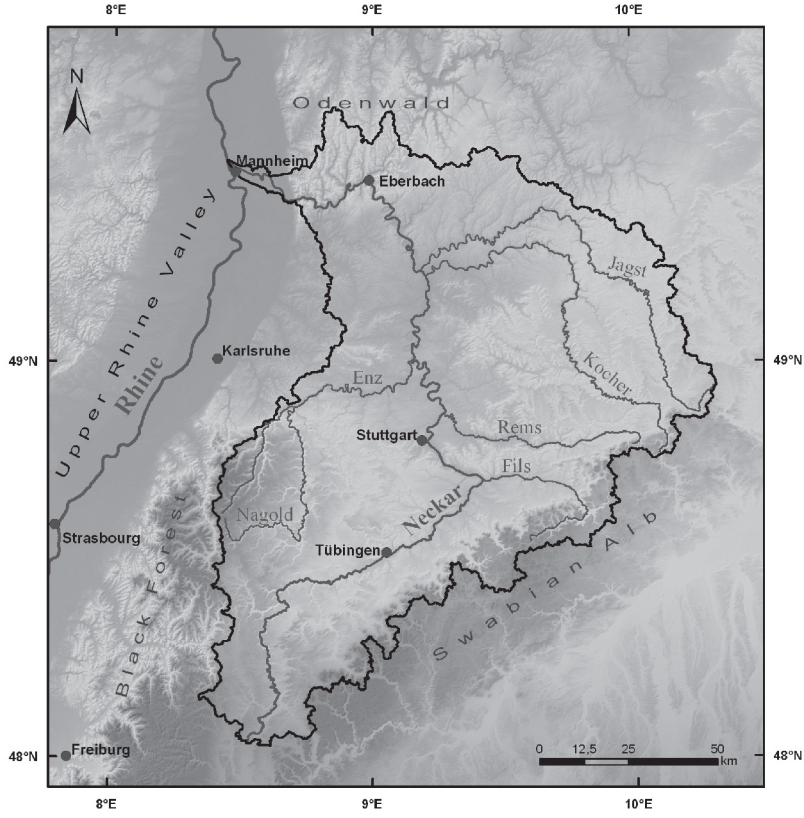

Figure 1. Map of the study area and the Neckar catchment.

2. The area of the German Federal-State of Baden-Württemberg (founded in 1952) was covered by the Grand Duchy of Baden, the Prussian Province of Hohenzollern and the Kingdom of Württemberg during the nineteenth century.

The Neckar is one of the largest tributaries of the Upper Rhine and the largest catchment area in Baden-Württemberg. Its source is near the city of Villingen–Schwenningen, lying east of the Black Forest at an altitude of 706 m above sea level. It is 367 km long and passes through the cities of Tübingen, Stuttgart, Heilbronn, Heidelberg and Mannheim and then flows into the Rhine. The Neckar is navigable along the 203 km stretch from Plochingen at the inflow of the Fils to Mannheim, which is located at the river mouth. The significance of this river is evident from the fact that, along with the Rhine and the Main, the Neckar constitutes one of the three main waterways in Baden-Württemberg.

Database for the reconstruction of the 1824 flood event

The extreme magnitude of the flood event along the Neckar in 1824 is reflected in a multitude of historical documents dealing with the direct and indirect consequences of this catastrophe. The data sources, including chronicles, contemporary newspapers, official documents, weather reports and meteorological and hydrological measurements, are located in more than forty archives and libraries in the Federal State of Baden-Württemberg and adjacent areas (Switzerland and France). These historical data contain detailed descriptions of the course and the development of the weather situation, the subsequent damage and administrative and civil reactions after the flood event. The historical meteorological measurements and weather descriptions were a particularly valuable data source for reconstructing the circumstances leading to the flood in October 1824. Meteorological measurements were carried out in seven cities in the wider Neckar catchment area.[3] They were usually made three times a day – in the morning, at noon and in the evening – corresponding more or less to the *Mannheimer Stunden*,[4] pertaining to the method that had been established by the *Societas Meteorologica Palatina* in 1780. The recorded meteorological parameters usually encompassed air pressure, air humidity, temperature at the barometer and outside in the shade, wind direction and the weather conditions. Figure 2 shows a data sheet compiled by Johann Gottlieb Friedrich von Bohnenberger between 8 and 28 October 1824.[5] Bohnenberger's meteorological measurements took place between 1815 and 1828 at the castle of Tübingen. The recorded meteorological parameters in Figure 2 are, from left to right, date, air pressure, temperature at the barometer, relative humidity, temperature outside in the shade and sky conditions.

Precipitation measurements are usually only available as monthly totals but Gustav Schübler, who maintained a network of meteorological stations in the

3. Meteorological measurements for 1824 are available from Freiburg, Karlsruhe, Mannheim, Tübingen, Stuttgart, Augsburg and Basel (Switzerland).

4. Mannheim observing hours at 7 a.m., 2 p.m. and 9 p.m.

5. Inheritance of Johann Gottlieb Friedrich von Bohnenberger, University Library Tübingen, Md. 22.

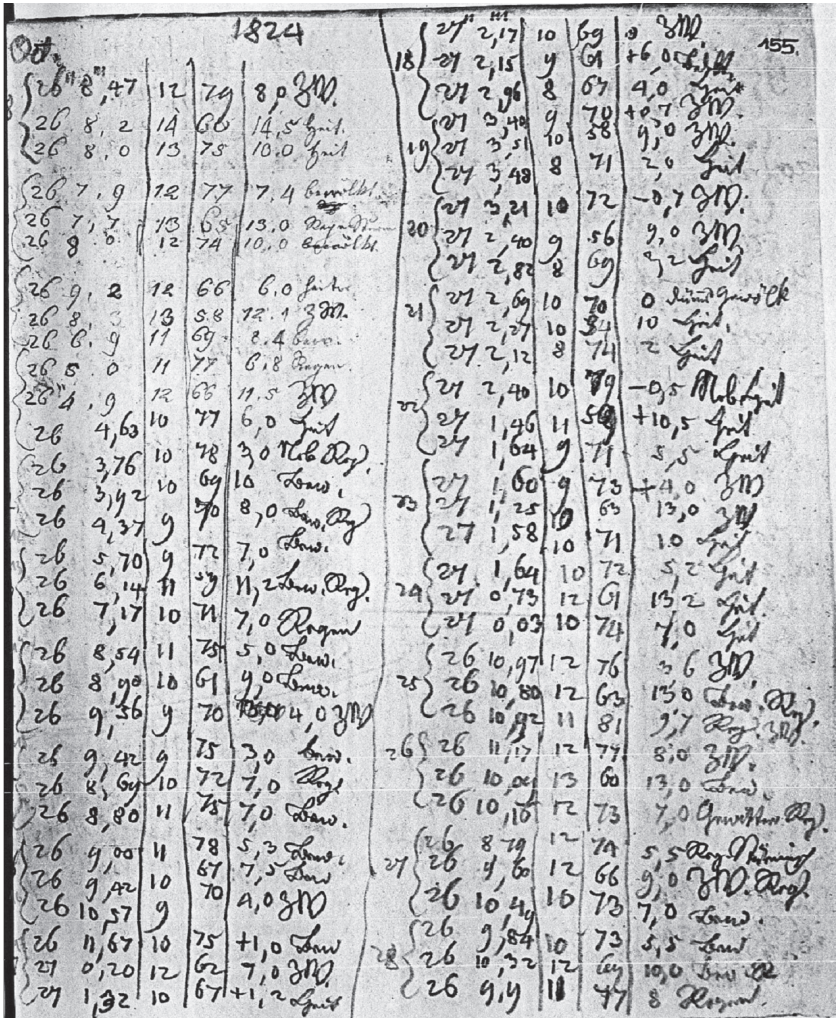

Figure 2. An excerpt from the meteorological observations of Johann Gottlieb Friedrich von Bohnenberger.

former Kingdom of Württemberg,[6] at the end of October 1824, compiled on a daily basis the data on the rainfall that caused the extraordinary flood event in the Neckar catchment area.[7] In addition to these measurements, qualitative data on

6. Gustav Hellmann, *Repertorium der deutschen Meteorologie*, (Leipzig: Engelmann, 1883).

7. Gustav Schübler, 'Über die ungewöhnliche Überschwemmung zu Ende Octobers des vorherigen Jahres und die dabei in verschiedenen Gegenden Württembergs gefallene Regenmenge',

the weather conditions at that time were found for more than twenty sites in the study area. These consist of descriptive newspaper reports and chronicles, which give detailed information about the onset time and duration of the flood-triggering rainfall. The qualitative data also provide the necessary information to assess the overall process of the developing weather patterns and the course of the flood event. By combining all the available historical data it was possible to make a detailed reconstruction of the flood event and of the triggering precipitation.

The causes and course of the flood event in 1824

A combination of several factors was responsible for the extreme magnitude of the flood along the Neckar in 1824. Generally speaking, the historical observations show that the summer and autumn of this year were wet and cold. The Bad Cannstatt[8] chronicle (Bad Cannstatt is now a district of the city of Stuttgart), for example, reported that the month of May 1824 was predominantly wet, which also caused two minor floods in the River Neckar. June was also wet and cold; the chronicle reports that this had a negative effect on the growth of fruit and grapevines. The months of August and September 1824 were characterised by variable weather conditions, with high amounts of rainfall leading to a poor grape harvest in terms of quality and quantity. Similar circumstances were recorded in a chronicle written by Georg Hohloch and Conrad Wekler from Reutlingen,[9] which is situated 30 km south of Stuttgart. Schübler's overview of the meteorological conditions for the whole year indicates that the precipitation amounts for the months of May, June, October and November 1824 were extraordinarily high.[10] This points to high water saturation in the Neckar catchment area during the second half of the year, which was further evidenced by the springs that started to flow all across the study area at the end of October 1824.[11] Eventually, the onset of the flood catastrophe was marked by heavy thunderstorms in wide sections of the Neckar catchment area in the evening of 26 October. These thunderstorms did not cause any immediate major flooding, yet they led to complete water saturation in the catchment area, so that the rain that fell from 28 October onwards went directly as surface-runoff

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Annalen der Physik und Chemie 3/2 (1825): 145–154.

8. Chronicle from Cannstatt, City Archive Stuttgart, Nr. 1859.

9. Chronicle from Georg Hohloch and Conrad Wekler, City Archive Reutlingen, Signature S 1 Nr. 4.

10. Gustav Schübler, 'Allgemeinere Resultate über die Witterung des Jahres 1824 mit näheren Beobachtungen über die Temperatur, Gewitter, Schloßen und Regenmenge in verschiedenen Gegenden Württembergs', *Correspondenzblatt des Königlich-Württembergischen Landwirthschaftlichen Vereins* 7 (1825): 1–39.

11. Gustav Friedrich Wucherer, 'Ueber die Ueberschwemmungen im Großherzogthum Baden etc. zu Ende Octobers und Anfangs Novembers 1824', *Kastner's Archiv* 5 (1825): 465–478.

into the Neckar and its tributaries. Gustav Schübler described this situation in a contemporary scientific article as follows:

> In the evening of 26 October thunderstorms, accompanied by rain, broke out in several regions of south-west Germany, but no unusual rise of the water levels in the rivers could be detected. On 27 October, there was some rainfall in the Upper Neckar Valley. In the evening of 28 October unusually heavy rain began to fall, which lasted 36 hours with few interruptions, up to the early hours of 30 October, and caused this exceptional inundation. The rain quantity was very high in the Black Forest. The regions of the lower Neckar and the Enz were especially affected by this inundation. In many places, the rainy weather, with a few minor interruptions, continued until 2 November.[12]

The recorded rainfall amount at seven sites in the Kingdom of Württemberg (now part of the German federal state of Baden-Württemberg) during the 36 hours from the evening of 28 October to the early hours of 30 October ranged from 89 mm in the south-eastern part of the Neckar catchment area to 194 mm in the northern parts of the Black Forest.[13] These measurements were very valuable in determining the precipitation pattern for the 1824 flood event.

Complementing the meteorological observations and measurements was a variety of information about water levels during the flood in different cities in the study area. These data were noted in official historical documents, chronicles and contemporary newspaper reports and as flood marks on bridges and houses. Although they were not precise measurements, they yielded valuable information. Along the Neckar and its main tributaries, it was possible to reconstruct water levels during the flood at forty sites. The analysis of this data revealed that the flood was at its highest level between Tübingen and Heidelberg and in most of the main tributary catchment areas. Figure 3 gives an excerpt from the district council protocols of Esslingen (10 km upstream of Stuttgart), where the water levels from different floods are indicated on a city gate:

> Underneath the Schelz Gate, which stands about four feet above the normal water level [of the Neckar], the water level was nine feet, four inches, five lines in the year 1529, nine feet, one inch in the year 1669, eight feet, seven inches, five lines in the year 1778, seven feet, four inches in the year 1817 and 10 feet, three lines on 28/30 October 1824. The water marks from previous times are missing.[14]

Only three floods recorded at other dates in the Neckar catchment area were higher than the one of 1824: the flood in 1789 along the Rivers Kocher and Jagst, the flood in 1778 in the upper course of the Neckar (up to Tübingen) and the flood in 1784 in the lower course of the Neckar (between Heidelberg and Mannheim).

12. Schübler, 'Über die ungewöhnliche Überschwemmung zu Ende Octobers'
13. *Ibid*.
14. District council protocols of Esslingen 1824, City Archive Esslingen.

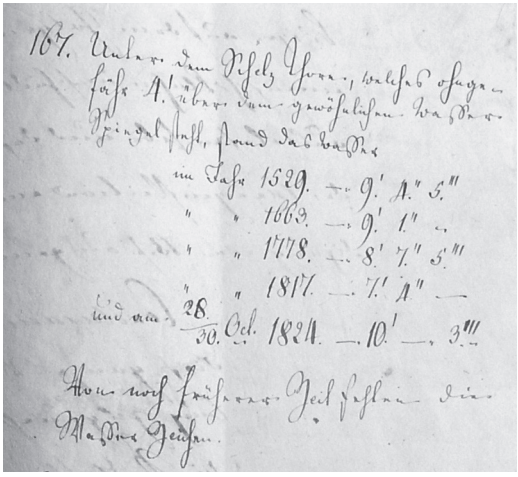

Figure 3. An excerpt from the district council protocols of Esslingen in 1824 stating the water levels at the 'Schelztor' city gate during different flood events.

The descriptive data also gave some information about the time of the highest water levels during the flood in 1824. Along the Neckar they occurred in the area around Stuttgart on 30 October between 1:30 a.m. and 2:30 a.m. and in Heilbronn on 30 October at 9:30 a.m. The Enz tributary reached its highest level on 29 October at 7:30 p.m. in Neuenbürg (10 km upstream from Pforzheim) and at 10:30 p.m. in Vaihingen, which is located about 30 km downstream of Pforzheim. This indicates that the flood wave of the River Enz reached the Neckar at the Besigheim inflow before the flood wave coming from the upper course of the Neckar.

Apart from the Neckar catchment, the northern parts of the Black Forest were also severely affected by the heavy rainfalls; the rivers in this area are tributaries of the Upper Rhine. The severest floods occurred on the western fringes of the Black Forest from Karlsruhe in the north to Freiburg in the south. This strong inflow also caused a substantial rise in water levels along the Upper Rhine. The areas south of Freiburg and in the northern parts of the Kingdom of Württemberg (tributaries of the River Main) were not affected. Further severe flooding during the end of October was reported in the eastern parts of France where the Rivers Moselle, Marne, Seine and Saône were affected,[15] and in the upper course of the River Danube.[16]

15. *Schwäbischer Merkur*, Nr. 268, 7 Nov. 1824 and Nr. 271, 11 Nov. 1824.

16. Chronicle of the City of Scheer, State Archive Ludwigsburg, Record E258 Bü 3453.

A reconstruction of the meteorological conditions in October 1824

It was possible to reconstruct the local weather conditions during the flood of October 1824 with a high degree of accuracy. The meteorological observation data from all sites in the study area show a decrease in air pressure from 24 October to 30 October. This was marked by the passing of thunderstorms and depressions. A ridge of high pressure was indicated at all sites on 30 October, before the weather deteriorated again at the beginning of November. The widely reported thunderstorms on 26 October were also recorded in the meteorological observations at Karlsruhe, Basel, Tübingen and Stuttgart. The wind direction at the end of October was predominantly westerly with a south-westerly component in the Upper Rhine Valley, where the conditions are affected by the orographic situation of the valley and the adjacent mountain ranges of the Vosges and the Black Forest. The air temperature also decreased during the last days of October, e.g. from midday values in Stuttgart of 17.5°C on 24 October to 7.5°C on 31 October.

After reconstructing the local weather conditions in south-west Germany during the last days of October, the next step was to determine the large-scale atmospheric circulation pattern over Western Europe and the North Atlantic. The reconstructed air-pressure measurements and the 500 hPa pressure level regime are available from 1659 on a monthly basis with a one-degree resolution[17] and this made it possible to analyse the characteristic circulation patterns that caused the flooding. A distinct zonal weather pattern with strong cyclonic characteristics prevailed in October 1824, which led to persistent rainfall in Central Europe. The air-pressure measurements from fourteen cities across Europe were analysed in order to obtain a detailed picture of the weather situation and the development of synoptic weather maps at barometric sea-level pressure.[18]

Synoptic weather maps showing the mean sea-level pressure over Europe at midday were thus derived (Figure 4). With these data and the historical series of measurements from the study area, it was possible to plot the Europe-wide daily pressure fields and cyclonic stream systems for the end of October 1824. The period from 26 to 29 October was identified as a cyclonic westerly situation, according to the *Großwetterlagen* (large-scale weather types) classification of Hess & Brezowski.[19]

17. Jürg Luterbacher, Elena Xoplaki, Daniel Dietrich, Ralph Rickli, Jucundus Jacobeit, Christoph Beck, Dimotros Gyalistras, Chirstoph Schmutz and Heinz Wanner, 'Reconstruction of Sea Level Pressure Fields over the Eastern North Atlantic and Europe back to 1500', *Climate Dynamics* 18 (2002): 545–561.

18. Data records from Armagh (Northern Ireland), Barcelona, Cadiz and Madrid (Spain), Milan, Padua and Palermo, (Italy), Paris (France), Basel/Berne (Switzerland), Vienna (Austria), Prague (Czech Republic), Reykjavik (Iceland), Stockholm and Uppsala (Sweden) were available (n. 21).

19. Friedrich Gerstengabe and Peter Werner, *Katalog der Großwetterlagen Europas nach Paul Hess und Helmuth Brezowski 1881–1992*, (Offenbach: Deutscher Wetterdienst 1993).

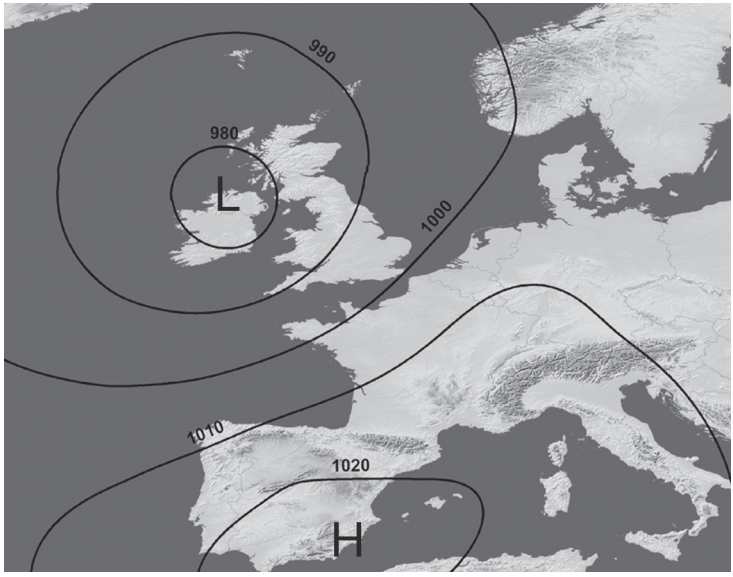

Figure 4. A map showing the reconstructed sea-level pressure and circulation pattern over Europe for 26 October 1824.

The weather situation in October 1824, which triggered the flood, can be described as follows: a low-pressure area over the British Isles meeting a high-pressure area over the Mediterranean caused a strong pressure gradient and carried warm and humid air masses from the Atlantic into Central Europe. This brought gales and thunderstorms with heavy precipitation to south-west Germany. The low-pressure system triggered heavy showers in the northern and southern parts of the Black Forest. Another westerly low-pressure area caused further precipitation in the Neckar catchment area from 1 November onwards. This reconstructed circulation pattern is in accordance with other investigations of flood-releasing circulation. Jucundus Jacobeit *et al.*[20] have systematically analysed the correlation between flooding events and weather situation in Central Europe for the previous 500 years. The circulation pattern over south-west Germany was identified as the most significant weather condition triggering strong precipitation.[21]

20. Jucundus Jacobeit, Rüdiger Glaser, Jürg Luterbacher and Heinz Wanner. 'Links between Flood Events in Central Europe since AD 1500 and the Large-scale Atmospheric Circulation Models', *Geophysical Research Letters* 30/4, 1172 (2003): 1172–1175.

21. Katrin Bürger, Jochen Seidel, Paul Dostal, Florian Imbery, Mariano Barriendos, Rüdiger Glaser and Helmut Mayer, 'Hydrometeorological Reconstruction of the 1824 Flood Event in the Neckar River Basin (Southwest Germany)', *Hydrological Sciences Journal* 51/5 (2006): 864–877.

A reconstruction of the precipitation pattern in south-west Germany from 28 to 30 October 1824

The first step towards reconstructing the precipitation in the Neckar catchment area for October 1824 was to compare the general weather situations that prevailed from 1934 to 2006 with the weather conditions at the end of October 1824. The aim was to find a recent weather analogue with a sufficiently comprehensive database that would correspond to the large-scale weather situation in 1824. A combination of the analysis of monthly weather forecasts of the Deutscher Wetterdienst[22] (DWD) and heavy precipitation statistics for south-west Germany showed that the data from 26 to 28 October 1998 corresponded best to the situation at the end of October 1824. This period in 1998, characterised by a similar atmospheric circulation pattern and local weather conditions to 1824, also experienced heavy rainfall and floods. The resultant assumption is that the spatial rainfall distribution patterns in the 1824 and the 1998 events were very similar.

The determination of the spatial rainfall pattern in the Neckar catchment area leading up to the flood in 1824 proceeded in several steps. The first step was to conduct a linear-logarithmic regression analysis of the seven historical precipitation records from 1824 and the data from the rainfall event of October 1998 at the same sites. The resulting relationship was

$$P_{1824} = 1.5 + \frac{4}{\ln(DEM)^4} P_{1998}$$

where P is the rainfall amount for each event and DEM (Digital Elevation Model) is the altitude (m a.s.l.) for each historical record site. The second step was to modify the total rainfall recorded at the 220 available stations in the Neckar catchment area in 1998 according to the above equation, in order to obtain values that would correspond to the rainfall amount in 1824 according to the principles of linear-logarithmic regression. From these modified rainfall amounts, precipitation patterns with a resolution of one kilometre were interpolated using Kriging interpolation. Results are shown in Figure 5. The highest rainfall amounts, with values up to 230 mm in 36 hours, occurred in the northern parts of the Black Forest. Secondary maxima were recorded in the northern and eastern parts of the Neckar catchment area. The atmospheric circulation pattern and the local orographic features in the study area explain this spatial rainfall distribution. The location of the high- and low-pressure cells in the large-scale synoptic reconstruction implies a south-westerly warm and humid air flow to Central Europe as a causal mechanism. Large-scale south-westerly air flows are typically modified by the mountain ranges of the Vosges and the Black Forest. The northern parts of the Black Forest, in particular, are

22. Deutscher Wetterdienst is the German Meteorological Service. See www.dwd.de/

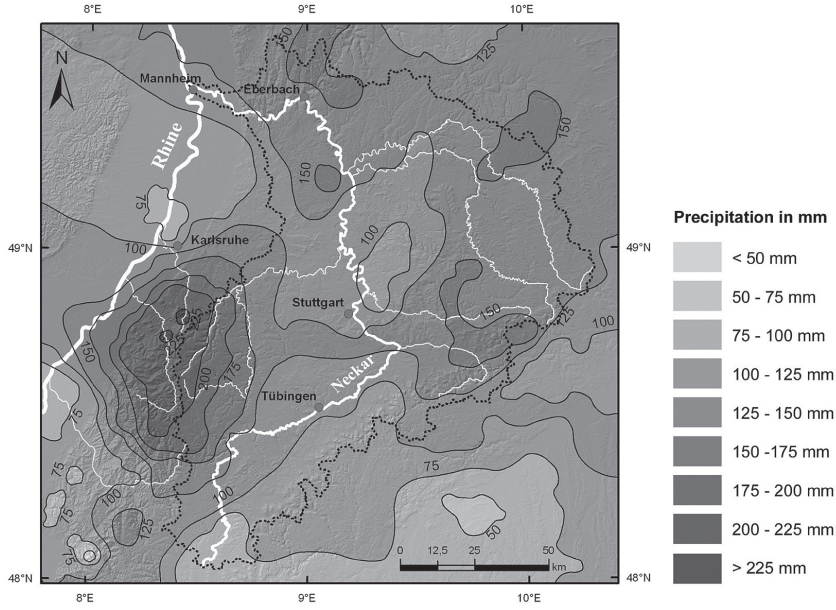

Figure 5. The reconstructed precipitation pattern of the 36-hour rainfall for 28–29 October 1824 in the Neckar catchment and adjacent areas.

frequently subjected to high rainfall during such weather conditions due to the orographic features on the western side of the Upper Rhine Valley. This strongly affects the discharge in the sub-catchments. The River Enz, which drains large parts of the eastern fringes of the northern Black Forest, showed very high discharge values during the flood event in 1824. This was confirmed by the historical records of water levels and the descriptive archival data.

Impacts and consequences of the 1824 flood event

As mentioned above, the flood event of 1824 led to very high water levels along the Neckar River. It is difficult to compare the information from these data with contemporary records, since no official gauging system was installed in the Neckar catchment until 1880. Therefore, the water levels in 1824 were usually indicated in height above an arbitrary 'normal' water level of the Neckar River. In light of this and the fact that the channel of the Neckar River has been altered through

the construction of dams, hydropower plants and ship locks during the twentieth century it is difficult to put the historical water level data into context. Nevertheless, the information from contemporary newspapers and other archive data reveals a detailed picture about the severity of the flood. Many sources mentioned the breaking of river dams, which led to the flooding of wide areas adjacent to the river. A newspaper report from 1824[23] said that the valley of the Neckar River between Bad Cannstatt and Hedelfingen (both municipalities are now part of the city of Stuttgart) resembled a lake in appearance. Many villages and cities along the river were flooded so severely that people had to use rafts and barges as means of transportation. Bad Cannstatt, for example, stood under approximately three metres of water and the city was only navigable by boat until the evening of 30 October.[24] A similar situation is documented in an equally spectacular fashion by the flood marks in the City of Heidelberg (Figure 6), situated in the lower course of the Neckar River. Here the extremely high water level of 1824 was only topped by an earlier local flood after a severe winter in 1789, which was caused by ice melt.

Figure 6. Flood marks in the city of Heidelberg. The flood of 1824 was the second highest of all recorded events.

23. *Neckarzeitung*, (November 1824): 1213.

24. *Königlich privilegierte Stuttgarter Zeitung*, No. 178, (2 November 1824): 887.

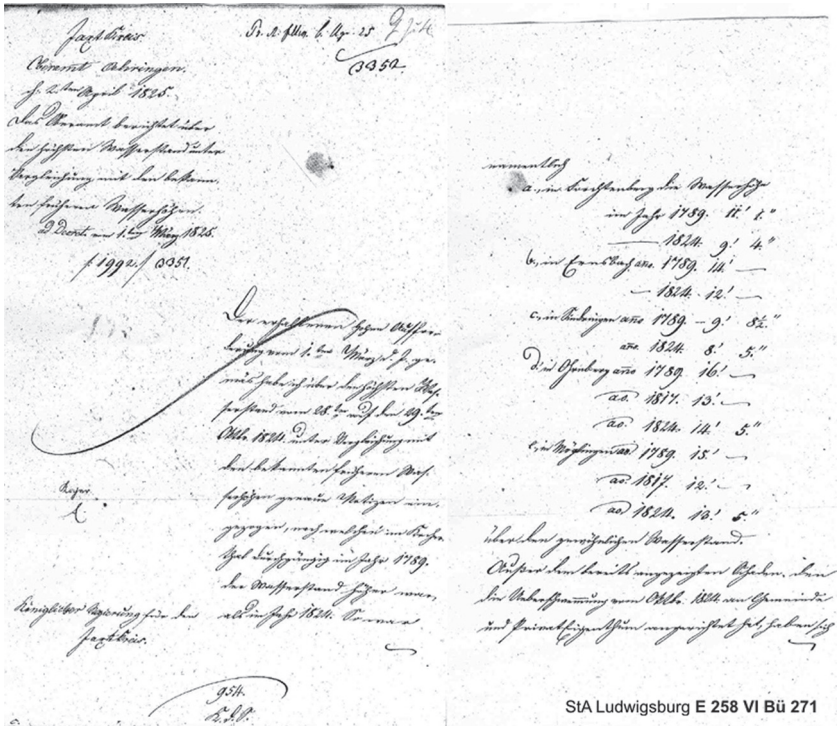

Figure 7. Historical document from Öhringen with water levels of the River Kocher from the 1824 flood event in different municipalities, in comparison with earlier flood events.

For practically all stretches of the Neckar and its tributaries, there are reports of damaged houses and infrastructure, such as bridges and roads. Although the material damage was great, there are only occasional reports that mention human casualties resulting from the flood event of 1824. However, since the historical material has been only partially preserved for posterity, it is difficult to evaluate and state the overall damage and loss of life caused by this extraordinary flood. The historical sources also provide some valuable insight into social reactions after this catastrophe. In October 1824 and March 1825, all the district authorities in the former Kingdom of Württemberg were required by the Royal Government of Württemberg to submit damage reports and water levels from the flood event of October 1824. A part of this correspondence is preserved in the public record office of Ludwigsburg[25] (Figure 7) and provides some insight into the course of this flood event and resulting damage. These records also detail the financial support

25. Staatsarchiv Ludwigsburg, Records F 160 I Bü 678 and E 258 VI Bü 271

given to victims of the flood as well as measures taken to ensure that these relief efforts were primarily directed at the most affected boroughs. Many other archives in Baden-Württemberg also contain documents describing the appeals made for financial support in order to help the victims of the flood event and for the repair of damaged infrastructure.

An interesting social response in the aftermath of the flood event was the 'codes of conduct' issued to the public at the beginning of November 1824.[26] These codes of conduct stated the behavioural measures to be taken after the flood in order to help lessen the economic and sanitary impact. The inhabitants of the flooded houses, for example, were ordered not to return to their houses until the floor and walls were completely dry; the rooms were to be ventilated regularly. Foul vegetables like potatoes and beets had to be sorted out, while the others had to be removed from cellars and stored elsewhere until the cellars were completely dry again. To speed up this drying process, inhabitants were advised to keep all doors and windows open, light fires in the cellar and cover the floors afterwards with sand.

Furthermore, these codes of conduct give advice on how to use flour and how to treat wet straw and grass before feeding to animals. This strengthens the assumption that the authorities were well aware at the time that a famine could break out due to a lack of food supplies in the affected areas.

Elsewhere, the historical records contain some interesting information in documents that address the problem of rebuilding houses destroyed by the flood. A letter from the Royal Government of Württemberg to the district authority in Bad Cannstatt, dated 16 November 1824,[27] for example, states that houses that were destroyed or severely damaged by the flood in 1824 should not be rebuilt on their original flood-exposed sites but elsewhere, on higher ground and further away from the river, where risk of repeated flooding was lower.

As touched upon above, this highlights a parallel to the caveats of modern flood risk management, in which strategies are being developed as to how to reduce the vulnerability of flood-threatened areas.

Conclusion

Extreme natural disasters like the flood of 1824 in south-west Germany had a severe impact on society and, consequently, have left many traces in the historical documents available in archives and libraries today. This is important, since a pre-requisite for the reconstruction of historical events is the existence of sufficient meteorological and hydrological data and additional observational data from archives and libraries. The data analysed in this study made it possible to reconstruct the historical flood

26. Staatsarchiv Ludwigsburg, Record F 154 Bü 484

27. Staatsarchiv Ludwigsburg, Record F 160 I Bü 678

event of 1824 along the Neckar River in south-west Germany at a very precise level. The key to reconstructing the circumstances of the flood was the availability and evaluation of diverse data sources. These included local historical meteorological measurements and observations and Europe-wide air-pressure data, on the one hand, and the information contained within official correspondence, newspapers, chronicles and historical flood markings, on the other. As part of this study, the information from flood marks from the 1824 flood event could be confirmed and checked against the numerous documentary sources found in several archives in the Federal State of Baden-Württemberg.

Another interesting aspect of this study is social reactions after the 1824 flood event, which, in certain aspects, were quite similar to those witnessed in modern times. For example, the appeals for donations or the comparison of the flood to previous events are reactions that still occur today. Furthermore, the recommendation that buildings that had been heavily damaged or destroyed in the course of the 1824 flood should not be rebuilt in their original flood-prone locations has a parallel to modern-day concepts of flood risk management.

A further aspect in analysing historical flood events is the reconstruction of flood discharges. This topic is not addressed in this chapter but it is generally possible to determine the discharges of historical flood events. Two basic approaches are possible. One is the reconstruction of precipitation fields – as presented in this study – and using this data in combination with a hydrological run-off model to simulate discharges as presented by Bürger *et al.*[28] The other method is to determine discharges using a hydraulic model and historical data on water levels and river cross profiles. Such a study was conducted by Sudhaus *et al.* in 2008 and showed that it was possible to calculate the discharges of the 1824 flood event at several sites along the Neckar River.[29] Both methods yield comparable results when applied to the example of the 1824 flood event. With the help of such studies, past extreme flood events can be quantified more accurately and the flood risk can be assessed more reliably than would be possible from statistical calculations alone.

The results presented in this work give emphasis to the adage of '*learning from the past to ensure a safer future*'. We have shown that a mere look back into history can provide a consistent analysis of past extreme flood events. This shows the potential of historical flood analysis for modern day flood-risk management. Recent flood events have often revealed the problems of current flood management, which is usually solely based on statistical calculations with very short reference periods. With the information from historical flood events, the reference periods for statistical calculations could be expanded to lead to more reliable results regard-

28. Katrin Bürger *et al.* 'Hydrometeorological reconstruction of the 1824 flood event'.

29. Dirk Sudhaus, Jochen Seidel, Katrin Bürger, Paul Dostal, Florian Imbery, Helmut Mayer, Rüdiger Glaser and Werner Konold, 'Discharges of Past Flood Events Based on Historical River Profiles', *Hydrology and Earth System Sciences* 12 (2008): 1201–1209.

ing return times. Furthermore, knowledge of the hydrometeorological causes of such severe floods as the 1824 event along the Neckar and its tributaries can raise awareness about such flood events and their potential to recur in modern times.

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Times of Flood – Times of Favour. Disaster Management and the Social Response to Catastrophic Floods: the Example of Saxony (1784–1845)

Guido Poliwoda

Introduction

Disasters are in great demand. The first part of the IPCC report, published at the beginning of 2007, provided further momentum to the subject of 'climate change causing natural disasters'.[1] In Saxony, between 1784 and 1845, there were no fewer than twelve disastrous floods.[2] This chapter focuses on which historical aspects of disaster management and social response can be considered useful, if disasters are frequent or recurrent.

This introductory section provides an overview of climate history between 1784 and 1845, enabling the presentation of recurring inundations, which evoked considerable reaction from a wide range of commercial players and levels. This leads into the main body of the chapter, which presents an examination of its key question: how do the political factions with responsibility in society react when society is repeatedly affected by natural disasters?

1. M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (eds.), *Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007*, (New York: Cambridge University Press 2007), see http://www.ipcc.ch/publications_and_data/ar4/wg2/en/contents.html

2. Guido N. Poliwoda, *Aus Katastrophen lernen. Sachsen im Kampf gegen die Fluten der Elbe 1784 bis 1845*, (Köln: Böhlau Verlag 2007), *passim*. See excerpts at http://books.google.de

A millennium event?

The Czech Republic, Austria and Germany were afflicted by disastrous flooding in August 2002. More than twenty people were killed in Germany, art treasures were damaged in Prague, dirty water flooded the central railway station in Dresden and communications broke down. Economic losses were estimated at €25 billion.[3]

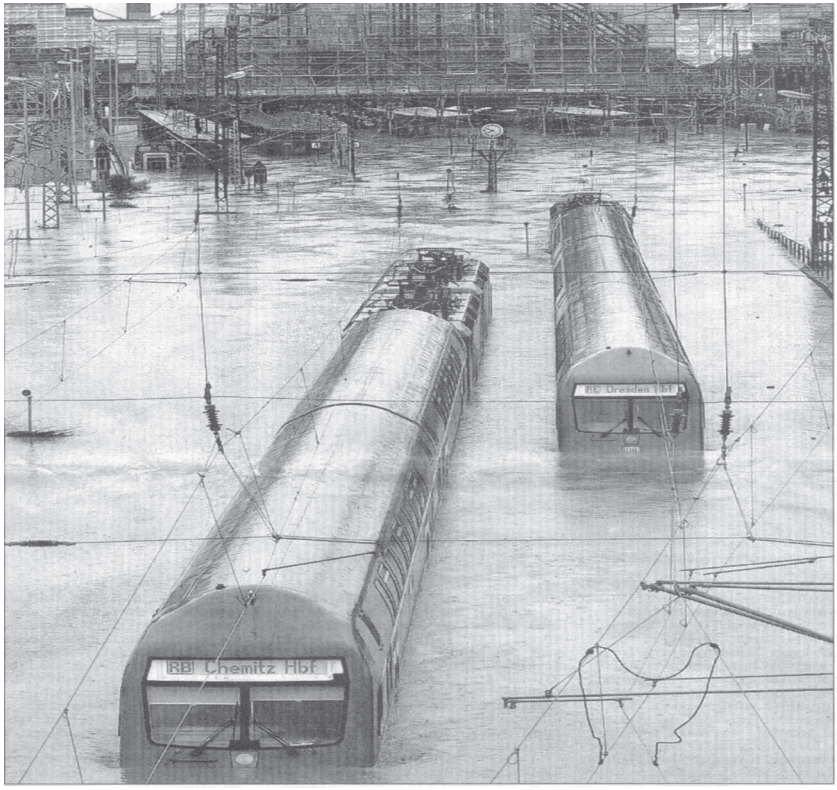

Figure 1. The flooded central rail station in Dresden, 2002. Source: Der Bund, (18 August 2002), p.12.

Documentary data – such as narrative descriptions, flood marks and water-gauge records – constitute the only evidence that allows us to view such rare but socio-economically significant disasters in a long-term perspective. The more extreme the event, the more descriptions are available and the more detailed they are. Documentary data shows that, over the past 500 years, Saxony has been

3. *Der Bund*, (18 August 2002) p. 12.

flooded more than forty times during the winter period (November to April) but only ten times during the summer (see Figure 2). The 2002 flood could best be compared to the one that occurred on 15–17 August 1501, when parts of the towns of Dresden, Prague and Augsburg and several districts of today's Czech Republic were submerged. The Rivers Danube and Inn flooded the city of Passau (Bavaria) so severely that only the higher parts of the town stuck out of the water like islands. As one floodmark reveals, the peak level of the Elbe at Dresden was 8.57 m, about one metre less than in 2002. Similarly, in 2002, the floodwater stood higher than in all recorded floods in the Middle Ages. Of course, the question remains of whether historical events are comparable to recent catastrophes, considering changes to the riverbed, for example, but we can still assume that the 2002 flood may well have been a millennium event. A cluster of floods between 1784 and 1845 stands out in the following graphical review of winter flooding along the Elbe.

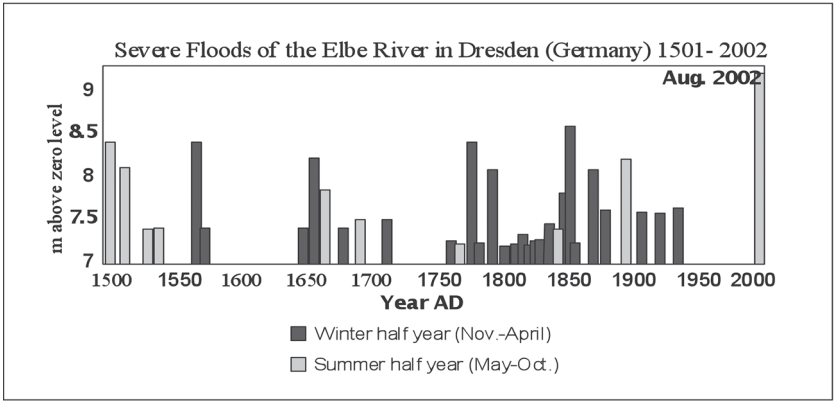

Figure 2. Severe Floods of the Elbe River in Dresden, 1501–2002. Source: Poliwoda/ Pfister, Documentary data and the millennium flood of 2002. http://www.pages.unibe.ch/shighlight/archive03/poliwoda.html (February 2003).

This period was characterised by lower mean winter temperatures. Over these five decades the town of Dresden was afflicted by no less than twelve disastrous floods (peaking above 7.3 m) during the winter half year. This illustrates the well-known fact, familiar from global warming scenarios, that a shift in mean conditions is often associated with an increased frequency of extreme events and disasters. However, we have learned that such changes must be carefully assessed.

European winters in the second half of the eighteenth century were generally cold with high precipitation, although there were also warmer phases. Solar activ-

ity was reduced long-term during the Dalton minimum (1780–1840).[4] A review of winter temperatures in Central Europe from the second half of the eighteenth century to 1830 shows a negative pattern.[5] According to Berlin temperature records, the 1780s and 1790s were approximately 1.4 to 1.7°C below the Dahlemer mean (1909–1969).[6]

The initial catastrophe

The Prologue

Hydrologically, the Elbe is a rain-snow-type river with characteristic winter high water. Ice flow and standing ice with closed ice cover may occur during periods of prolonged frost. As runoff rises, excess pressure builds under the ice cover, entailing higher water levels and soil erosion. In the event of rapid weather change or when high water collects in conjunction with standing ice, the consequent ice flow can lead to blockages at bottlenecks ('ice jams'), damage to dykes and burst dykes. Consequently the climatic deterioration characterised by particularly severe winters at the end of the eighteenth century led to a whole series of catastrophic instances of flooding.[7]

Europe was hit by various sorts of natural hazards in 1783 and 1784. The Laki Eruption on Iceland caused so called 'Höhenrauch' (dry fog) all over Europe, parts of northern America and northern Africa. 'In terms of H_2SO_4 yield, the most important eruption of the last 500 years was the Laki fissure eruption in Iceland (1783). This is the well-known event which produced "dry fogs" over Europe …'[8]

4. Christian Pfister, *Wetternachhersage. 500 Jahre Klimavariationen und Naturkatastrophen*, (Bern 1999), p. 155.

5. Rüdiger Glaser, *Klimageschichte in Mitteleuropa seit dem Jahr 1000, 1000 Jahre Wetter*, (Klima, Katastrophen. Darmstadt 2001), p. 177. Pfister, *Wetternachhersage*, p. 76.

6. H. v. Rudloff, *Die Schwankungen und Pendelungen des Klimas in Europa seit Beginn der regelmäßigen Instrumentenbeobachtungen (1670)*, (Braunschweig 1967), pp.133–137; P. Schlaak, *Skizzen der Wetter- und Witterungsverhältnisse und ihre Auswirkungen auf Land, Leute und Wirtschaft zur Zeit des Aufstiegs Preussens (1640-1850)*, Beilage zur Berliner Wetterkarte des Instituts für Meteorologie der Freien Universität Berlin. 32/82, (Berlin 1982), p. 10. In historical climatology statistical data are deduced from such 'means' or historical records.

7. J. Rommel, *Studie zur Laufentwicklung der deutschen Elbe bis Geesthacht seit ca. 1600*, Koblenz/Berlin 2001. p.29, see http://elise.bafg.de/ Accessed Dec. 2001. C.G. Pötzsch, *Chronologische Geschichte der großen Wasserfluthen des Elbstroms seit tausend und mehr Jahren*, (Dresden 1784). IKSE (ed.): *Die Elbe und ihr Einzugsgebiet. Internationale Kommission zum Schutz der Elbe*, (Magdeburg 1995). The climate got worse in the late 17th century; see Pfister, *Wetternachhersage*, p. 211.

8. R.S Bradley.and P.D. Jones, 'Records of Explosive Volcanic Eruptions over the Last 500 Years', in R.S. Bradley and P.D. Jones, *Climate since A.D. 1500,* (London/New York 1992), p. 613.

The shock of 1784

That 'dry fog' might have been responsible for the enormously cold winter of 1784 in Europe. This aberrant cold caused enormous ice jams on the Elbe and other rivers such as the Danube and the Rhine. Ice accumulated in rivers so that Europe was hit by an ice flood on a massive scale. Saxony was not prepared for this sudden catastrophe. For the most part, the people were left to their fate.

After the flood, the elector Frederick Augustus III of Saxony sent a commission of district and local governors out into his territories to take stock of the damage.[9] The following schedule was compiled for implementing the rebuilding measures: viewing the damage, calculating how much responsibility the state was prepared to assume financially, holding collections on Good Friday and asking for donations from all over Saxony. This approach, which continued on nearly the same lines until 1845, was in response to the immediate reaction of the elector and his counsellors. He provided funds and the grants were announced in the Leipzig newspapers – on the occasion of this milestone flooding – only eight days after the peak water level.

On 9 March 1784 Frederick Augustus issued an edict that the army and cavalry inspectors be instructed to oversee the removal of ice from the fields.[10] To prevent, as far as possible, the economy from coming to a halt, the government of Saxony focused efforts in the next step on restoring roads and tolls.[11] The distribution of private donations (40,338 thalers) was in the hands of commissioners who adopted a proportionate allocation system. This ensured that the funds were distributed fairly according to the damage reported to the authorities. It may be assumed that the lion's share of the total amount was also subject to this proportional distribution system,[12] and that it was only the funds raised through the newspaper calls for donations that were distributed directly by those who had placed the

9. HStAD: Locat 508.: Vol. I: Acta, die zu Abwendung der bei einem entstehenden Eisschutze zu besorgender Gefahr getroffenen Veranstaltungen, ferner die durch die starke Eisfahrt und außerordentliche Überschwemmung verursachten Schäden, diesfalls bewilligte Gnadenbeihilfen und sonst gemachte Vorkehrungen betr. 1784. p. 91a–97b. Anon.: Ausführliche Nachricht von der großen Elbfluth in Sachßen am 29. Februar u. f. Tage. p. 127, in J.C. Hasche (ed.), *Magazin der Sächsischen Geschichte. 1784,* Part 1. (Dresden 1784).

10. HStAD: Locat 508.: Vol. I. Acta die zu Abwendung. p. 81a,b.

11. Stefan Militzer, *Klima – Umwelt – Mensch (1500–1800). Studien und Quellen zur Bedeutung von Klima und Witterung in der vorindustriellen Gesellschaft.* Vol. I, (Leipzig 1998), pp. 378–9. A comparable approach was taken in Switzerland; see Agnes Nienhaus, 'Entwicklungshilfe und Armenfürsorge. Die Hilfsaktionen anlässlich der Überschwemmungen von 1834 am Fallbeispiel Graubündens', in Christian Pfister (ed.), *Am Tag danach. Zur Bewältigung von Naturkatastrophen in der Schweiz 1500–2000*, (Bern 2002), p. 71.

12. Christian G. Pötzsch, *Nachtrag und Fortsetzung*, (Dresden 1786), pp. 64-67. Anon: Vermischte Dresdner Nachrichten, p. 409, cited in J.C. Hasche, (ed.), *Magazin der Sächsischen Geschichte*, 1784, Part 1. (Dresden 1784); Militzer, *Klima,* Vol. I, pp.380–1.

advertisements – reputable citizens of high social standing, such as judges, priests and other officials.

As only part of the damage could be covered by state grants, it seems fair to assume that the local councils that placed advertisements in the Leipzig newspapers in particular were the ones that had not been duly compensated by the state or that had not been able to alleviate their need effectively with the grants received. This is evidenced by the emphatic comments, encountered again and again, that such and such a place or its inhabitants were particularly hard hit and suffering the most crushing poverty.[13] As the destruction of infrastructure led to bottlenecks in supply, the state relieved certain industries from paying dues and taxes as it saw fit or introduced tax relief for the branches of production considered essential in providing an impetus to the economy.[14]

In its 15 May issue, the *Zürcher Zeitung* rated the damage caused throughout Europe at at least 200 million thalers but added that the definitive amount would no doubt be higher, as effects on agriculture would have to be added. The paper considered this catastrophe 'more important and sadder than a war would have been as a war would never have destroyed so much in such a short time. Never has an occurrence been so politically or statistically remarkable as this general water disaster in the year 1784.'[15]

Most important learning steps between 1784 and 1800

Another step in the learning process after the initial catastrophe in 1784 was the sounding of the alarm by firing cannon from the fort of Königstein. The breaking up of the ice in Bohemia was observable there and, as soon as it broke, three shots were to be fired to warn Pirna.

Sounding the alarm by firing cannon was also reported from Bonn after the 1784 catastrophe;[16] thus it was not a purely Saxon innovation. Similarly, Frederick Augustus III decreed that riders were to report the breaking of the ice from the Saxon–Bohemian border to settlements downriver. Boats for the rescue and evacuation of the people were also kept ready.[17]

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13. *Leipziger Zeitungen*, 50. Stück, Mittwochs den 10. März 1784, p. 252. *Ibid.* p. 84. Stück, Sonnabends den 30. April 1785, Elsterwerda den 20. April 1785, p. 526.
14. HStAD: Locat 508.: Vol. I; Locat 11104: Acta, die bei dem letzten Eisbruch und Überschwemmung der Flüsse an ihren Werkstühlen und Fabrikgerätschaften Schaden gelittenen Manufakturisten angediehene Unterstützung betr. 1784, no page number. Militzer, *Klima,* p. 379.
15. *Zürcher Zeitung*, 39, (Saturday, 15 May 1784). Diverse news. No page number. Translation, Poliwoda.
16. *Zürcher Zeitung*, (Saturday, 13 March 1784) No. 21, Germany. Bonn, 26 February. No page number.
17. Dieter Fügner, *Hochwasserkatastrophen in Sachsen*, (Leipzig/Zwickau 2002), pp. 33–4.

Other important learning steps ordered by Dresden officials between 1784 and 1800 were preventative hygiene regulations (including the disinfection of flats with wine vinegar) throughout Saxony, removal of trails (planked paths across the ice) in good time and requiring timber merchants to remove their logs from the banks of the Elbe in good time.

With their early preventative measures in 1799 the authorities showed that they had learned from the totally inadequate crisis management during the 1784 catastrophe. The catalogue of measures hardly changed but increased vigilance and the readiness of the local authorities would help to prevent the worst. Measures instituted included the availability of soldiers to break up the ice, freeing the Elbe from ice, the more efficient use of signal cannon, 24-hour monitoring and inspection of the dykes introduced by state officials in February 1799.

The state established the following reaction pattern in 1799: saving the lives of those threatened by the high water, repairing roads and arterial routes, preventing food crises, supporting affected farming and business sectors and providing the incentive to institute individual rebuilding measures.[18] Before the turn of the century, counter-measures were more or less purely defensive.

The early decades of the nineteenth century – the 'emancipation' of local authorities?

Written communication on preventative and immediate counter-measures was made at the local level. Whereas officials from Dresden had issued instructions to the public offices after the 1784 disaster, local officials now organised preventative measures *themselves* or recruited rescue workers and reported on their actions to the next level but not directly to the Dresden administration. The motive for the change cannot be deduced from the sources. Dresden was certainly aware of the actions of the local authorities and districts.[19] Regulation, partly by repeated edict, was a thing of the past. Had the procedure within the local-authority system become routine, as could be assumed from the 'annual' de-icing in Torgau and did they no longer need Dresden's protective hand? Alternatively, had a certain 'emancipation' of the local authorities led to this change of paradigm?

It can be assumed that the Privy Finance Council was fully aware of activities in Torgau and Schandau. It seems improbable that this office, of such major importance in high-water terms, could have dropped out of the communication network in 1804 and 1805. The role of the Privy Finance Council over these two years remains unclear.

In July 1810, the Privy Finance Council estimated the cost of reinforcing the banks and building embankments at Torgau in the Graditz and Werdau area, between 1771 and 1800, at 51,000 thalers and there was further expenditure of

18. Militzer, *Klima,* Vol. I, p. 378.

19. HStAD: Loc. 39815: Acta, Die nach der 1784. p. 133b.

16,884 thalers after 1800. The Council held the irregular course of the Elbe in this region responsible for the considerable outlay.[20] If these amounts are extrapolated to cover the overall course of the Elbe in Saxony, we might find another reason as to why the state held back with financial relief for flood victims and repair work. Even if one takes into account the fact that not all stretches of the river called for such immense financial commitment, these observations and considerations put the behaviour of the Privy Finance Council into perspective.

These years should be looked upon as the initial phase of the systematic management of persistent flooding. Due to its already tight financial situation, the state was no longer in a position to cope with such outlays. It had thus to take another course if it was to avoid further deterioration.

Beyond the Elbe Flow, Bank and Dam decree

The first framework law, the Elbe Flow, Bank and Dam decree, was a milestone in the management of high-water problems. In the eighteenth century the consensus of opinion was that navigable rivers should be maintained by the state and work on drafting bank and embankment regulations had been in progress since 1781. In view of the inexorable increase in this work, the decision was taken in 1811 to create two water construction directorates headed by Directors of Waterways in Torgau and Dresden.[21]

Christian Friedrich Wagner, who had taken over the work of his father, P.S. Wagner (d. 1799), was appointed Director of Waterways in Torgau by royal decree on 10 August 1812. J.F. Le Plat[22] was appointed Director of Waterways in Dresden. He had come from Harburg in 1806 and was engaged as a canal engineer for Saale and Unstrut in Weissenfels. When he entered into Prussian service, following the partition of Saxony in 1815, C.F. Wagner assumed the office of Director of Waterways, and was given two qualified assistants. After 1815 the post became an independent office, answerable to the Privy Finance Council.[23]

The Elbe Flow, Bank and Dam decree, which had been long in preparation, became law on 7 August 1819. There was also an interchange between the social authorities and the Privy Finance Council during the General Government period. After Frederick Augustus' return from captivity, work continued on the basis of experience gathered during this time.[24]

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20. HStAD: Loc. 6539: Acta, Die Unterstützung der Grundbesitzer bey Damm-Ufer- und Waßerbauen an öffentlichen Flüssen betr. 1804. p. 13a.
21. On the dating and immediate preparatory work for this law, see HStAD: Loc. 5458: Acta, Den Elb-Ufer-und Dammbau s.w.d.a. betr. 1812. pp. 10a–11a, 20a, 58a,b.
22. See, in this respect, HStAD: Loc. 5458: Acta, Den Elb-Ufer-und Dammbau. p. 59a-b.
23. HStAD: Loc. 5458: Acta, Den Elb-Ufer-und Dammbau, pp. 61a,b.62a–68a.
24. HStAD: Loc. 5458: Acta, Den Elb-Ufer-und Dammbau, pp. 66a–126b, in particular p. 75a.

This decree and the Elbe Navigation Act of 1821 were the basis for the planning and realisation of extensive works to improve navigation conditions on the Elbe and its riverbank structures. The mandate was to be implemented with due consideration for local conditions and the smaller rivers.[25] This was the responsibility of the construction inspectors. They carried out the detailed technical work for the Waterways Building Commission, on which both the district governor and the relevant local administrator were represented with regard to building measures to be financed by the state.

All matters concerning the Elbe submitted to the state by outsiders were subject to the jurisdiction of the Privy Finance Council which was the decision-making authority with respect to work on the Elbe. The intention was to increase the participation of riparian proprietors with property on the Elbe.[26] Paragraph 5 advocated joining the forces of landowners and local councils in the individual sections to form embankment communities. Units, now in many respects stronger, were created to cope with the permanent costs of state aid. The Finance Council consequently set up embankment funds into which the communities paid an annual contribution, regardless of whether work was scheduled or not. The amount of this contribution was set by the Bank Structures Commission.[27] The commission appointed embankment officers from among the communities and it was their job to see to the breaking up of ice before the thaw, to alert rescue teams and ensure the availability of material for securing embankments and to instruct the messengers who were to warn neighbouring communities. This was a decisive link in the catastrophe-prevention chain. If it failed, there was a risk of more serious damage to these communities.[28]

Villages in areas where there had been considerable dyke construction work in consequence of repeated flooding were to have safe havens 'that must be spacious enough to succour man and beast in times of danger'.[29] Similarly, there had to be one or two 'bake-houses' out of reach of floodwater in every village. The decree does not expressly indicate that this precaution dated back to 1784 but in that very year it was impossible to bake bread after the flood, because all 'bake-houses' were flooded.[30]

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25. Meinert (no first name), 'Vortwort' [Preface], *Findbuch Sächsisches Hauptstaatsarchiv Dresden, 10940, Sächsische Wasserbaudirektion Band 1, Wasserbauverwaltung*, (Dresden 1980).

26. HStAD: Loc. 5458: Acta, Den Elb-Ufer-und Dammbau, pp. 21b–24b.

27. HStAD: Loc. 5458: Acta, Den Elb-Ufer-und Dammbau, pp. 30b–31b.

28. HStAD: Loc. 5458: Acta, Den Elb-Ufer-und Dammbau, pp. 32a,b.

29. HStAD: Loc. 14376: Fasciculus Gutachtliche Vorschläge. Die Eisfahrt des Jahres 1820 betr. IV., Die in Beziehung auf die gemachten Erfahrungen zu thuenden Vörschläge für künftige Einrichtungen bey ähnlichen Nothfällen. HStAD: Loc. 14376: Fasciculus. No page number. 28 Dec. 1820, prs. 31 Dec. 1820. Translation Poliwoda.

30. *Ibid.*

After ice flow and high water, an embankment inspection commission viewed the damage, deliberated on what repairs and improvements had to be made and set a time frame for the work.[31] Under the new order, cutting through the necks of the Elbe meanders was considered a desirable improvement.

Another paragraph of the regulations was devoted to the behaviour of the riparian dwellers when there was a threat of ice floods. As soon as there was a marked rise in the water level, the embankment watchmen were ordered to the dykes. All riparian communities were called on for disaster prevention along the Elbe. If the villages detailed for this task were far apart, huts and watch-post cabins to which the rescue forces could withdraw in good time were established in the centre of the district.

As ice barriers formed in 1820, the Elbe rose 'so forcefully and with such rapidity that it overflowed the embankments at Oppitzsch, Forberge and Gröba and nothing could be done'.[32] The Elbe flooded these towns and, in places, the water level was even higher than in 1784 and 1799. It was only 6 ¾ ells in Dresden on 22 February, which cannot be classed as an extreme high water (higher than 7.30 m), at least for the capital.[33]

The Director of Waterways' appraisal

On 25 November 1820, the Privy Finance Council called upon Wagner, the Director of Waterways, to submit his report and proposals with respect to ice floods.

The breakdown of costs for rebuilding the bank structures

Wagner demanded that all embankments on the Elbe be examined before the beginning of winter to see if they could stand up to an ice flood in the spring and the same rule be applied to embankment sluices.[34] He had to admit, however, that, for the year 1820, 'this control is only feasible for the stretches of embankment that are patently in a poor condition'.[35] The private embankments were in such a sorry state that it was not possible to realise all the measures that had to be implemented before the next high water – the unfavourable weather conditions were a further impediment, so this plan would not be practicable in the short-term.[36] He

31. HStAD: Loc. 5458: Acta, Den Elb-Ufer-und Dammbau, pp.34a–35a.
32. HStAD: Loc. 14376: Fasciculus Gutachtliche Vorschläge. No page number. 5 May 1820, prs., 8 May 1820. Translation, Poliwoda.
33. HStAD: Loc. 14376: Fasciculus Gutachtliche Vorschläge. No page number. 7 Feb. 1820, prs. 9 Feb. 1820.
34. HStAD: Loc. 14376: Fasciculus. No page number. 28 Dec. 1820. prs. 31 Dec. 1820.
35. *Ibid.* Translation Poliwoda.
36. *Ibid.*

strongly recommended that, now the commission was aware of the precise condition of the embankments and dykes, the people living along the Elbe[37] should be given instruction in the work that had to be carried out in the longer term. They were responsible for the maintenance of the protective structures. He insisted on a deadline by which the repairs must be done but, for the most part, the repair work that the Elbe riparians were supposed to fund was not realised.[38]

Team lists for embankment watch and the prevention of dyke breaches

The Director of Waterways demanded that, for all settlements along the Elbe, 'in times when ice flow is imminent',[39] a list should be compiled showing which teams could be called on for embankment watch and to work on the structures while the ice was flowing.

If there was imminent danger of a dyke bursting while the villagers were attempting to stabilise it, they would flee to safety with their goods and chattels in good time. This withdrawal would happen just when 'the work to save a dyke is most urgent'.[40] Consequently, Wagner proposed that these workers be replaced immediately by a new workforce, made up of villagers who were not immediately endangered by a burst embankment or by flooding.[41]

Setting the Elbe watermarks

'It will be necessary to mount Elbe watermark gauges at various points to permit sufficiently reliable monitoring of the water levels'.[42] Wagner left the determination of the points at which the watermarks were to be mounted for a later juncture. He would submit his proposal to the Finance Council in writing, as it was not possible at that time to mount several water-level benchmarks.[43]

The inefficiency of the signal cannon

Both the officials and the Director of Waterways, used the term 'experience' frequently in their writings after the 1820 flood. The officials also outlined a wide range of options in their accounts of 'experience' of past floods and what should be learned from them for the future. They described the disadvantages of comparative

37. Those responsible for the maintenance of the private embankments were called 'Damminteressenten' or 'people with embankment interests'.

38. HStAD: Loc. 14376: Fasciculus. No page number. 28 Dec. 1820. prs. 31 Dec. 1820.

39. *Ibid.* Translation, Poliwoda.

40. *Ibid*.

41. HStAD: Loc. 14376: Fasciculus. No page number. 28 Dec. 1820. prs. 31 Dec. 1820.

42. Ibid. Translation Poliwoda.

43. *Ibid.*

measures that had to be optimised before, during and after the high water. In this respect the officials' use of the term 'experience' was somewhat excessive.

Neither Wagner nor the local officials found that the warning system fulfilled its purpose in the event of thaw and break-up of the ice, ice flow or the dreaded ice barriers. Were Wagner's demands on the system too high? Was cannon fire in the eighteenth century more efficient than before and after the test flood of 1815? Wagner said that the objective of sounding the signals was 'never' achieved until 1820 but he did not detail the period covered by this pronouncement. He had been Director of Waterways in Torgau since 1812, and in Dresden since 1815, and his father had held the office until 1799 when he took over. He was therefore in a position to follow the 'history of the signal cannon' from the end of the eighteenth century.

He pinpointed the considerable distance between the cannon as a major reason for their inefficiency. What is more, strong gusts of wind were enough to make the signals indistinct and impossible to differentiate. He had already drawn attention to this shortcoming in a statement submitted to the Council at the end of December 1817.[44] Another factor contributing to the unsatisfactory image of the warning system was that the watch was made up of 'peasants' who Wagner had found 'in the watch huts and even sound asleep'[45] in bad weather. He supported local officials' demand that the 'peasants' be replaced by military units to monitor the signals. The rural population worked in the fields, in factories or workshops during the day and it is not altogether surprising that the watchmen fell asleep, particularly when the ice broke into ice floes at night. Wagner therefore proposed that the cannon be better positioned and that they be guarded. Fire signals could be used at night for example. Improvements could be achieved during the day 'with a telegraphic arrangement using differently coloured flags'.[46] However, bad weather and fog would impede this type of transmission. Wagner proposed that if the implementation of his suggestions met with too many obstacles, or if 'the military authorities should raise objection'[47] to setting up sufficient warning cannon with military personnel, then messengers on horseback could be used to transmit the warnings. He had already submitted proposals to this effect.[48]

He left the decision as to the choice of transmission methods to the toll collector, Zeschau, who had a leading position in the Finance Council in Dresden

44. HStAD: Loc. 14376: Fasciculus. No page number. 28 Dec. 1820. prs. 31 Dec. 1820
45. *Ibid.* Translation, Poliwoda.
46. HStAD: Loc. 14376: Fasciculus. No page number. 28 Dec. 1820. prs. 31 Dec. 1820. Translation, Poliwoda.
47. *Ibid.* Translation Poliwoda.
48. *Ibid.*

but pointed out that 'extensive announcements of the methods to all settlements along the river Elbe are essential and that this has been lacking to date'.[49]

'Baking-houses'/private embankment structures

It was necessary to bring quantities of earth to all the locations that had been flooded to build up an area that would not get flooded at high water. A 'baking–house', accessible to everyone, was to be set up on this artificial mound.[50]

Until the introduction of the Elbe bank and embankment regulations the private owners of stretches of the riverbank built their embankments and structures as they thought fit. They did not have sufficient knowledge of waterway structures, however, and, besides, were only concerned with their personal advantage and ignored the fact that their activities could disadvantage their neighbours. Consequently, these embankment structures were 'a serious drawback' to the riparians and to navigation. This, in turn, implied a 'deterioration of the course of the current, both at normal water levels as well as when the river was running particularly high'.[51] Wagner advised the embankment-structure commission against 'such inappropriate and disadvantageous structural undertakings'.[52] In the worst case, this would entail innumerable court cases and the objective of freeing the Elbe region of this scourge would not be achieved. One example he mentioned was the Riesaer 'embankment issue'.

The introduction of the new order would not eliminate this deplorable state of affairs and 'as experience has shown, hardly anywhere have the decrees ordered by the Council been strictly followed'.[53] The course of the Elbe was patently out of control, with the gravest negative consequences. At this juncture 'hardly anything has been done'; the requisite funds were not available. The 5,000 thalers from state funds were hardly sufficient to maintain the embankments, as this sum also had to cover work on the smaller rivers and private initiatives.[54]

Most important learning steps between 1800 and 1820

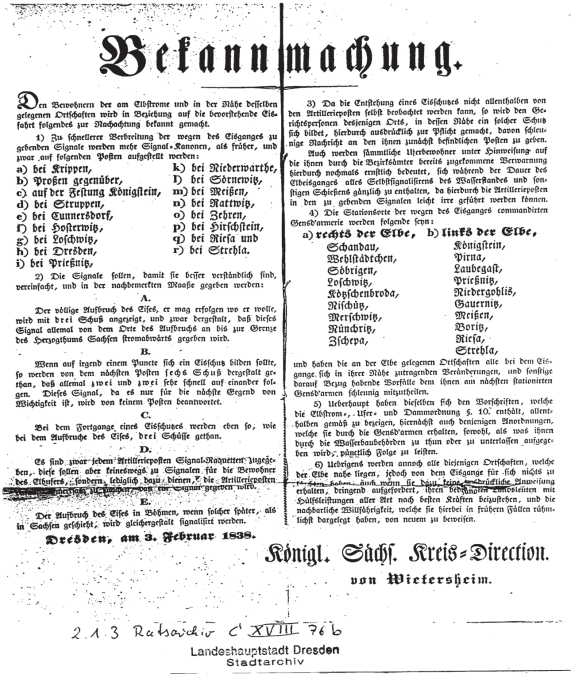
Until 1800, disaster communication took place at middle and local administrative levels. Boroughs and administrations moved away from the passiveness of the previous decades and measures were undertaken in one step: damage assessment and health

49. HStAD: Loc. 14376: Fasciculus. No page number. 28 Dec. 1820. prs. 31 Dec. 1820. Translation, Poliwoda.
50. *Ibid.*
51. *Ibid.* Translation, Poliwoda.
52. *Ibid.* Translation, Poliwoda.
53. HStAD: Loc. 14376: Fasciculus. No page number. 28 Dec. 1820. prs. 31 Dec. 1820. Translation, Poliwoda.
54. *Ibid.*

care were finally combined with one another; costs for control work were handed to the user (creation of funds to support districts, combining of Elbe districts to form dam communes, creation of dam funds to maintain bank defences); two water construction directorates were founded in Torgau and Dresden in 1811 (experts, water construction directors and local officials worked together on commune issues); the Elbe Flow, Bank and Dam decree became law in 1819. The mobilisation of all available forces for disaster defence on the dykes, creation of dam communes and dam funds and the organisation of raised areas and 'bake-houses' were measures realised to avoid support bottlenecks after a flood.

From public announcement to crisis management

There was no effective change in the basic problem of the uncontrolled Elbe. The unfortunate conditions that had prevailed since 1784 had not been eliminated and were still causing officials grave concern.



Bekannmachung.

Den Bewohnern der am Elbstrome und in der Nähe desselben gelegenen Ortschaften wird in Beziehung auf die bevorstehende Eisfahrt folgendes zur Nachachtung bekannt gemacht.

1) Zu schnellerer Verbreitung der wegen des Eisganges zu gebenden Signale werden mehr Signal-Kanonen, als früher, und zwar auf folgenden Posten aufgestellt werden:

a) bei Krippen,
b) Proßen gegenüber,
c) auf der Festung Königstein,
d) bei Struppen,
e) bei Cunnersdorf,
f) bei Hosterwitz,
g) bei Loschwitz,
h) bei Dresden,
i) bei Prießnitz,
k) bei Niederwarthe,
l) bei Cörnewitz,
m) bei Meißen,
n) bei Rattwitz,
o) bei Zehren,
p) bei Hirschstein,
q) bei Riesa und
r) bei Strehla.

2) Die Signale sollen, damit sie besser verständlich sind, vereinfacht, und in der nachbemerkten Maasse gegeben werden:

A.

Der völlige Aufbruch des Eises, er mag erfolgen wo er wolle, wird mit drei Schuß angezeigt, und zwar dergestalt, daß dieses Signal allemal von dem Orte des Aufbruchs an bis zur Grenze des Herzogthums Sachsen stromabwärts gegeben wird.

B.

Wenn auf irgend einem Punkte sich ein Eisschuß bilden sollte, so werden von dem nächsten Posten sechs Schuß dergestalt gethan, daß allemal zwei und zwei schnell auf einander folgen. Dieses Signal, da es nur für die nächste Gegend von Wichtigkeit ist, wird von keinem Posten beantwortet.

C.

Bei dem Fortgange eines Eisschusses werden eben so, wie bei dem Aufbruche des Eises, drei Schüsse gethan.

D.

Es sind zwar jedem Artilleriepostens Signal-Raketten zugegeben, diese sollen aber keinesweges zu Signalen für die Bewohner des Elbstroms, sondern, lediglich dazu dienen, die Artilleriepostens [illegible] gegeben wird.

E.

Der Aufbruch des Eises in Böhmen, wenn solcher später, als in Sachsen geschieht, wird gleichergestalt signalisirt werden.

Dresden, am 3. Februar 1838.

3) Da die Entstehung eines Eisschusses nicht allenthalben von den Artilleriepostens selbst beobachtet werden kann, so wird den Gerichtspersonen desjenigen Orts, in dessen Nähe ein solcher Schuß sich bildet, hierdurch ausdrücklich zur Pflicht gemacht, davon schleunige Nachricht an den ihnen zunächst befindlichen Posten zu geben.

Auch werden sämmtliche Uferbewohner unter Hinweisung auf die ihnen durch die Bezirksämter bereits zugekommene Verwarnung hierdurch nochmals ernstlich bedeutet, sich während der Dauer des Eisganges alles Gethöfignalisirens des Wasserstandes und sonstigen Schießens gänzlich zu enthalten, da hierdurch die Artilleriepostens in den zu gebenden Signalen leicht irre geführt werden können.

4) Die Stationsorte der wegen des Eisganges commandirten Gensd'armerie werden folgende seyn:

a) **rechts der Elbe,**	b) **links der Elbe,**
Schandau,	Königstein,
Wehlsdrfchen,	Pirna,
Sdbrigen,	Laubegast,
Loschwitz,	Prießnitz,
Köpschenkroda,	Niederpoyritz,
Rischütz,	Gauernitz,
Merschwitz,	Meißen,
Nünchritz,	Boritz,
Zschepa,	Riesa,
	Strehla,

und haben die an der Elbe gelegenen Ortschaften alle bei dem Eisgange sich in ihrer Nähe zutragenden Veränderungen, und sonstige darauf Bezug habende Vorfälle dem ihnen am nächsten stationirten Gensd'armen schleunig mitzutheilen.

5) Ueberhaupt haben diesselben sich den Vorschriften, welche die Elbstrom-, Ufer- und Dammordnung §. 10. enthält, allenthalben gemäß zu bezeigen, hiernächst auch denjenigen Anordnungen, welche sie durch die Gensd'armen erhalten, sowohl, als was ihnen durch die Wasserbaubehörden zu thun oder zu unterlassen aufgegeben wird, pünctlich Folge zu leisten.

6) Uebrigens werden annoch alle diejenigen Ortschaften, welche der Elbe nahe liegen, jedoch von dem Eisgange für sich nichts zu befürchten haben, auch wenn sie dazu keine ausdrückliche Anweisung erhalten, dringend aufgefordert, ihren bisherigen Maßregeln mit Holzlieferungen aller Art nach besten Kräften beizustehen, und die nachbarliche Willfährigkeit, welche sie hierbei in früheren Fällen rühmlichst dargelegt haben, von neuem zu beweisen.

Königl. Sächs. Kreis-Direction.
von Wietersheim.

2.1.3 Ratsarchiv C XVIII 76b
Landeshauptstadt Dresden
Stadtarchiv

Figure 3. The first public announcement on the location of signal cannon along the Elbe was published in 1826. This Dresden announcement was dated 3 February 1838. Source: Town Archives, Dresden C XVII 76b

The proposals that Wagner made in 1820 were adopted during the following decade. More signal cannon were positioned along the Elbe at clear specified locations. The signals were also simplified, as the local officials demanded, and the rural population was thus in a position to understand them. The precise firing sequence was explained as well as the specific firing pattern for each situation.[55] These improvements culminated in the public announcement system that had been needed for so long, which was utilised again and again from 1826 to 1845.

In 1836 an element of preventative disaster management was introduced that was not only new but also promised innovative improvements in assessing the volume of water that was to be expected. It was clearly possible after 1836 to assess how high the water would rise in certain areas of the city of Dresden.[56]

The high-water chart (Figure 4) showing to what level certain parts of the city would be flooded, and how deeply, clearly emphasises how much the authorities had learned from the high waters of previous decades. With this chart the civic authorities had created a tool permitting the more efficient organisation of rescue measures.[57] Work on this listing had been in progress since 1836, when the flood had provided a good indication of where various flooding stages could be assessed most accurately.

If people had hitherto been more concerned with coping with the Elbe floods as best they could (by whatever means), from 1845 onwards they were considering the potential consequences of their (previous) actions. These misgivings became even clearer when the proposed relocation of the Dresden railway stations was violently criticised. There was talk of 'industrial folly' and predictions that a further narrowing of the Elbe would entail catastrophic flooding. Twenty years before Ernst Häckel came up with a preliminary definition of ecology,[58] Saxon society was already considering the consequences of massive intervention in the natural order.

People also wondered whether certain 'new building areas' and the Ostra-Gehege had only become endangered by floods as a result of alterations to the course of the river when their ancestors had located these developments in the flood zone. 'The restoration of the old bed of the Elbe at and beyond the villages mentioned as far as Serkowitz'[59] was demanded. As the Elbe prevented the Weißeritz from flowing

55. StAD: RA C XVIII 76b: Acta, Die beym harten Winter und Ergießungen des Elbstrohms im Jahr 1799 allhier getroffenen Veranstaltungen betr. No page number, 14 January 1826.

56. StAD: RA G XXIV 89e I: Acta, Das Begehen der zugefrorenen Elbe, die Eisfahrt und die hierbei sonst zu treffenden Vorsichtsmaasregeln betr. 1831–1856. 25 January 1836, no page number.

57. StAD: RA B XIII 115f Vol. I: Acta, die Unterstützung der ... 1845. No page number, no date.

58. See http://www.gwdg.de/~munger/materialschmidt/einfuehrung.html; http://www.ucmp.berkeley.edu/history/haeckel.html;http://home.tiscalinet.ch/biografien/biografien/haeckel.htm Accessed 14 Jan. 2003.

59. StAD: RA GXXIV 89c Vol. II, p. 5: *Dresdner Anzeiger*, No.94 (Friday, 4 April 1845) p.16. Translation, Poliwoda

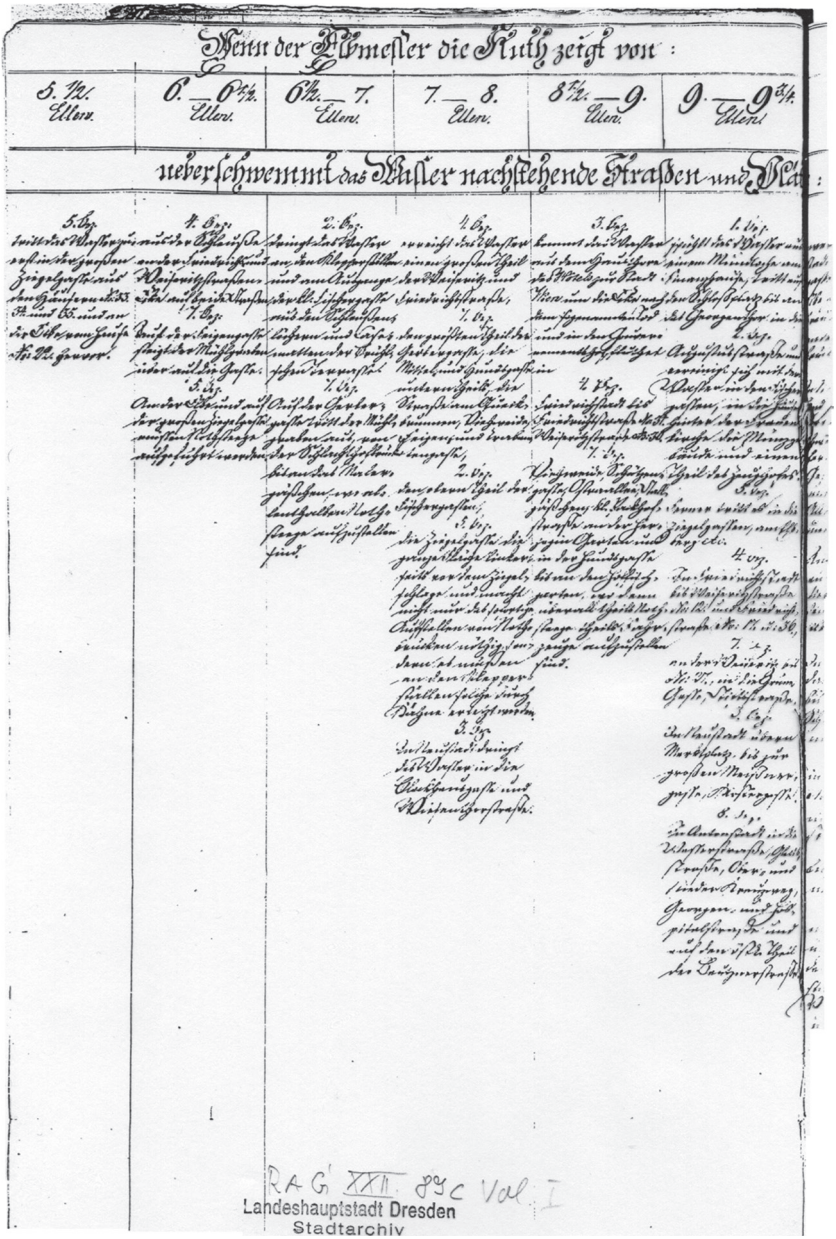


Figure 4. High-water chart for Dresden, 1836. Source: StAD RA G XXII 89c Vol.I

away effectively in 1845, the water could not run off from the Ostra-Gehege and was still at a high level up to three weeks after the river level had fallen.[60]

Although they had coped with the effects of the flood in 1845 better than was usually the case, the district authorities in Dresden criticised the lack of 'unity … energy and consensus among the authorities in resorting to the necessary measures'.[61] To alleviate this, Marbach, the regional director, and the royal ministries demanded 'that a certain meeting point be determined in advance where, in such cases, all those persons were to meet who were'[62] considered essential for a crisis management committee. As well as the Minister of the Interior, or his deputy, 'a member of the War Ministry and the government, the regional director, the burgomaster, the director of police and the local governor of the 1st local government district in the administrative districts of the regional government were to deliberate, initiate and manage the requisite measures'.[63] This went beyond the previous lessons that had been learned and set an objective of the further optimisation of measures only one-and-a-half months after the catastrophe.

Most important learning steps between 1820 and 1845

In 1820 water construction director Wagner drew up a comprehensive report, which formed the basis for improved disaster management (learning input came in part from local officials). A public announcement system existed from 1826: the number of signal cannon increased to seventeen sites, nineteen police posts were built along the Elbe and the actions of citizens before, during and after ice flow were optimised. In 1835 the founding of a rescue association in Dresden was realised; 1836 saw the availability of a 'high-water chart' for Dresden, which enabled an estimation of anticipated water quantities and resultant preventative use of police and military. From 1845 there was constant communication between periphery and main city (police and local officials reported to the borough administrator in Dresden); even during the flood in 1845 the people of Dresden were praising the measures of the authorities. In 1845 critical voices were raised immediately after the flood, discussing increased high water risks as a result of previous river controls. After the flood in 1845, the creation of a crisis management committee (comprising a member of the War Ministry and the government, the regional director, the burgomaster and the director police of Dresden and the head of the 1st administrative department) was intended to ensure optimised coordination in the event of future floods.

60. StAD: RA GXXIV 89c Vol. II, p. 5: *Dresdner Anzeiger,* No.108 (Friday, 4 April 1845) pp.14–5.

61. StAD: RA GXXIV 89c Vol. III, no page number. Dresden 19 May 1845. Translation, Poliwoda.

62. *Ibid.* Translation, Poliwoda.

63. *Ibid.* Translation, Poliwoda.

Conclusion

The entire Saxon community applied itself directly or indirectly to the issue of high waters. If the structure of the state is examined, then one sees a vertical penetration across the complete timeframe. This vertical penetration manifests itself through a range of coping mechanisms such as cash contributions, disaster defences, health care etc. or the continued implementation of measures such as de-icing the River Elbe. The initial measures taken and lessons learned after the flood of 1784 were dominated by recurring and repeated edicts of Dresden's officials.

A vertical ability to react, implemented immediately after 1784, was not only a central but also a consistent theme, which ran right through to the flood of 1845. The Saxon state budget was seriously threatened by recurring high waters. Local measures could not prevent waters breaking through the dykes and monetary support from the districts and communes became disproportionate when compared to that of the state. At the end of the eighteenth century the monarchy financed an extensive proportion of the damage costs but in the nineteenth century the state finally relinquished this responsibility and left the costs of damage to be met by those affected.

At the beginning of the nineteenth century, local officials themselves organised preventive measures or recruited rescue workers. They attempted preventatively to avert catastrophic results at the dykes. They provided the water construction director Wagner with their experience and advice and he went on to present this to the Secret Finance Council. At the beginning of the new century, this process reversed the flow of disaster defence information. The reversal of the flow of information from 'bottom to top' resulted in disaster management being increasingly transferred into the hands of civilians. The result was a socialisation that vertically permeated higher levels of administration.

In the decades that followed, the local authorities implemented preventative and immediate counter-measures to improve protection. Hierarchies (in terms of the attainment of improved defences) were levelled by this new form of communication. From 1826 one can speak of a sectorally-networked disaster management, in which the players worked together. After 1820 and the Wagner report, the reflexive learning elements gained in strength, not only because the information flow had transferred from bottom to top, but also because all contributory levels were interacting with one another.

Along with the appraisal made by the Director of Waterways, the Elbe Flow, Bank and Dam decree catalysed the previously mentioned systematic phases during the 1820s and 1830s. Without these learning procedures, adequate disaster management would not have been possible in 1845.

Following the disaster in 1845, Saxony had access to a state-wide announcement system that preceded the onset of high waters, a risk chart for Dresden and a crisis management committee, together providing it with a modern disaster manage-

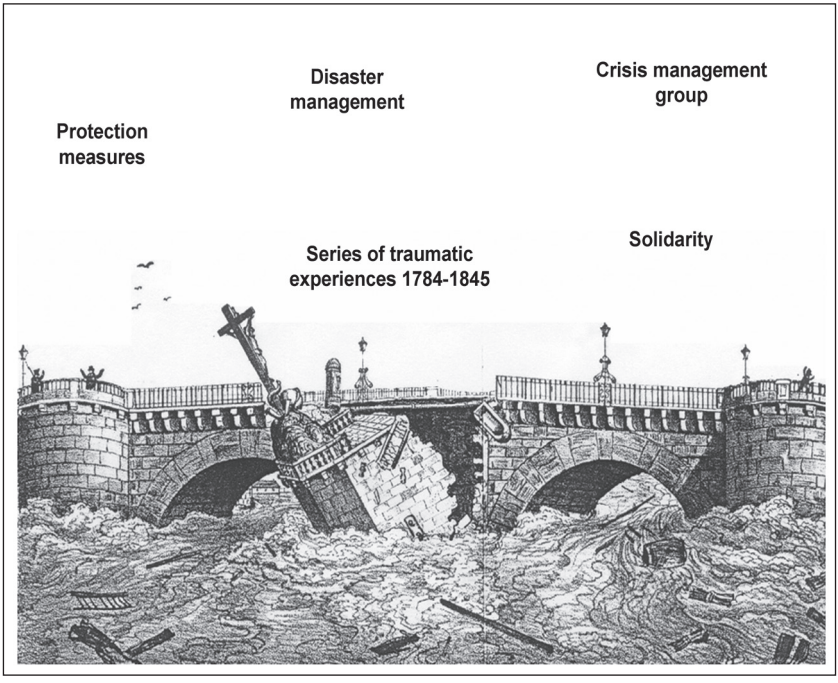


Figure 5. Collapse of the crucifix column on 31 March 1845. Source: Townarchive Dresden, RA G XXIV 75.

ment system. In six decades the Saxon administration had learned not only how to cope with disastrous ice floods, but how to preventatively defend itself from them.

Not only did these recurring catastrophes facilitate consideration of modernised learning procedures, they also resulted in their development. This development was manifest in government administration (the cabinet and administrative departments, for example) and was also the result of reactive output at all social levels.

The modern treatment of ever-recurring crisis situations was accompanied by modern, self-fabricated risks. The control of the Elbe exhibited knock-on effects in 1845. Debate ensued after the flood, attempting to assess the extent to which habitations had been built on flood plains – the extent to which the control of the Elbe had actually exacerbated the high waters that followed. Conversely, the Saxony administration learnt nothing from these modern deliberations – it would appear that the pressure that had enabled the evolution of learning in previous years decreased in the following decades.

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Locat 14376: Fasciculus Gutachtliche Vorschläge in Beziehung auf die bei Eisfahrten und Ueberschwemmungen wegen Abwendung der Gefahr und Linderung des Nothstandes zu ergreifenden Maaßregeln enthaltend. Behalten bei der Königl. Sächß. Kreishauptmannschaft des Meisner Kreises im Jahr 1820.

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PART V

Remoulding Rivers, Reshaping Societies

~ 13 ~

From Natural to Modified Rivers and Back? Timber Floating in Northern Sweden in 1850–1980 and the Use of Historical Knowledge in Today's Ecological Stream Restoration

Erik Törnlund

Introduction

The onset of large scale timber floating operations in northern boreal Sweden

The development of the export-oriented forest industry played an important role in the industrialisation of Sweden. A moving timber frontier, reflecting the demand for sawn timber and the initial exploitation of the forest landscape, swept from the coasts inland and north over the peninsula of Scandinavia during the nineteenth century.[1] The increasing demand for timber became a strong incentive to establish a dense and extensive network of floatways even in the most remote forest landscapes.[2] Moreover, forest exploitation did not end after the first wave of logging

1. Jörgen Björklund, 'From the Gulf of Bothnia to the White Sea: Swedish Direct Investments in the Sawmill Industry of Tsarist Russia', *Scandinavian Economic History Review* 32/1 (1984): 17–41; Lars Östlund, 'Logging the Virgin Forest. Northern Sweden in the Early-Nineteenth Century', *Forest & Conservation History* 39/4 (1995): 160–71.

2. Erik Törnlund and Lars Östlund, 'Floating Timber in Northern Sweden: The Construction of Floatways and Transformation of Rivers', *Environment and History* 8/1 (2002): 85–106; Erik Törnlund, 'Investments and Changing Labour Productivity in Timber Floating: the Case of Tributaries in Northern Sweden, 1930–1960', *Scandinavian Economic History Review* 54/1 (2006): 22–46; Erik Törnlund and Lars Östlund, 'Mobility Without Wheels: the Economy and Ecology of Timber Floating in Sweden, 1850–1980', *The Journal of Transport History* 27/1 (2006): 48–70.

(initial timber frontier): it expanded and developed into sustainable forestry that largely contributed to continuing economic growth.[3]

At the end of the nineteenth century, the export of sawn timber, pulp and paper accounted for approximately fifty per cent of Sweden's total exports by value, and during the first half of the twentieth century the contribution of the forest industry never fell below forty per cent.[4] The transport of timber to industrial locations by floating was essential: at the beginning of the twentieth century almost ninety per cent of the timber volume used in forest manufacture was transported in this way. During this time, the length of the floatways was twice that of the railways, around 20,800 km as opposed to 11,300 km.[5]

This exploitation of the forest resource had a parallel impact on the watercourses. As a practical solution to the transportation problem and as a way of lowering the cost to forest companies, the transformation of natural watercourses began with the building of different kinds of floatway structures, which resulted in a dramatic change to the free-flowing water system. Timber-floating operations, the construction of different floatway structures and stream clearing affected watercourses in northern Sweden in many ways during the whole era of timber floating (1850–1980). For instance, timber-floating activities in the tributaries were affected by a lack of water after floods subsided. This required various improvements to be made, including the construction of stone piers, box booms, flumes and splash dams, for example, to regulate the streams. On the main rivers the higher waterfalls and rapids made operations even more difficult because of the risk of huge logjams that proved costly and dangerous to break up. It was therefore necessary to build a number of different constructions, especially stone piers, to regulate the rapids and to cut off the side-channels.[6]

Changeable streams, changeable environments

From an environmental-history perspective, the expression 'second nature' could be used to symbolise the relation between nature and what human agency has created within it. The natural has to be controlled in one way or another.[7] Timber

3. Mats Larsson & Ulf Olsson, 'Industrialiseringens sekel', in L Nabseth, *et al.* (eds.), *Sveriges industri,* (Stockholm: Gotab 1992), pp. 17–45; L. Östlund, O. Zackrisson, and A-L. Axelsson, 'The History and Transformation of a Scandinavian Boreal Forest Landscape since the 19th Century', *Canadian Journal of Forest Research* 27 (1997): 1198–1206.
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7. William Cronon, *Nature's Metropolis. Chicago and the Great West,* (New York: W. W. Norton 1991), *passim.*

floating and its many floatway constructions involved much controlling of water as a resource. Another expression to be used in this context is Theodore Steinberg's term 'industrial pace', which refers to the way in which industries create technical systems that exploit nature to varying degrees, as with the regulation of water levels that was a feature in the exploitation of water power.[8]

Timber-floating activities such as stream clearing and the construction of different floatway structures affected watercourses and stream habitats in northern Sweden in many ways. For instance, the geomorphological and hydrological effects of removing boulders and dead trees (large woody debris) and dredging bottom sediments in stream-clearing operations included reduced sinuosity and flow-path complexity.[9] The construction of stone piers for straightening the stream channel and cutting off backwaters and side channels had similar effects. The ecological effects of these changes included decreased spawning and rearing habitats for stream-dwelling fish, especially brown trout (*Salmo trutta*) and Atlantic salmon (*Salmo salar*).[10] The construction of floatway structures also affected riparian vegetation and land-water interactions: as channel sinuosity is decreased, the riparian ecotone (i.e., the boundary between land and water) is also decreased, potentially resulting in less frequent but more intense flooding and sediment deposition. This could limit the species and age diversity of the vegetation[11] and potentially limit the ability of the riparian forest to produce litter and woody debris, which provide nutrition and a habitat for aquatic insects and fish populations.[12]

Ecological stream restoration work involving the removal of physical floatway constructions, the opening up of side-channels that were closed due to the timber-floating activities and the returning of rocks to the channels, potentially restores the conditions in which these organisms can thrive: it makes the rivers wider, more multi-channelled and sinuous and their bottoms rougher. In other words it favours the productivity and diversity of riverine organisms.[13]

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8. Theodore Steinberg, *Nature Incorporated: Industrialization and the Waters of New England*, (Ahmerst: University of Masschusetts Press 1994), *passim.*

9. P. Tikkanen, P. Laasonen, T. Muotka, A. Huhta, K. Kuusela, 'Short-term Recovery of Benthos Following Disturbance from Stream Habitat Rehabilitation', *Hydrobiologia* 273 (1994): 121–30.

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11. M.M. Pollock, R.J. Naiman and T A. Hanley, 'Plant Species Richness in Riparian Wetlands – a Test of Biodiversity Theory', *Ecology* 79 (1998): 94–105.

12. F. Lepori, D. Palm and B. Malmqvist 'Effects of Stream Restoration on Ecosystem Functioning: Detritus Retentiveness and Decomposition', *Journal of Applied Ecology* 42 (2005): 228–38.

13. C. Nilsson, F. Lepori, B. Malmqvist, E.Törnlund, N. Hjerdt, J M. Helfield, D. Palm, J. Östergren, R. Jansson, E. Brännäs and H. Lundqvist, 'Forecasting Environmental Responses

In a broader sense, today's restoration of ecosystems such as forests and rivers is primarily aimed at increasing ecological sustainability and protecting biodiversity. Increased environmental awareness motivates restoration programmes and enhances the value people attach to pristine environments. On the political level, the EU's Water Framework Directive requires stream restoration. It sets one important goal, namely to ensure that a good ecological status is achieved in all water bodies in the EU by 2015 or, in the case of heavily modified and affected watersheds, that they reach their maximum ecological potential without interfering negatively with the current use of resources.[14] The Swedish Environmental Protection Agency (EPA) has specified objectives to ensure the natural dynamics and movement of species, sustained biodiversity and natural hydrologic conditions in wetland areas and streams.[15]

However, one major problem in today's attempts to restore the ecology of streams and forest landscapes is our limited knowledge about 'pristine' conditions and long-term environmental patterns and processes of disturbance, both locally and regionally. A crucial challenge in restoration efforts is the lack of knowledge about natural conditions and human impacts. Human society has, in various ways and to different degrees, affected ecosystems in forests and river landscapes and usages have changed over time throughout history. This makes it difficult to assess the human impact on a specific ecosystem, and to appreciate how it looked and functioned before major human alterations. Reference to different historical records and biological archives will help to increase our knowledge of how different ecosystems have changed over time and thus facilitate specifying targets for ecosystem restoration.[16]

The aims of the essay

This essay aims i) to describe the development of timber-floating operations in boreal Northern Sweden (the counties of North and West Bothnia, *Norr-* och *Västerbotten*), during the period 1850–1980, ii) to describe and analyse the transformation

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to Restoration of River Used at Log Floatways: An Interdisciplinary Challenge', *Ecosystems* 8 (2005): 779–800.

14. Anon., *Directive of the European parliament and of the council 2000/60/EC establishing a framework for community action in the field of water policy*, (Luxemburg: The European Parliament and the Council of the European Union 2000).

15. Anon., *Nationell strategi för skydd av vattenanknutna natur- och kulturmiljöer – delmål 1. Levande sjöar och vattendrag*. Rapport 5666, (Stockholm: Naturvårdsverket 2007).

16. Marcus Hall, *Earth Repair, A Transatlantic History of Environmental Restoration,* (Charlottesville: University of Virginia Press 2005), *passim.* Also see, T.W. Swetnam, C.D. and Allen and J.L. Betancourt, 'Applied Historical Ecology: Using the Past to Manage for the Future', *Ecological Applications* 9 (1999): 1189–206; Marcus Hall (ed.), *Restoration and History. The Search for a Usable Environmental Past,* Routledge Studies in Modern History vol. 8, (London: Routledge 2010).

of streams and watercourses in order to make them functional for timber-floating activities and iii) to discuss today's ecological restoration attempts in river landscapes and the need for historical knowledge and methods.

The development of timber floating in the Swedish forest industry

Timber floating, or rafting, has been common practice in waterborne transportation throughout history in Scandinavia[17] and most of the other European countries[18] as well as in the United States, Canada, Russia and Asian countries.[19] In North America in particular the practice of logging and timber floating had many similarities with that in Sweden during nineteenth century forest exploitation: during the timber-frontier movement, similar administrative and floatway structures, techniques and tools were used in both countries.[20]

Timber floating was practised in Sweden on a relatively small scale even before there was a forest industry, for the transportation of fuel wood to the mines during the seventeenth and eighteenth centuries for examples.[21] From the beginning of the nineteenth to the first decades of the twentieth century, water tar barrels were also transported by river in Northern Sweden. Tar, produced for the export market and especially the shipping industry, became important for both the local and the national economy. The barrels were transported from tar pits in the forest region down rivers to the ports for further shipment to the international market.

The development of large-scale timber floating in Sweden, designed for and linked to the forest industry, may be divided into three phases. The first phase coincided with early forest exploitation in the middle of the nineteenth century and was characterised by the clearing of rivers and the establishment of a network of floatways. The floatway length expanded from less then 5,000 km to about 20,000 km at the turn of the nineteenth century. The second phase, from 1900 to 1960, might be described as one of expansion and refinement within the exist-

17. Ismo Björn, 'Takeover: The Environmental History of the Coniferous Forest', *Scandinavian Journal of History* 25/4 (2000): 281–96; Törnlund, 'Flottningen dör aldrig', pp. 15–16.

18. Mauro Agnoletti, 'From the Dolomites to Venice: Rafts and River Driving along the Piave River in Italy (13th to 20th Centuries)', *Journal of the Society for Industrial Archaeology* 21/1 (1995): 15–31; G. Hollister-Short, 'The Other Side of the Coin: Wood Transportation Systems in Pre-industrial Europe', *History of Technology* 16 (1994): 72–97; D. Turnock, 'Forest Exploitation and its Impact on Transport and Settlement in the Romanian Carpathians', *Journal of Transport History* 12/1, (1991): 37–60.

19. Michael Williams, *Americans and their Forests: a Historical Geography*, (Cambridge: Cambridge University Press 1989), *passim.*; Törnlund, *'Flottningen dör aldrig'* pp. 15–19.

20. Erik Törnlund, 'Timmergränsens förskjutning och flottningens utveckling: Norra USA och Sverige 1850-1920', in S-O. Olsson, R. Pettersson and M. Lindmark (eds.), *Miljö – ekonomi – historia*, (Laholm: Trydells 2002): pp. 169–96.

21. Törnlund, 'Flottningen dör aldrig', pp. 2-3.

ing limits. Timber floating was at its peak during this time and in the second half of the 1920s about 15 million cubic meters of timber were floated yearly and the length of the floatways was more than 30,000 kilometres. The third phase, marked the successive decline and eventual abolition of timber-floating operations, with land transportation, first of all on lorries, becoming the predominant mode of log transportation.[22]

Nevertheless, from the mid-nineteenth century onwards, timber floating became established as a crucial link in the large-scale timber industry, for two basic reasons. First, the use of natural watercourses of different sizes made it possible to transport logs over long distances, from the inland logging areas to the coast where the saw- and pulp mills were situated. The distances easily reached 300 km. The practice of timber floating also meant relatively low transportation costs – almost ninety per cent lower than rail transportation during the first decade of the twentieth century (Figure 1).[23]

Secondly, by using natural watercourses, the investment cost of floatways was relatively low compared to other alternatives, such as rail transport; the cost per kilometre for floatways was about ninety per cent lower than the construction of smaller private railways at the turn of the twentieth century. During the period 1850–1900, the total investment in floatways in Sweden is estimated at a maximum of 50 million Swedish kronor and in private railways at around 420 million Swedish kronor (at current prices). The construction of the state railway network was even more expensive.[24]

The rapid increase in floatways and the growing demand for logging and timber-floating operations were also linked to institutional issues, namely the timber-floating law of 1880, which was the first piece of national legislation regulating timber floating. This law included two basic premises that greatly affected further development. First, timber floating and the building of floatway structures had priority use of the watercourses, provided that this gave the nation and/or the local municipalities opportunities for economic growth. This gave the sawmill owners and the logging companies considerable advantages over local salmon fishing and watermill activities, for example. Secondly, the law prescribed that timber floating and investment in floatway structures had to be organised and administered by a floating association and it was the associations that organised and administered timber floating and floatway contrivances constructed along watercourses. All interested parties using the floatways had to be members and their influence on decisions and share of payment for transportation and investment costs were de-

22. Törnlund, 'Flottningen dör aldrig', pp. 5-6.

23. Törnlund and Östlund, 'Floating Timber in Northern Sweden', p. 87; Törnlund, 'Flottningen dör aldrig', pp. 6–7.

24. Törnlund, 'Timmergränsens förskjutning och flottningens utveckling: Norra USA och Sverige 1850–1920', pp. 185–7.

pendent on how much timber they floated. This law therefore gave the watercourses for the continuous use of the forest industry for its own purposes, a condition that prevailed until the end of timber floating in the 1980s.[25]

Figure 1. Floatways in Sweden, 1907.

Source: G. Andersson, 'Timmertransporter på de svenska vattendragen och dess geografiska förutsättningar', *Ymer* (1907): Tafl. 2.

25. Magnus Nordqvist, 'Flottleder och flottning', in Gunnar Arpi (ed.), *Sveriges skogar under 100 år, Del II,* (Stockholm: Ivar Haegströms boktryckeri 1959), pp. 446–50; Eva Jakobsson, 'Flottning – konflikter och politik om vatten', in Erik Törnlund and Lars Östlund (eds.), *Flottning. Vattendragen, arbetet, berättelserna,* Skrifter om skogs- och Lantbrukshistoria 14, (Lund: Nordiska museets förlag 2000), pp. 99–102.

Finally, forestry and logging operations have also had a deep impact on the socio-economic situation in agrarian society and the boreal areas. The timber floaters were mostly smallholders, crofters or tenant farmers and their work was performed within the framework of a normal annual cycle comprising forestry in winter, timber floating in spring and harvesting in summer, a 'combination of trades', as it could be called (Figures 2–3). There were only a few full-time floaters or lumberjacks and they formed a more proletarian component of the forestry industry. This raises the question of how many people were employed in timber floating and lumbering: during the 'golden era' of timber floating, the interwar period from 1920–1940, official statistics indicate that almost 50,000 men were employed in timber floating. The number of forestry workers in Northern Sweden at the same time has been estimated at about 145,000, while the number employed in the forest industries (sawmilling and wood pulping) was about 60,000.[26]

The exploitation of watercourses – a long-term overview of timber-floating activities and the construction of floatways

We cannot adequately describe timber-floating activities without also taking into consideration free-flowing water streams. Timber floating was a system whereby human beings attempted to control nature by constructing different kinds of floatway structures. It is therefore essential to be aware of the historical relationship between nature and society in any exploration of this kind of socioeconomic development and landscape change.[27] Another important point is that timber floating continued over a long period of time and reflected different phases, techniques and impacts (See Table 1).

Floatway structures were first made by hand with basic tools, especially during the first phase of floatway and timber-floating development from 1850–1900. Before dynamite was introduced at the end of the nineteenth century, the use of black powder and stone burning was the usual way of removing rocks from stream channels. Simple hoisting cranes were also used in both stream clearing and construction work and motorised cranes were introduced at the beginning of the twentieth century. New equipment put into use after World War II included bulldozers, which were used as a cheap, easy and fast method of clearing stream channels, and for building side piers to regulate the water flow. However, construction engineering and the types of structures built changed over time. Floatway structures

26. Törnlund, 'Flottningen dör aldrig', pp. 74–75, 81–88; Törnlund, 'Investments and Changing Labour Productivity in Timber Floating', pp. 29–31.

27. William Baleé, 'Historical Ecology: Premises and Postulates', in W. Baleé (ed.), *Advances in Historical Ecology*, (New York: Colombia University Press 1998), *passim;* Carole L. Crumley, 'Historical Ecology. A Multidimensional Ecological Orientation', in C. L. Crumley (ed.), *Historical Ecology: Cultural Knowledge and Changing Landscape,* (Santa Fe: School of America Research Press, 1994), *passim.*

Figure 2. Practices of timber floating. Timber floaters rowing their boats in the stream. In the background, the removal of a logjam. Vindeln River, 1947.

Source: Umeå flottningsförenings arkiv, Folkrörelsearkivet vid Västerbottens museum, Umeå. With permission.

Figure 3. Timber floating in a smaller tributary around the year 1950, place unknown.

Source: Skogsbibliotekets arkiv, SLU, Umeå. With permission.

Table 1. Floatway use and its impact in Sweden during different periods, 1800–1980 [28]

Time period	Floatway use	Impact
1800–1900	Initial water transport	Stream clearings
	Water transport of tar barrels	Clearing of boulders and obstacles using black powder and stone burning
	Timber rafts and loose floating in primary main courses	Some floatway constructions (box booms of wood and stone)
1850–1900	Expansion of timber floating and floatways	Building of floatway structures
	Loose floating in both main courses and tributaries	Tributaries: flumes, splash dams, box booms, use of explosives in stream clearing. Main courses: box booms, stone piers.
	Floatways in 1900: length: 25,325 km; density*: 0.14 km/km$^{2.}$	
1900–1960	Expansion within the existing limits	Continuing construction work
	Loose floating in both main courses and tributaries	Tributaries and main courses: canalisation and the use of hosting cranes in construction work.
		Use of motorised boats over tranquil waters (1930s), bulldozers in stream clearings and canalisation (1950s)
	Floatways in 1950: length: 32,961 km; density: 0.18 km/km^2	
1960–1980	The decline of timber floating	The abolition of floatways
	Intensive expansion of forest roads, introduction of lorry transport	A decline in timber floating in tributaries (1955–1970) and in main courses (1965–1980)
	Floatways in 1970: length: 14,572 km; density: 0.08 km/km^2	

* Density = Floatway length (km) per km^2 forested land in river drainage area

28. Sources: G. Andersson, 'Timmertransporter på de svenska vattendragen och dess geografiska Förutsättningar', *Ymer* (1907): 315–371; Erik Törnlund, *Flottning, flottledsbyggnader och förändringar i vattenmiljön: fallstudie för sträckan Storgräsforsen-Storsandforsen i Vindelälven 1850–1970*, Umeå Papers in Economic History 21, (Umeå: Umeå University, 1999), pp. 16–20; E. Törnlund and L. Östlund, 'Floating Timber in Northern Sweden: The Construction of Floatways and Transformation of Rivers', *Environment and History* 8/1 (2002): 85–106; C. Nilsson, F. Lepori, B. Malmqvist, E. Törnlund, N. Hjerdt, J M. Helfield, D. Palm, J. Östergren, R. Jansson, E. Brännäs and H. Lundqvist, 'Forecasting Environmental Responses to Restoration of River Used at Log Floatways: An Interdisciplinary Challenge', *Ecosystems* 8

were mainly made of wood and stone during the second half of the nineteenth century, while stone piers became more common at the beginning of the twentieth century, especially in the main courses. Different kinds of splash dams constructed in the mid-nineteenth century were further developed during the first decades of the twentieth century and flumes became rare due to increased canalisation of the naturally meandering watercourses (Figure 4).[29]

The extent and number of floatway constructions vary between different river basins because of natural pre-conditions. The Vindel and Pite Rivers in northern Sweden could be used as a good example in this sense. At first glance, these catchments seem to have much in common but differences in pristine conditions and historical development distinguish them. For instance, the timber frontier reached the Vindel River around 1850 (the last year of timber floating was 1976) and incorporated the Pite River two decades later, during the 1870s (the last year of timber floating was 1982). The natural pre-conditions differed in these two rivers: the Vindel River had higher forest density and higher productivity than the Pite, largely because of the Pite's higher latitude. The Pite watershed has steeper slopes than the Vindel and they are also generally more rocky and turbulent and required a greater number and variety of floatway constructions to make timber floating possible and profitable. The densities of floatway structures (m/km) are greater here than the on Vindel River (Figure 5).

The use of historical knowledge in the study of change in river ecology

Historical perspectives increase our knowledge of the dynamic nature of running water and its surrounding landscape and many studies have emphasised different aspects of these matters. The focus may be on the natural impact on and change to meandering and sedimentation processes in wandering gravel-bed rivers,[30] for

(2005): 779–800; E. Törnlund, 'Investments and Changing Labour Productivity in Timber Floating: the Case of Tributaries in Northern Sweden, 1930–1960', *Scandinavian Economic History Review* 54/1 (2006): 22–46; SOU 1932: 26, *Uppskattning av Sveriges skogstillgångar verkställd åren 1923–1929. Redogörelse avgiven av rikskogstaxeringsnämnden. Del II*, (Stockholm 1932).

29. Törnlund and Östlund, 'Floating Timber in Northern Sweden', pp. 90–9; Nilsson *et al*. 'Forecasting Environmental Responses to Restoration', pp. 780–82; Törnlund, 'Investments and Changing Labour Productivity in Timber Floating', pp. 42–44; Törnlund and Östlund, 'Mobility without Wheels: the Economy and Ecology of Timber Floating in Sweden, 1850–1980', pp. 52–5.

30. Cf. A. R. G. Large and G. E. Petts, 'Historical Channel–floodplain Dynamics along River Trent', *Applied Geography* 3 (1996): 191–201; K. F. Leys and A. Werrity, 'River Channel Planform Change: Software for Historical Analysis', *Geomorphology* 29 (1999): 107–20.

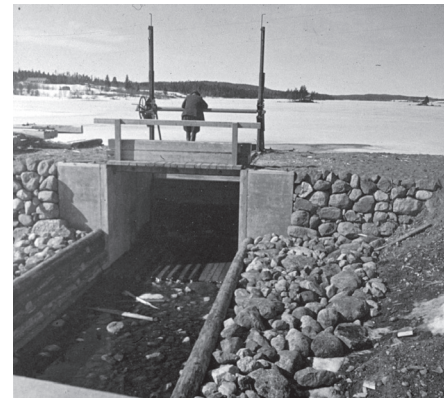
A. A well sculpted stone jetty (1920s). These constructions effectively regulated streams and cut off side-channels, and were primarily built in main courses (rivers). Their length could reach over 100 m and height up to 5 m.

B. Box boom made from wood and stream-cleared stones (1910s). This kind of construction (a 'one-faced box boom') was common in tributaries and was built to make the natural streams more narrow and canalised.

C. Flume, just below a splash dam (1930s).

Figures 4A–4F. Examples of floatway constructions.

D. Splash dam (1950s).



E. Stream clearing, preparing explosives (1920s).

F. Stream-clearing operation with a bulldozer (1950s).

Source: Photographs A, D, F; Umeå flottningsförenings arkiv, Folkrörelsearkivet vid Västerbottens museum, Umeå, photographs B, C, E; Skogsbibliotekets arkiv, SLU, Umeå. All reproduced with permission.

	Vindel	Pite
Catchment area (km^2)	12,650	11,220
Mean annual discharge at mouth (m^3/s)	190	170
Height of falls (m)	470	577
Floatway length (1950)		
Tributaries:	1,200	800
Main course:	355	435
Total length of floatway constructions (km)		
Tributaries:	45	33
Main course:	23	58
Density of floatway constructions (m/km)		
Tributaries:	87	166
Main course:	65	133
Number of splash-dams*	174	112
Density of splashdams (km floatway/splash-dam)	6.9	7.9

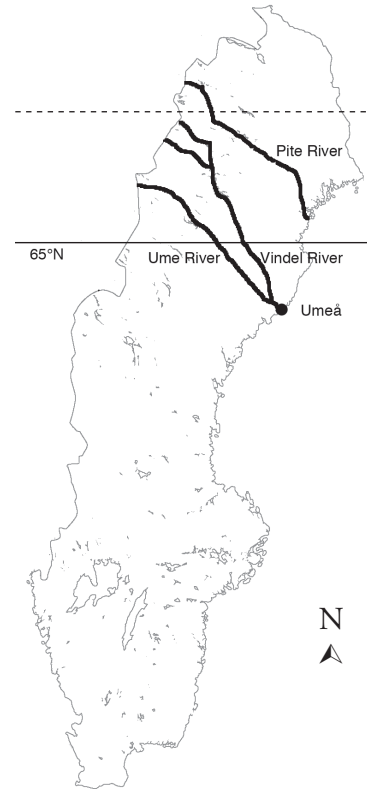


Figure 5. Basic data and map showing the Vindel and Pite rivers.

Source: R. Jansson, C. Nilsson, M. Dynesius, E. Andersson, 'Effects of River Regulation on River-margin Vegetation: A Comparison of Eight Boreal Rivers', *Ecological Applications* 10 (2000): 203–224; Erik Törnlund, *Ekologisk återställning av flottningspåverkade vattendrag och exempel på hänsyn till kulturhistoriskt bevarande av olika flottledskonstruktioner. Exemplet Vindel- och Piteälven med bivattendrag*, (National Heritage Board, Ms/Report, 2005).

Notes:
Map does not include tributaries, only the main courses.
*Splash dams only occur in tributaries.

example, or on the impact of different kinds of human activities and the use of rivers for various agricultural and industrial purposes.[31]

In the case of timber floating in the boreal areas of Sweden, the human impact on the watercourses is obvious.[32] A historical perspective on the construction of floatway structures and their effects is more dependent on different kinds of information sources and research methods than the more common natural-science approach. However, historical archives provide opportunities for studying, as well as natural resource management, inherent ecological aspects, which have been brought out in the field of forest-history research, not least in the case of boreal Sweden.[33]

Historical records of different kinds of timber floating-related activities are to be found in the archives of the River Drive Associations. This data, which in many cases starts in the middle of the nineteenth century, consists of floatway documents, including investigation and construction journals, general ledgers and maps (both handwritten and based on aerial photographs) among other things. It could be used to calculate and analyse long-term changes at specific sites on a main river course or tributary through the identification and dating of single constructions and to describe the general development of timber floating.[34]

The case of Bjurbäcken, one of many tributaries of the Vindel River, could be used as an example to illustrate long-term change in floatway constructions and the physical effects on the river landscape. Timber-floating operations in this tributary started in the middle of the 19th century and ended at the beginning of the 1970s. The change could be studied on the scale of specific reaches, such as *Bergvattenforsen*, one of 10 rapids along Bjurbäcken. The development of these

31. Cf. L. M. Smith and B. R. Winkley, 'The Response of Lower Mississippi River to River Engineering', *Engineering Geology* 45 (1996): 433–55; J. Girel and O. Manneville, 'Present Species Richness of Plant Communities in Alpine Stream Corridors in Relation to Historical River Management', *Biological Conservation* 85 (1998): 21–33; P. Sippel, 'Controlling the Nagara: Changing Approaches to Water Management in Japan', *Water Policy* 2 (2000): 283–97.; H. Benjoudi, P. Weng, R. Guérin and J.F. Pastre, 'Riparian Wetland of the Middle Reach of the Seine River (France): Historical Development, Investigation and Present Hydrologic Function. A Case Study', *Journal of Hydrology* 264 (2002): 555–67.

32. A 'boreal forest', also called the Taiga, is defined as the cluster of forest ecosystems that is able to endure in northern, particularly subarctic, regions.

33. Östlund, Zackrisson, Axelsson, 'The History and Transformation of a Scandinavian Boreal Forest Landscape since the 19th Century', pp. 1198–1206; S. Ericsson, L. Östlund and A-L. Axelsson, 'A Forest of Grazing and Logging: Deforestation and Reforestation History of a Boreal Landscape in Central Sweden', *New Forest* 19/3 (2000): 227–40; A-L. Axelsson, and L. Östlund, 'Retrospective Gap Analysis in a Swedish Boreal Forest Landscape Using Historical Data', *Forest Ecology and Management* 147/2-3 (2001):109–122; T. Josefsson, E. Hellberg and L. Östlund, 'Influence of Habitat History on the Distribution of *Usna longissima* in Boreal Scandinavia: a Methodological Case Study', *The Lichenologist* 37/6 (2005): 555–67.

34. Törnlund and Östlund, 'Floating Timber in Northern Sweden': 85–106.

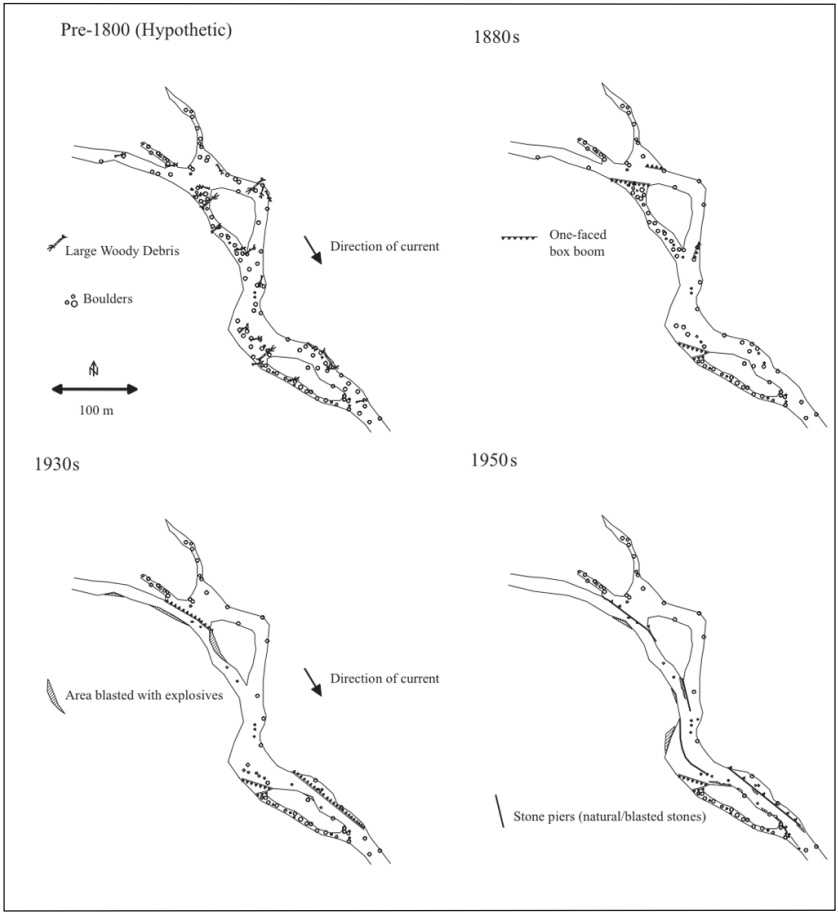


Figure 6. Floatway structures and the transformation of Bergvattenforsen in Bjurbäcken, 1850–1950.

Source: Umeå flottningsförenings arkiv, Folkrörelsearkivet vid Västerbottens museum, Umeå. F.XI:3 *Flottledshandlingar* Bjurbäcken; F.XI: 58 Flottledshandlingar Uman-Vindeln vol.I. Uman-Vindeln, allmänt 1857–1867; F.XI: 59 *Flottledshandlingar* Uman-Vindeln vol. II (Investigation journals year 1867, 1880 and 1888); J.I *Kartor* (rullade) nr 5–7, Bjurbäckens flottled; (Maps). G.VI. *Byggnadsspecial* 1916–1946, (Journal of Construction); G.XI. *Huvudböcker* 1946-1970 (General Ledger). Personal observations in fieldwork. Also published in C. Nilsson, F. Lepori, B. Malmqvist, E. Törnlund, N. Hjerdt, J M. Helfield, D. Palm, J. Östergren, R. Jansson, E. Brännäs, H. Lundqvist 'Forecasting Environmental Responses to Restoration of River Used at Log Floatways: An Interdisciplinary Challenge', *Ecosystems* 8 (2005): 779–800.

rapids was successive, but a comparison between the origin and final situations reveals a tremendous change (Figure 6).

To complement this picture of physical change in the stream environment, it is also possible to measure the impact on and the loss of important ecological structures, the effects of stream clearing, floatway constructions and canalisation (e.g. the clearing of stones, boulders and large woody debris, reduced flooding and riparian ecotone and cut-off side channels), by using the historical sources mentioned above combined with field work and observations. Parallel consideration and measurement of change in the surrounding forest landscape (e.g. forest composition and dead standing trees) could provide valuable additional information.[35] All of these measurements are relevant when it is a question of selecting targets for ecological stream restoration.

Back to nature? Some concluding remarks and discussion

Today's 'Era of ecological restoration'

During the timber-floating era of 1850–1980, streams were cleared of large boulders and rapids were canalised by means of various kinds of floatway structures. This resulted in simplified channel morphology, altered flood and sediment regimes and a loss of aquatic habitat. In rivers now undergoing ecological restoration, floatway structures have been removed and boulders placed back in the channel. These actions serve to restore channel complexity and re-open side channels in order to enhance interactions between the river channel and the riparian margins, among other things.

River restoration after timber floating activities has been carried out before and has been scientifically documented, especially in Finland and Canada.[36] The EVP project (Ecological Recovery in the Vindel and Pite Rivers) was a multi-disciplinary study conducted in parallel with the physical removal of floatway constructions along the Pite and the Vindel, two major, largely free-flowing, rivers in northern Sweden. Both have been declared National Rivers and are protected from regulation by hydroelectric power plants. The project, which ran from 2002–2005, comprised research on landscape ecology, fish biology, insect biology, geology/hydrology and

35. Cf. P. Angelstam, G. Mikusinski and J. Fridman, 'Natural forest remnants and transport infrastructure – does history matter for biodiversity conservation planning?' *Ecological Bulletins* 51 (2004): 149-62.

36. G.F. Hartman, J.C. Scrivener and M.J. Miles, 'Impacts of Logging in Carnation Creek, a High-energy Coastal Stream in British Columbia, and their Implication for Restoring Fish Habitat', *Canadian Journal of Fish Aquatic Science* 53 (1996): 237–51; P. Laasonen, T. Muotka and I. Kivijärvi, 'Recovery of Macroinvertebrate Communities from Stream habitat Restoration', *Aquatic Conservation: Marine and Freshwater Ecosystems* 8 (1998): 101–13; D.A. Scruton, T.C. Anderson and L.W. King, 'Pamehac Brook: a Case study of the Restoration of a Newfoundland, Canada, River Impacted by Flow Diversion for Pulpwood Transportation', *Aquatic Conservation: Marine and Freshwater Ecosystems* 8 (1998): 145–57.

timber-floating history. The ecological restoration of these two rivers includes both main courses and tributaries and the project was funded by the Swedish Environmental Protection Agency (EPA) through a local investment programme (LIP), financed by the EU. It is hoped that it will continue, in order to follow up and evaluate the ecological effects of remediation and to work out restoration programmes.[37] Compared with previous restorations, the scale and scope of the EVP project were wider: the Vindel and Pite rivers are generally rockier, have a higher gradient and are more turbulent than, for instance, corresponding Finnish and Canadian rivers with timber floating activities.[38]

Another aspect of the EVP project was the idea that the restoration would have profound effects on the entire river ecosystem and not only in terms of increasing the population sizes of game fish, especially salmonids. However, restoring rivers used for timber floating and forecasting the environmental responses involves many steps and aspects. The first step necessitates knowledge about the history of timber floating and its physical effects on river channels. When and how were the different floatway structures constructed? What were the purposes and the resulting effects? Focusing on the connection between history and the biotic environment is important in restoration work and in evaluating the environmental effects on aquatic and riparian organisms.[39]

Facing historical change

River restoration is motivated by environmental awareness and the increasing value we attach to pristine environments; there are also many challenges. For one thing, watercourses have been affected in various ways and to different degrees and river usage has changed over time. Human-led effects and changes in river systems often occur more quickly than natural disturbances, which may make it difficult to distinguish the effects of a single disturbance from those of more natural and general recurrences.[40] This, in turn, makes it very difficult to assess the human impact on rivers and to appreciate how rivers looked and functioned before human intervention. Moreover, different stages in the long-term human exploitation of the forest landscape involve different kinds of utilisation. Local, unregulated, pre-historic

37. C. Nilsson (ed.), Återställning av älvar som använts för timmerflottning. En vägledning för restaurering. Naturvårdsverket, Rapport 5649, (Stockholm 2007).

38. C. Nilsson *et al.* 'Forecasting Environmental Responses to Restoration of River Used at Log Floatways: An Interdisciplinary Challenge', pp. 779–800.

39. Lepori, Palm and Malmqvist, 'Effects of Stream Restoration', pp. 228–238; J.M. Helfield, S.J. Capon, C. Nilsson, R. Jansson and D. Palm, 'Restoration of Rivers Used for Timber-floating: Effects on Riparian Plant Diversity', *Ecological Applications* 17 (2007): 840–51.

40. Cf. E. Ojala and S. Louekari, 'The Merging of Human Activity and Natural Change: Temporal and Spatial Scales of Ecological Change in the Kokemäenjoki River Delta, SW Finland', *Landscape and Urban Planning* 61 (2002): 83–98.

use vs. industrial exploitation, management strategies, institutional frameworks and change are all potential subjects of study at different levels and for different durations.[41] Historical knowledge may thus be used to identify different kinds of disturbance and to set goals for ecological restoration work.

Within this historical context, there is one major problem that has to be addressed, namely what concepts such 'Pristine State' and 'Back to Nature' really mean and how these states can be reached in practice, if ever.[42] In physical terms, some watercourses may have been altered to such a degree that it is difficult to restore them to any kind of 'pristine state', as this would require both resources and techniques that are not available to most restoration projects. Even a channel that has been restored to a highly natural state still may not recover ecologically to its pre-disturbance state. For instance, it is almost impossible to restore large areas of boulders or bed rock in pristine watercourses that were dynamited during the era of timber floating, at least if exactly the same stone material is to be used, because these former boulders/bed rock have been transformed into small pieces of very sharp blast stone material.

What kind of history should be preserved for the future?

Finally, ecological restoration planners must also consider the historical value of some floatway structures and their place in the cultural landscape. These floatway constructions are the only physical remnants of the period of timber floating in boreal Sweden and represent a unique epoch in the history of Northern Sweden.[43] Today's ecological restoration of former floatways means that these cultural remains will disappear forever. A few examples of them will probably remain, although this specific group of historical relics has become the object of extensive and fast demolition as the restoration of floatways has accelerated during the last decade. [44]

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41. See E P. Farrell, E. Führer, R. Dermont, F. Andersson, R. Hüttl and P. Piussi, 'European Forest Ecosystems: Building the Future on the Legacy of the Past', *Forest Ecology and Management* 132 (2000): 5–20. Cf. Timo Myllyntaus, *'Changing Forests, Moving Targets in Finland', in* Marcus Hall (ed.), *Restoration and History. The Search for a Usable Environmental Past,* Routledge Studies in Modern History vol. 8, (London: Routledge 2010), pp. 46–57.

42. C. Gamborg and B. L. Larsen, 'Back to Nature – a Sustainable Future for Forestry?' *Forest Ecology and Management* 179 (2003): 559–7; 1. Wang, S., 'One Hundred Faces of Sustainable Forest Management', *Forest Policy and Economics* 6 (2004): 205–13.

43. Cf. Erik Törnlund, '"Damned Waterfall, Now Your Days are Numbered!" On Timber Floating, Masculinity and Nature in Northern Sweden', in Fredrik Björk, Per Eliasson and Bo Fritzboger (eds.), *Miljöhistoria över gränser*, Skrifter med historiska perspektiv, volym 3, (Malmö: Holmbergs 2006), pp. 231–63; Törnlund, Erik, *Kulturhistorisk utredning – Flottningsmiljön efter Laisälven. Underlag för kulturreservatsutredning*, (Länsstyrelserna i Norr- och Västerbotten 2007).

44. Erik Törnlund, *Flottningslämningar i Västerbottens län,* Länsstyrelsen i Västerbotten. Meddelande 1, (Umeå: Larsson & Co:s Tryckeri AB 2006), pp. 1–57.

At the same time, we have a responsibility to preserve such remnants of cultural history. In today's 'Era of ecological restoration', legislation could give some protection to remnants from the era of timber floating, by the Law on cultural monuments stipulated in 1988.[45] The Environmental code of 1998 also deals with this kind of matter. For instance, certain areas, either on land or water, may be designated cultural reserves if considered valuable cultural landscapes.[46]

The removal of these floatway constructions is therefore something that requires further consideration. Firstly, dynamiting boulders, the construction of stone piers with basic hand tools, all the sometimes hard and dangerous work involved in timber floating in the roaring rapids in order to remove log jams, were not things that came about 'just for fun'. They reflected the socioeconomic reality and the need for wages for the working people along the rivers in northern Sweden and we should therefore further ask what kind of history should be preserved for the future and to what extent.

Secondly, it is a mistake and a risk to set cultural and ecological purposes against each other. One important part of restoration work should be to consider both ecological *and* cultural aspects, and one essential question should be raised.[47] What specific kinds of floatway structures should be removed and restored in order to achieve the highest possible positive ecological effects, without too much negative impact on efforts at saving some historical remnants of the timber-floating era?

45. SFS 1988:950, *Lag om kulturminnen mm,* [Law on cultural monuments and other things].

46. SFS 1998:808, *Miljöbalken*, part two, chapter 7, section 9.

47. Cf. Hall, *Restoration and History*, *passim*.

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To Act or Not to Act: Water Problems in North-East Hungary after 1945

Viktor Pál

Introduction

Industrialisation deeply transformed agrarian Hungary during the twentieth century. While society changed and the economy grew, the environment was in many respects degraded.[1] The human–nature co-existence is interwoven with people's everyday lives and individual experiences. Social perceptions and scientific research are two ways to explore environmental changes. This chapter examines individual and group perceptions of the relationship between water supply problems in an industrial centre, Miskolc, and the contamination of the nearby Sajó river.

Hungary is situated in the Carpathian Basin of Eastern-Central Europe, the flat landscape, *puszta*, is crossed by several rivers, such as the Danube and the Tisza, whose sources lie in neighbouring countries. This a specific feature of the region in question, where the Sajó and Hernád rivers flow from Slovakia through Borsod–Abaúj–Zemplén county to join the Tisza river south of Miskolc.

Miskolc and the surrounding industrial zone, called the Borsodi Basin or the Valley of the Sajó, are characterised by the sinuous and rather minor Sajó river. Nowadays the region consists five dusty provincial towns (Ózd, Putnok, Kazincbarcika, Sajószentpéter, and Sajóbábony) with dozens of derelict but also some operational industrial plants and Miskolc, the principal town of the valley, which has less than 170,000 inhabitants. Once a thriving agricultural and industrial region, the valley of Sajó has been showing symptoms of emigration, ageing

1. Ivan T. Berend and György Ránki, *Studies on Central and Eastern Europe in the Twentieth Century: Regional Crises and the Case of Hungary*, (Aldershot: Ashgate 2002); Ivan T. Berend, *From the Soviet Bloc to the European Union: The Economic and Social Transformation of Central and Eastern Europe since 1973*, (Cambridge: Cambridge University Press 2009), *passim*.

population, extreme high unemployment, ethnic tensions and deforestation in ethnic villages since the late 1980s.

This chapter analyses local environmental concerns and discourses primarily focused on Miskolc from the mid-1950s to the 1980s. It concentrates on river water pollution, since that issue was the main public environmental concern throughout the given period. The central research material is water related articles, comprising approximately seventy per cent of environmentally related articles published in the researched Hungarian daily newspapers and journals.[2]

The Valley of Sajó witnessed industrial development from the mid-1800s. During the 1950s and 1960s, the Sajó river became synonymous nationwide with massive industrial pollution, and received the nickname 'Dead River' or 'Black River' from journalists.[3] By the late 1950s, discussion emerged over worsening river water conditions and problems in the water supply system, partly caused by degraded water quality in the Sajó river. The deteriorating environmental conditions that followed large scale state-socialist industrialisation became issues of discussion in Central and Eastern Europe from the 1950s. In the present case, a smaller proportion of the local populace than in much of 'Western Europe' was engaged in the debate about water issues. They were mainly engineers, hydrologists, journalists and local politicians. In the mid-1980s, the political atmosphere became increasingly liberal in Hungary. Then a strong environmentally-conscious opposition began to emerge in Budapest. More than 140,000 people signed an appeal to stop construction at the Nagymaros dam, part of a larger barrage system on the Danube river.[4]

The mid-1980s was also the era of stagnating industrial production. Less industrial waste caused fewer environmental problems in the Borsodi Basin. However, it is still unclear why the masses did not join the debate over environmental degradation in the Borsodi Basin by the late 1980s. I suspect that, when the political atmosphere became mellower, the required *habitus*[5] was not present. It is also important to note that pollution levels lowered significantly by the end of the 1980s.

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2. Borsodi Műszaki Élet, Borsodi Szemle, Déli Hírlap, Észak-Magyarország, Felvidéki Népszava, Vizeink and Vizgazdálkodás. See the list of researched periodicals and daily newspapers with years of reference in the Bibliography.

3. Tibor Priska, 'Fekete folyók [Black rivers]' Észak-Magyarország (Miskolc) (13 March 1968), p. 5.

4. John Fitzmaurice, *Damming the Danube, Gabčikovo and the Post-Communist Politics in Europe*, (Boulder, Colorado: Westview Press, 1998).

5. *Habitus* is a complex concept but in its simplest usage could be understood as a structure of the mind characterised by a set of acquired schemata, sensibilities, dispositions and taste. John Scott & Gordon Marshall (eds.), *A Dictionary of Sociology*, (Oxford: Oxford University Press 1998).

Figure 1. Map of Hungary (modified by Viktor Pál).

This chapter aims to find answers to the following questions with the aid of Bourdieu's sociological concept of *habitus*[6]. How did discursive practices over water evolve in Miskolc between the 1950s and late 1990s? When, how and why did agents participate in the debate over these issues? And what was the outcome of these discursive practices?

The theoretical basis of this study draws mainly on sociology. The conceptual frame combines and complements Bourdieu's concepts of *habitus* and cultural and symbolic capital. Bourdieu's influential ideas on *habitus* were developed to objectify the subjective. The term *habitus* refers to a system of mental constructions adopted through upbringing and education.[7] On an individual level, agents develop subjective categories of perception and action, according to which they respond to the objective conditions they experience around them. In other words, we might all see a tainted river near our home but we perceive and act upon it in very different ways.[8]

6. Pierre Bourdieu and Loïc J.D. Wacquant, *An Invitation to Reflexive Sociology*, (Chicago: University of Chicago Press 1992), *passim*.

7. Pierre Bourdieu, *Outline of a Theory of Practice* (Cambridge: Cambridge University Press, 1977), p. 169

8. Compare this phenomenon to the concept of 'environmental literacy' applied by Anu Eskonheimo in her chapter in this volume. See also David Orr, *Ecological Literacy: Education and the Transition to a Postmodern World*, (New York: State University of New York 1992) and Minna Hares, Anu Eskonheimo, Timo Myllyntaus and Olavi Luukkanen 'Environmental Literacy in Interpreting Endangered Sustainability. Case Studies from Thailand and Sudan', *Geoforum* 37/1 (2006): 128–44.

If we accept that *habitus* is the capacity to produce classifiable works and to differentiate these works according to likes and dislikes, a certain environmental change has different meanings for most people. It also means that there is no right way to perceive an environmental change. Rather there are ways that contribute to a more sustainable and more humanistic future, and ways that do not.[9]

Miskolc and an industrial Utopia

The city of Miskolc has a long history of industrial production beginning in the 1770s. However, the accelerated development of local steel and engineering works began during the second half of the nineteenth century and peaked after World War II. The first water-supply system in Miskolc was constructed by 1913, as regular cholera epidemics and floods endangered the town's 40,000 inhabitants. Water intake plants were established on karst water resources. A nearly forty-kilometre-long water-supply and waste water system, a water tank on top of the Avas Hill and a waste water treatment plant served the population in the city centre, around eighteen per cent of the total population of Miskolc.[10] The city saw only a modest development of its water-supply system in the interwar period like many other Hungarian urban centres and during World War II the waste water treatment plant, many water pipes and much of the sewage network were destroyed. No new waste water treatment plant was constructed in the city until 1972.[11]

During World War II, the steel mills of Miskolc gained national prominence and their output rose dramatically. That growth was soon followed by increased urbanisation. By the early 1950s the town inevitably became the centre of northern Hungary and of national steel and machinery production. A technological university was also established there, which reinforced the dominant position of Miskolc in heavy industrial production. However, the infrastructure, especially water-related investments, could not keep pace with the increasing demands of the citizens and of local industries. The original version of the first five-year plan, approved in 1949, aimed at a ten per cent annual growth rate and a 63 per cent overall growth of the

9. Pierre Bourdieu, *Distinction, A Social Critique of the Judgement of Taste* (London and New York: Routledge and Kegan Paul, 1984), p. 170.

10. János Teslér and József Piukovics, *A miskolci vízművek és fürdők 50 éves története, 1913–1963* [The History of the 50-year-old Miskolc Waterworks, 1913–1963], (Miskolc: Miskolci Vízművek, 1963), p. 13.

11. 'The annual report of the Miskolc Waterworks', 1958, Papers of the Miskolc Waterworks (XXIX-113), Post World War II Branch Archive (Mezőcsát) of the Borsod-Abaúj-Zemplén County Archives, Miskolc (Hungary).

Table 1. Milestones of the Miskolc City Water and Waste Water Works, from the 1810s to the Present Day

Milestone	**Years**
1. Hámor artificial dam (industrial use)	1812–present
2. Felső- spring intake; gravity system (industrial use)	1908–present
3. High-pressure water-supply system (public use; after 1948 public/industrial use)	1913–present
- Tapolca high-pressure karst water-intake station	1913–present
- Avas water tank	1913–present
4. Sajó waste-water treatment plant	1913–44
5. I water-supply main	1913–present
6. II water-supply main	1939–present
7. Avas tunnel	1939–present
8. Tavi spring intake (industrial use)	1940–present
9. Avas dual water tanks	1954–present
10. Anna spring intake (industrial/public use)	1955–present
11. Szinva spring intake	1963–present
12. Intermunicipal network from the Boldva and Sajóecseg intake plants)	1970–present
13. Sajó waste water treatment plant	1972–present
14. Alsózsolca groundwater intake	1974–present
15. Tetemvár water tank	1974–present
16. East main water supply pipeline	1974–present
17. Hernád groundwater intake	1977–present
18. Reintroduction of water meters	1990–present
19. Improved Sajó waste water plant (biological treatment)	1994–present
20. Improved Sajó waste water plant (sludge dry plant)	1998–present

Sources: based on Fig 26.1 in Petri Juuti and Viktor Pál, 'Sister Towns of Industry: Water Supply and Sanitation in Miskolc and Tampere from the late 1800s to the 2000s', in Petri Juuti, Tapio Katko and Heikki Vuorinen (eds.), *An Environmental History of Water, Global Views on Community Water Supply and Sanitation*, (London: IWA Publishing 2007).

national economy for the following five years (1950–1954). The revised version of that plan predicted 130 per cent growth for the entire five-year period.[12]

During the 1950s and 1960s, Miskolc became the second-largest industrial centre of Hungary after Budapest. Besides the traditional steel mills, machine works and paper manufacturing, new branches of the processing industry such as glass, medicine and alcohol production emerged. A territorial expansion took place in 1950, which increased the local population served by potable water. Water pipes were soon constructed and hydrants were set up in the suburbs.[13] All in all, accelerated needs did not match the amount of usable karst water resources.[14] The shortage of fresh water was already a significant threat in the 1950s. The 1958 annual report of the Miskolc City Waterworks warned city officials that the supply of water for new housing estates could be assured only by the installation of a new water-intake plant.[15]

By the end of the nineteenth century a number of urban water-supply and waste water systems were established in Hungary, but the majority of towns and villages had to rely on public and private wells even as late as 1945. One of the key aims in the first five-year plan of the new socialist state was the rapid construction of infrastructure, such as urban water-supply systems. I feel that the expansive goals of state-socialism shared much with the aims of the growth-based nineteenth and twentieth century capitalism. In terms of their relationship with the environment, both political systems have shown disrespect and immature confidence. This comparison, however, cannot be the topic of the present chapter.

After 1948, waste water network building lagged behind the construction of water-supply pipelines, which enjoyed priority in most of Eastern Europe. Lack of funds prioritised the rapid construction of water supply networks, to supply safe

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12. Gábor Révész, Perestroika in Eastern Europe, Hungary's Economic Transformation. (Boulder, Colorado: Westview 1990), p. 33.

13. M. H. '200 százalékra teljesítik a hároméves tervet a miskolci Vízgazdálkodási Hivatal dolgozói [The Central Plan is finalised by 200 per cent by the workers of the Water Administration of Miskolc]' Észak-Magyarország (Miskolc) 2 October 1949, p. 9.

14. A certain type of landscape consists of two different layers of earth: water can penetrate easily through the upper layer but will be stopped by non-soluble rock strata. This phenomenon, called Karst topography, is characterised by the dissolution of a layer or layers of soluble bedrock, usually carbonate rock such as limestone or dolomite. 'Due to subterranean drainage, there may be very limited surface water, even to the absence of all rivers and lakes. Many karst regions display distinctive surface features, with sinkholes or dolines being the most common. However, distinctive karst surface features may be completely absent where the soluble rock is mantled, such as by glacial debris, or confined by a superimposed non-soluble rock strata. Some karst regions include thousands of caves, even though evidence of caves that are big enough for human exploration is not a required characteristic of karst.' http://en.wikipedia.org/wiki/Karst_topography Accessed 12 Oct. 2010.

15. 'The annual report of the Miskolc Waterworks, 1958', Papers of the Miskolc Waterworks (XXIX–113).

Figure 2. The River Sajó near Miskolc. (Photograph: Viktor Pál)

drinking water. Despite the delayed construction of waste water pipes, urban and industrial effluent increased from 285,000 cubic metres to 995,000 cubic metres from 1945 to 1957.[16] That was mostly a result of industrialisation. In the 1950s, major water supply construction projects were mainly constructed in the capital, Budapest, and in industrial centres such as Kazincbarcika, Komló, Tatabánya and Miskolc, of which two are found in the Valley of the Sajó.

In the late 1950s hydrologists and city officials began to face a 'Catch-22 situation'.[17] Karst water sources were hard to exploit, depending on seasonal rainfall; surface water was either polluted or too far away. The most abundant water-intake possibilities for Miskolc were the flowing rivers nearby, the Sajó and the Hernád. These rivers entered the country carrying pollution from Czechoslovakian industrial plants.[18] In addition, the Sajó river ran through the heart of the northern Hungarian industrial region with its various activities such as steel mills, engineering and chemical plants and glass factories. During the same period, newspaper articles were warning the public of the consequences of water problems.[19]

To live close to polluted surface water was not uncommon in other European countries either: for example, in Finland, now famous for her conservation areas and clean surface-water resources, fifty per cent of the population lived close to heavily polluted surface waters during the same period, as Erkki Pihkala notes.[20]

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16. Szitkey, László, Szennyvízcsatornázásunk helyzete 1958. év végén [The state of the national waste water pipe construction at the end of 1958], (Budapest: Országos Vizügyi Főigazgatóság [National Water Administration] 1959), p. 318.

17. The idiom *Catch-22*, meaning a no-win situation, also refers to a general critique of bureaucratic operation and reasoning. The phrase is derived from a historical novel by the American author Joseph Heller, first published in 1961. See http://en.wikipedia.org/wiki/Catch-22 Accessed 8 Oct. 2010.

18. A monitoring report carried out on the Sajó River in 1974 clearly showed the trans-boundary nature of water pollution in the region. The situation was so severe that waste water from one of the largest Hungarian chemical plants in Kazincbarcika, only 25 kilometres downstream from the Czechoslovakian border, improved water quality in the river and especially the oxygen content. Those complex problems should have been solved with the cooperation of various groups of actors locally, nationally and internationally. Oral interview with Ferenc Sallai, Chief Councillor at the North-Eastern Hungarian Environmental Inspectorate, 18 May 2006.

19. M., Sz., 'Tervek Miskolc ivó- és iparvízellátásának javitására – a csapadék és a szennyvízelvezetés megoldására [Plans to improve the public and industrial water supply and to solve the problems of rain drainage and sewerage of Miskolc]' Észak-Magyarország (Miskolc) 24 April 1959, p. 2.

20. Errki Pihkala, 'Elintason nousuja kehityksen varjopuolet' [The rise in living standards and the dark sides of development], in Jorma Ahvenainen, Erkki Pihkala and Viljo Rasila (eds.), *Suomen Taloushistoria 2.* [The economic history of Finland vol. 2] (Helsinki: Tammi 1982), p. 523.

Drought and a meagre debate

As a result of extraordinarily dry weather conditions over several months in the Miskolc region, water levels in the local karst wells gradually fell by mid-1964. These subterranean springs were supplied directly from cave systems in the local limestone mountains. Given the over-stretched karst resources, only a low quantity of water was available. Nonetheless, it was of high quality because the water was filtered through the rocks and naturally purified. The exploitation of new springs was on the way but this would not solve the growing needs of industry and the local population. Local rivers such as the Sajó and Hernád could not be used without large investment in pipelines and filtration plants and there was the constant danger that various types of industrial pollution might find their way into the water-supply system.

A consequence of the above-mentioned conditions was that around 30,000 inhabitants lost access to safe tap water for about three months during the summer of 1964 and even the county hospital had to delay surgery because of a lack of water.[21] Beyond merely causing inconvenience, the lack of water endangered public health, as people in some of the suburbs began to use old, polluted wells. Inhabitants on the upper floors of some of the modern apartment blocks had to use the taps of downstairs neighbours in order to obtain water.[22] These issues were all discussed in the local media, especially Èszak-Magyarország ['Northern Hungary'] and Déli Hírlap ['Midday Courier']. Newspapers were cheap and popular and therefore daily newspapers had a major media impact in informing local citizens. Even after television became popular among blue-collar workers in the 1970s, regional newspapers remained the main source of information on local issues.

Journalists

It is often assumed that the media in socialist countries were highly censored. However, in the case in question, the newspapers accommodated various opinions in connection with water issues and created a forum for various actor groups to express their views. These articles were often critical of water-related incidents and of existing legal and administrative policies. It is likely that local socialist-party leaders occasionally pressured journalists but there was no sign of any restrictions in regional party documents.[23] Oral arm-twisting and journalists' own self-censorship

21. Sándor Pozsonyi, 'Ismét hiány lett a legerősebb ital [The strongest drink is in short supply again]' Észak-Magyarország (Miskolc) 24 April 1966, p. 5.

22. 'The annual report of the Miskolc Waterworks, 1958', Papers of the Miskolc Waterworks (XXIX–113).

23. Városi PB anyagok 1960–1969 [City party commission documents], Baross Street Branch archive (Miskolc) of the of the Borsod-Abaúj-Zemplén County Archives, Miskolc (Hungary).

Figure 3. Housing projects in Miskolc. (Photograph: Viktor Pál)

must have played an important role. However, this line of argument needs future investigation.

During the early 1950s, when the country was forced into supporting the Stalinist victory, no articles were published on water-related problems. However, according to archival documents, the first comprehensive water scarcity emerged during the summers of 1951 and 1952.[24] Water articles at that time were representations of competition. The more water was extracted, the more the industry of the people's republic was able to produce.

Things changed after the Hungarian revolution of 1956 and several reports on water issues appeared in local newspapers, as well as in specialist journals.[25] At that time, the articles concentrated on the economic importance of water and viewed urban water supply and sanitation as the responsibility of public engineering. News on a lack of appropriate water resources and the emerging water shortage even hit the front page by 1962. The insufficient supply also drove up the value of water and water-related news. Stories on its regional and global value appeared monthly

24. 'The annual report of the Miskolc Waterworks, 1958', Papers of the Miskolc Waterworks (XXIX–113).

25. See Bibliography, Newspapers.

during the dry summers of the 1960s in Èszak-Magyarország, the popular daily of northern Hungary.

After the drought of 1964, debate over water-related environmental and technical issues appeared increasingly often in local newspapers.[26] A number of journalists joined the public engineers and other water supply experts in debate. Water became an issue. Disagreements and popular debate concerning urban water supply and the pollution of regional watercourses were not only perceived as technological and economic problems in the news of the late 1960s, however. A new journalistic tone with an environmental flavour emerged, focusing on long-term environmental perspectives in the region. One of the proponents was Tibor Priska, who published numerous articles on urban pollution in local papers. He wrote in one of his articles, 'Black Rivers – What is a lot? And what is a little?' about two options: environmental fines or building a waste water treatment plant. 'Building a waste water plant may cost millions [of Hungarian Forints],[27] paying the fine may cost no more than a hundred thousand. The final damage will show, however, later, when water cannot be used to irrigate the lands, and fish die out. What is more, this is happening every year.'[28] Where did the scientific information behind this news come from? Journalists represented an autonomous group in the discourse on water: most of their information was second-hand and came from hydrologists, who viewed the problem in many different ways.

Professionals

Another forum for the professional discussion of water issues was local conferences and project meetings, which took place sporadically after the end of the 1950s and produced a series of unpublished proceedings. These professionals aimed to find new water resources and to encourage city dwellers to consume less tap water.[29] However, this was not an easy task, as karst water resources were already fully

26. Èszak Magyarország was the major newspaper in the region of Miskolc; however another daily, *Déli Hírlap*, appeared in 1969.

27. For more on socialist welfare systems, see William Outhwaite & Larry Ray, Social Theory and Postsocialism (Oxford: Blackwell Publishing 2005), pp. 49–51.

28. Priska, 'Fekete folyók [Black rivers]', p. 5.

29. 'Miskolc vizellátásának komplex vizsgálata 1967' [Complex survey of the water supply of Miskolc], (Unpublished conference proceedings from the meeting of the Borsod Branch of the Hungarian Hydrological Society, 16 May 1967), 'Nagy-Miskolc vizellátási problémái' [The water supply problems of Greater Miskolc], (Unpublished research reports by Viziterv Company 1973), 'Miskolc város ivó,- fürdő és iparvíz ellátásának hidrogeológiai adottságai, műszaki feladatai és gazdasági problémái' [The hydro-geological makings of Miskolc's bath-tap and industrial water supply, technological challenges and economic problems], (Unpublished conference proceedings the meeting of the Borsod Branch of the Hungarian Hydrological Society, 28 November 1973).

exploited and all flowing water within a forty-kilometre radius was heavily polluted. At these meetings engineers and hydrologists considered the possibilities of constructing artesian wells, laying a hundred-kilometre-long water pipe from the Tisza river and other plans. By the end of the 1960s, industry accounted for about 65 per cent of water needs in the region.[30] To solve problems, foreign experience was increasingly used by the early 1970s. German and English experts examined the Sajó River and Hungarian engineers made several journeys to West Germany and the UK. The Development Programme of the United Nations awarded funding amounting to one million US dollars for the Sajó project in 1972.[31] The first phase of the project was to learn about foreign experiences and to adopt monitoring and laboratory techniques. The Rivers Thames and Lee in England and the Ruhr in Germany were used as models.

The Miskolc waterworks

Throughout this period, the priority in water-related investments was the construction of water pipes, which was a common feature in most Central-East European countries. In 1973, of the total 19 million forints invested by the Miskolc city waterworks, nine million were directed toward new water pipes, 6.5 million towards construction and machinery, two million towards waste water pipes, 1.5 million towards pools and thermal baths and the remaining half-million for other expenses.[32] First, the waterworks tried to resolve problems from its own budget, with limited success. Such a project would have required massive amount of central resources.

As its first response to the water shortage, the city council and waterworks aimed to exploit new karst water resources but rapid population growth outstripped the capacity of these water-intake projects. The exploitation of karst water resources was speeded up and even the thermal springs of the spa bath 'Augusztus 20' and the baths of Tapolca were added to the system, which resulted in bath closures in the 1960s. In addition, a significant amount of drinking water was purchased from the Sajómenti Waterworks of Kazincbarcika, which raised supply costs considerably.

Some internal problems can be traced: 'The problem is that our [pipe] construction capacity which was set [by the central plan] has not been fully used for the whole year because the orders from the city council exceeds the annual volume of available stocks. Therefore, we asked for an amendment to our annual plan on

30. 'The annual report of the Miskolc Waterworks, 1958', Papers of the Miskolc Waterworks (XXIX–113).

31. P. S. [Sándor Pozsonyi?], 'Megmentik a Sajót [They save the Sajó river]' Észak-Magyarország (Miskolc) 22 July 1972, p. 3.

32. 'The annual report of the Miskolc Waterworks, 1973', Papers of the Miskolc Waterworks (XXIX–113), Post World War II Branch Archive (Mezőcsát) of the Borsod-Abaúj-Zemplén County Archives, Miskolc (Hungary). See note 26 for further daily exchange details.

11 July 1960, to which no response was received. Furthermore, we will not be able to keep the plan of 7.8 million [Hungarian] forints[33] building value because we can obtain neither the necessary pipe materials nor the workers. Water pipes can be purchased in the remaining six months of the year. We will not be able to hire more workers because we do not have housing facilities for them.'[34]

During the 1970s, most technological and environmental questions in Miskolc were concerned with the construction of new water-intake plants and the resolution of urban waste water discharge problems. The term 'environmental pollution' appeared for the first time in local official correspondence from 1972. References to 'environmental problems' then became more frequent, although occasionally incoherent. The technological and economic aspects of pipeline construction and institutional water-filter installation were familiar but new terms emerged in the public debate for waste water discharge and pollution fines. Pollution fines were established in the Hungarian legal system as early as 1961 but they began frequently to be imposed in Miskolc only a decade later. The annual fines imposed by the local waterworks were set by the regional water authority, which was the next highest authority, but the Miskolc waterworks also imposed pollution fines itself once monitoring equipment had been installed along the Szinva creek and in the waste water system. [35]

The legal aspect of the debate brought new complications. The local water company argued that the construction of waste water systems was the responsibility of the Miskolc city council and that the waterworks could not therefore be blamed for any delays and cancellations in the construction of a new waste water plant. A plan had been put into action in 1955 but it was not financed by the National Planning Office. Mr Szilléry, the director of the waterworks, argued that they had no responsibility for delays or for water pollution since the plan had not been financed by the central authorities. The court ordered the company to built its own waste water treatment plant, which was an impossible task with only its own resources and without financial help from the state. According to József Piukovics, the chief engineer, and Dr Barna Konczvald, the director after Szilléry, this was clearly the government's responsibility. Furthermore, the 1/1961 governmental order regarding waste water discharge was not coordinated with the nationwide

33. According to the official daily exchange rates of the Hungarian National Bank, 11.74 HUF was equivalent to 1 USD on 1 September 1960. More information on daily historical data is available at the database of the Hungarian National Bank on the Internet: http://english.mnb.hu/engine.aspx?page=arfolyamlekerdezes

34. 'The annual report of the Miskolc Waterworks, 1960', Papers of the Miskolc Waterworks (XXIX–113), Post World War II Branch Archive (Mezőcsát) of the Borsod-Abaúj-Zemplén County Archives, Miskolc (Hungary).

35. 'The annual report of the Miskolc Waterworks,1972', Papers of the Miskolc Waterworks (XXIX–113), Post World War II Branch Archive (Mezőcsát) of the Borsod-Abaúj-Zemplén County Archives, Miskolc (Hungary).

apartment construction and development programme. Even ÈVIZIG, the regional water authority, could not comply with its own orders to prevent further apartment construction until safe and abundant water resources were connected to the Miskolc urban water supply system.[36] Building new housing estates with safe water supplies would only be possible if a new water-intake plant was installed and the new waste water treatment plant was constructed immediately. The construction of the new plant was finally announced on 26 April 1972, by which time the financing was in place to cover the costs of four hundred million Hungarian forints. [37]

Regional and national authorities

According to the Northern Hungarian Regional Water Authority, in addition to the water that ran through the ruins of the old waste water plant, 10,000 cubic metres of waste water flowed directly into the Sajó though the Attila József street main collector each day, another 16,000 flowed into distribution tanks, and a further 16,000 cubic metres into settling pans. The efficiency of the pans was extremely low: in fact they were worthless. Abstraction fines were set based on a single annual monitoring of the river's flow, before the monitoring system was installed. However, imposing a fine on the waterworks had a minimal impact on the amount of untreated waste water in the short term, because it was impossible to finance the investments needed to solve the environmental problems from the corporate budget and governmental resources were needed. Since the first sanctions for water pollution had been imposed in the 1/1961 governmental order, not much had been done to reduce the discharge of waste water before the end of 1971. As a consequence, the total volume discharged annually in Miskolc doubled during that ten-year period from 6.7 million cubic meters to 15.3 million cubic meters.[38]

In the early 1970s, the Miskolc waterworks began to prepare for the imposition of pollution fines. The first laboratory for examining the quality of local water flows was set up in 1972 and employed a full-time chemical engineer. Data collection began on the activities of major polluters, and, in the meantime, a new waste water treatment plan was finalised. When the local waterworks began to set discharge fines annually for some of the major polluters, many took steps to install mechanical waste water filters to prevent the discharge of fat and other substances. The debate over waste water discharge came to an end after the installation of the

36. Orders of the Regional Hydrological Supervisory: 7166/1966, to the Szentpéteri Kapu housing estate II–III stages, and 9291/1966 Bulgárföld housing estates. Papers of the Miskolc Waterworks (XXIX–113), Post World War II Branch Archive (Mezőcsát) of the Borsod-Abaúj-Zemplén County Archives, Miskolc (Hungary).

37. See note 33 for further daily exchange-rate details.

38. 'The annual report of the Miskolc Waterworks, 1972', Papers of the Miskolc Waterworks (XXIX–113).

mechanical waste water plant in 1974. The efficiency level of the new waste water plant was only thirty per cent but significant hazards to the environment and major technological issues began to disappear from dailies until the end of the 1980s, when environmental NGO received large media coverage regionally and nationwide.

Perhaps the installation of the new intake plant and the development of the infrastructure also contributed to ending the water debate. The first major investment was the new well 'No. II' installed in 1974 at the Alsózsolca water intake plant, with a daily intake of 4,000 cubic metres. At the same time, 9.5 per cent of the total water consumed was brought from the Borsod Regional Waterworks through an intersystem pipeline. In addition, a new water-intake plant on the Hernád River began operation in February 1975, with a very significant intake capacity of around 15,000 cubic metres.[39] Following the installation of new water-intake plants, the general perception was that there were no longer any dramatic water-supply or water-quality problems in Miskolc. The above-mentioned infrastructural and legal developments satisfied most actors' needs in connection with the supply and protection of water. However, these developments only signified a solution for the general *habitus* of the time. By the early 1980s, the growth in local industrial output had slowed, which affected population growth and consequently water intake. The economic stagnation of the whole country was affecting everyone living in Miskolc by the mid-1980s and the biggest shock was yet to come. In the following ten years, the city of Miskolc was transformed from the flagship of socialist industry to a melting pot of social, economic and ethnic issues. By the early 1990s, mammoth companies, families and most importantly local dreams about a better life had fallen apart.

Conclusions

The valley of the Sajó has a long tradition of industrial activities such as mining and iron smelting. Iron and coal mining and steelworks already dominated the valley of the Szinva in Diósgyőr and the valley of Hangony in Ózd by the second half of the nineteenth century. The valley of Sajó, a larger, predominantly agricultural landscape began to change significantly after 1948, when massive industrialisation took place in Kazincbarcika, Sajóbábony and in the already industrialised Diósgyőr and Ózd.

When the steel mills and engineering factories were enlarged in Miskolc, industrial water consumption increased radically. Population was drawn from nationwide to work in the booming manufacturing and smelting works. The population of Miskolc grew from 100,000 in the early 1950s to 225,000 by 1983. The emerging socialist metropolis was meant to accommodate 300,000 inhabit-

39. 'The annual report of the Miskolc Waterworks, 1976', Papers of the Miskolc Waterworks (XXIX-113), Post World War II Branch Archive (Mezőcsát) of the Borsod-Abaúj-Zemplén County Archives, Miskolc (Hungary).

Figure 4. Closed down steelworks in Miskolc. (Photograph: Viktor Pál)

ants by the turn of the millennium. At the same time, extensive industrial growth produced an increasing amount of various chemicals which were discharged into the river Sajó in Hungary and in upstream Czechoslovakia.

Looking back in time, the first water supply system was established in Miskolc in 1913. That was based on local karst water resources. Springs in limestone mountains are vulnerable to rainfall, and in dry years their output decreases. Sporadic water shortages were already being witnessed in Miskolc by the early 1950s. A decade later, water shortages were frequent and lasted longer: in 1964 for about three months. The integration of new karst water springs was a slow process and could not keep pace with demand. Surface water resources, in the shape of the Sajó and Hernád rivers, were either too polluted or too far away to provide adequate quality drinking and industrial water within a short period of time.

Journalists, water professionals, the Miskolc Waterworks, the Regional Water Board and various waste water producing industrial plants joined the regional debate about the problems of water resources and waste water production. Central authorities, such as the National Planning Office and the Ministry of Heavy Industries also participated to the discourse; however, the analysis of their role is not the task of the present chapter. Agents on the one hand discussed how new water

Figure 5. 'In harmony with nature' – the slogan for Hungarian chemical factory BorsodChem (ex-BVK)

resources could be extracted as fast and as cheaply as possible and, on the other, they debated the principle of imposing water pollution and abstraction fines, as well as the amounts to be paid.

One of the peculiarities of this debate was that actors were either state authorities, state-owned companies or persons working for state-owned firms. Actors debated environmental resources owned by the state, pollution discharged by state-owned firms and state-owned municipal waterworks. Actors argued about a lack of state environmental funds and environmental abstraction fines imposed by state authorities on state-owned industrial plants. Abstraction fines were paid by state-owned firms to state environmental authorities as a result of inadequate state investments in environmental protection.

Responsibility for environmental pollution was in question among the actors. An industrial plant could not be responsible for discharges if funds for waste water treatments plants were unavailable. The Miskolc Waterworks were not able to find solution for water scarcity in town or to construct a massive waste water treatment plant without extra central resources. Hence, responsibility was a ques-

tion of transferability. All the actors attempted to point out that the owner of the infrastructure, the People's Republic of Hungary, had the responsibility for water supply and waste treatment. In the Hungary of the Cold War period, environmental protection was therefore connected to major political and ideological issues.

Actors participating in the debate perceived water scarcity and water pollution as an economic and technological problem from the late 1950s to the late 1960s. Then, partly influenced by Western Europe, the environment and environmental pollution gained importance in its own right; however, the environmental literacy of Hungarians was only just emerging at the time. The *habituses* of various actors changed over time and following large-scale infrastructural investments in the 1970s to 'solve the problem'. When the infrastructure for water supply and waste water treatment were expanded, the complexity of the system increased, extending the problem to new areas but, on the other hand, making environmental degradation less visible for a limited period of time. However the socialist regime in Hungary collapsed before pollution and lavish water consumption managed to wreck the water service of Miskolc. Nevertheless, that phase, the deindustrialisation of this former manufacturing centre, did not solve the pressing environmental problems of the region.

Later on, new actors, including environmental NGOs, entered the game with a different *habitus* than that possessed by the majority of actors discussed in this chapter. Hence the debate was renewed and complemented with new nuances and requirements, such as 'sustainability'. Recurring incidents, such as the recent spillage of industrial sludge at the alumina plant, described as the 'biggest ever environmental disaster in Hungary', tend to maintain tensions in the Hungarian debate over environmental issues.[40]

40. On 4 October 2010 a million cubic metres of toxic sludge coloured by red iron oxide gushed into an agricultural valley through a fissure in a dam of the Hungarian Aluminium Production and Trade Company (MAL) in the western part of the country. The spill covered the villages of Kolontar and Devecser, which were evacuated. The flow of polluted liquid reached the Danube four days later. Around the country, a series of similar reservoirs are still storing the residue of 50 years of industrial production, much of it for the Soviet economy and military. The sludge polluted a vast area of farmland about 170 km west of the capital Budapest and killed fish in rivers including the Danube. *The Daily Telegraph*, 9 Oct 2010. www.telegraph.co.uk/ Accessed 10 October 2010.

    This disaster is comparable to another serious environmental catastrophe in January 2000 in Baia Mare (Hung. *Nagybánya*, Germ. *Frauenbach*), a city in North Romania, where a waste water reservoir contaminated by cyanide at a gold ore refining plant gave way. Poisonous sludge surged over populated areas and via the River Săsar to the Tisza and Danube, killing fish on the way. These two similar catastrophes have been the most serious environmental disasters in Eastern Europe since the Chernobyl accident in April 1986. http://fi.wikipedia.org/wiki/Baia_Mare Accessed 8 Oct. 2010.

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