Full program for WCEH 4th-8th August 2009

Locations:

The congress takes place partly at the Radisson SAS Falconer Hotel and partly at the Copenhagen Business School during the days Tuesday - Friday. On Saturday the congress is housed in Malmö University's building, Orkanen.

These session rooms are in the Radisson SAS Falconer Hotel: Audience Hall (plenary sessions), rooms 102, 202, 203, 204 and 205, while the poster exhibition and book stalls are in room 103-5.

The Copenhagen Business School, (CBS) is hosting sessions in rooms SPs03, SPs07, SPs08, SPs12, SPs13, SPs14, SP112, SP113 & SP114.

Malmö University´s building, Orkanen is hosting sessions in rooms: LUA426, LUA227, LUB423, LUC127, LUC231, LUC233, LUD131, LUD138, LUD222, LUD328, LUD337, LUE239, LUE323 & LUE439.

Tuesday, August 4th

Room

8:30 - 10:00 **Registration opens** **Lobby of Falconer Hotel**

10:00 - 10:30 **Opening plenary** **Audience Hall, Falconer Hotel**

Welcome by the chair of Local Organizing Committee, Professor Valery Forbes, Roskilde University
Official opening of WCEH2009 by rector, professor Henning Salling Olesen, Roskilde University

10:30 - 11:00 **ICEHO presentation, Steven Anderson** **Audience Hall, Falconer Hotel**

11:00 - 12:00 **Keynote lecture, Nobel laureate, Professor Paul Crutzen** **Audience Hall, Falconer Hotel**
Title: The Anthropocene: humans as a force in global environmental cycles

Paul Crutzen is a professor at the Max-Planck-Institute for Chemistry, Mainz, Germany. He was awarded the 1995 Nobel Prize in Chemistry along with Professors Mario Molina and F. Sherwood Roland for their work in atmospheric chemistry, particularly concerning the formation and decomposition of ozone. His main research interest is in Atmospheric Chemistry and its role in biogeochemical cycles and climate.
In recent years, Prof. Crutzen has become more and more interested in the study of the "Anthropocene", a notion to describe the current age, in which humans have - in the view of at least some researchers - become a global force influencing biogeochemical cycles. His presentation will discuss the "great acceleration" of the 20th century, its influences on the global atmosphere, and introduce the idea of geo-engineering of the atmosphere to combat global warming

12:00 - 13:30 **Lunch break** **Congress Lunch in Ground Floor Adjacent to Lobby of Falconer Hotel**

13:30 - 15:00 **Parallel Session 1**

Session 1.1 **Transnational Environmental Science: Comparative Perspectives on the Production and Movement of Natural Knowledge** **SPs03**

Chair: Libby Robin

309 'A geopolitics of "nature": place, travel and the International Phytogeographical Excursion, 1911'*; Laura Cameron and David Matless*

366 Geopolitical science? Field practices in the Canadian Arctic, 1955-1970*; Richard Powell*

473 Local knowledge in a global industry: the formation and movement of the science of salmon aquaculture*; Stephen Bocking*

732 Travelling Expertise: The US Fish and Wildlife Service in India*; Michael Lewis*

Session 1.2 **Global Foresters, Local Forests: Cross-cultural Challenges and Perspectives** **SPs07**

Chair: Steven Anderson

352 Slick and Clean: American Foresters and German Forests in the Great Depression*; Susan Flader*

480 Foresters from India in the British Caribbean*; Lawrence Grossman*

614 The US international forestry program and the scientific cultures of the British Overseas Forest Service, 1940-1970*; Jennifer Gold*

687 Foresters at War: How Military Service in France Affected American Timber Policy*; James Lewis*

Session 1.3 **History from Below: Comparative Groundwater Studies in World Environmental History** **SPs08**

Chair: John McNeill

568 Denying and Disguising Depletion: Groundwater Overdraft and Urban Sustainability in the American Southwest *; Paul Hirt*

755 Groundwater Irrigation in the Western Desert of Egypt: Ancient irrigation technologies in context*; Abigail Schade*

1118 Undercurrents of the Snake River Aquifer: Hydrology and Policy*; Kevin Marsh*

Session 1.4 **The Ecology of Wartime Nature** **SPs12**

Chair: Christof Mauch *Commentator: Christof Mauch*

256 Valuing the Environment: The Philippines War Damage Commission 1946-1951*; Greg Bankoff*

268 The Concept of the Environment and the Practice of Total War during World War I*; Dorothee Brantz*

270 The Ecology of Colonial Famines and Wars in the French African Empire, 1864-1916*; Bertrand Taithe*

Session 1.5 **Mapping Global Agricultural History 1** **SPs13**

Chair: Ulf Jonsson *Commentator: Janken Myrdal*

382 Mapping precolonial African agricultural systems*; Mats Widgren*

475 Mapping South American Agricultural History*; William I. Woods*

613 Antecedents of Amber Waves of Grain*; William E. Doolittle*

Session 1.6 **Towards an Environmental History of Rivers: Narratives and Concepts** **SPs14**

Chair: Verena Winiwarter

359 "The American Nile": Narrating Change on the Colorado River*; Donald Worster*

579 "A Mile Wide and an Inch Deep": Reflections on U.S.-Mexican Relations As Seen from the Rio Grande/Rio Bravo*; Mark Cioc*

670 Why write river biographies? Actors, institutions and historical narratives along the Rhine from a transboundary perspective, 1800 – 2000*; Christoph Bernhardt*

1121 Narratives about the river and the dam*; Eva Jakobsson*

Session 1.7 **The politics and science of climate: transcontinental perspectives** **SP112**

Chair: Marcus Hall *Commentator: Stefania Barca*

925 Debating the Great Hydraulic Transition: Changing Climates and Flooding in Nineteenth Century British India*; Rohan D'Souza*

927 Atmospheric Research and Colonial Control in Canada's North, 1830-1900.*; Liza Piper*

928 Colonial famine relief, development policies and climate: Towards an environmental history of Northern Ghana *; Holger Weiss and Jeff Grischow*

Session 1.8 **Rethinking the Landscape:Public Policies, Practical Technologies, and Social Idealizations in Comparative Perspective from Rural Landscapes in Latin America and the Iberian Peninsula** **SP113**

Chair: Sterling Evans *Commentator: Sterling Evans*

443 Coffee in the blue mountains. Landscapes, public policies and Green revolution in the coffee plantations of Costa Rica*; Wilson Picado*

467 Hydraulic policies and landscape alterations in the inland watersheds of atlantic spain (1900-2000) *; Cabana Iglesia and Lanero Taboas*

679 Landscape made weapons – the usage of landscape idealization in environmental conflicts*; Pedro Gabriel Silva and Lourenzo Fernandez-Prieto*

Session 1.9 **The Place of Animals in Environmental History** **SP114**

Chair: Michael Osborne

226 Contested Domains: the Cosmic Significance of the Soviet Space Dogs*; Amy Nelson*

289 Calling the Wild*; Harriet Ritvo*

358 Animals in the landscape in the seventeenth and eighteenth centuries*; Anita Guerrini*

947 The development of fishery in the Northern Adriatic Sea from the end of the 19th century to present*; Tomaso Fortibuoni*

Session 1.10 **Through the Eyes of 'Experts': Multifaceted Perceptions of the Arctic Environment** **202**

Chair: Graeme Wynn

936 Controversial perceptions of Arctic warming in the 1930s in the context of Soviet polar exploration and resource use*; Julia Lajus*

937 Northern Light: Ernest Thompson Seton (1860-1946), the Euro-Canadian Arctic, and Post-Darwinian Perceptions of Environment*; Suzanne Zeller*

938 Military Patronage and New Attitudes Towards the Arctic Environment After World War II*; Ronald E. Doel*

939 "Calm and Still as Death": Survival and the Lady Franklin Bay Arctic Expedition, 1881-1884*; Karen Routledge*

Session 1.11 **Urban politics and city planning in the postproductive era** **203**

Chair: Per Hillbur

372 Urban bay, urban politics: a history of the (failed) cleaning up of Guanabara Bay, Rio de Janeiro (1992-2005)*; Lise Sedrez*

373 "Her Majesty's Property": Environment, Regulation and Popular Use of Hamilton Harbour, 1846-1960*; Ken Cruikshank and Nancy B. Bouchier*

378 Nature and the Management of Space: Local and Global Connections to the Cuyahoga River Valley, Ohio, USA*; Gregory Wilson*

412 Transformation of an industrial harbour area to a sustainable housing district – the example of Western Harbur, Malmo, Sweden.*; Annika Kruuse*

Session 1.12 **New Approaches to Environmental History: Using Complex Systems Theories to Form Insightful Narratives** **102**

Chair: Mogens Rüdiger

717 Bringing the Canvasback Duck Back: An Ecological, Social, and Economical Restoration of a Prairie Pothole Watershed In Southwestern Minnesota, USA*; Stephen Thomforde*

803 Transportation, Economic Transformation, and Resource Use: A historical case study in Southern Wisconsin*; Peter Allen*

808 Hark! A Tale of New Narratives: Complexity, Post-Structuralsim, and the Space Between*; Marc Brakken*

Session 1.13 **The Oil Industry & Environmental Politics** **204**

Chair: Hans-Åke Persson

411 "Energy and Environmental Crossroads: Oil-led Activities and the Impact on South Louisiana's Wetlands"*; Jason Theriot*

251 "Explaining the Spill: Reactions of Exxon and the Bush White House to the Exxon Valdez Environmental Disaster"*; Tim Walker*

286 A Controversial Platform: The Politics of Fishermen and Environmentalists in the Rigs-to-Reefs Debate*; Dolly Jørgensen*

1116 Oil, Indians, the Natural Environment and Federal Indian Policy*; Donald Fixico*

15:00 - 15:30 **Coffee/tea break and ESEH 10th Anniversary Toast for all participants** **Lobby of Falconer Hotel**

The European Society for Environmental History Executive Board is pleased to invite all the delegates to a Toast that will be given to celebrate its tenth anniversary.

15:30 - 17:00 **Plenary poster session** **Audience Hall, Falconer Hotel**

Chair: Valery Forbes

863 Critical Habitat*; Jon Christensen*
799 Designer Weather: Irrigating the mid-20th Century U.S. West*; Kristine Harper*
999 Disease and Environment: Implications of Clonorchiasis Infection in Taiwan and Mainland China *; Ts'ui-jung Liu*
1024 Endeavouring to 'order' wild india during colonial times*; KAKOLI SINHARAY*
534 Environmental statistics in Georgia: historical view*; Nino Chikhladze*
845 Institutional dynamics governing forest resources in Babati district, Tanzania*; Babili H. Innocent*
204 Long-term socio-ecological research of a European watershed: Towards an environmental history of the Danube River Basin (ENVIRDANUBE)*; Martin Schmid*
405 Spatial and temporal reconstruction of fires and impact on Białowieża Primeval Forest – preliminary results*; Marcin Churski*
905 The Conflict of the Aluminium in the region of Marquesado del Zenete (Spain, 1989)*; Nadia Martinez*
646 The great rockslide on the Moenchsberg (City of Salzburg, Austria) in 1669 *; katrin hauer*
1082 The Political Manipulation of the Iraqi 'Marsh Arab' Narrative*; Tamara Mackenthun*
664 The Relationship between Human Being and Wild Animals in Chinese History*; Zhihong Cao*
959 The standard of living, consumption and the environment in Norway 1726-2006.*; Kjell Bjørn Minde*
1027 Towards an environmental typology of frontier violence, South Australia 1836-46*; Carol Fort*

European Science Foundation EUROCORES programme - Histories from the North - environments, movements, narratives (BOREAS); *Doubravka Olsakova*

European Science Foundation Forward Look "Responses to Environmental and Societal Challenges for our Unstable Earth" (a joint ESF-COST "Frontiers of Science" initiative); *Doubravka Olsakova*

17:00 - 18:30 **Roundtable: The Future of Publishing Environmental History** **Audience Hall, Falconer Hotel**

Moderator: Stefan Anderberg

Editors from four leading journals meet to discuss the future of publishing environmental history

Environmental history, *Marc Cioc*
Environment & History, *Georgina Endfield*
Global Environment, *Mauro Agnoletti*
Water History, *Johann Tempelhoff*

19:00 - 20:15 **Evening Ice breaker reception at Frederiksberg Town Hall** **100 meters south of Radisson SAS Falconer Hotel**

Wednesday, August 5th — Room

09:00 - 10:30 **Parallel Session 2**

Session 2.1 **Science and Nature on the Periphery: Africa and the Soviet Union in a comparative perspective** — **SPs03**

Chair: Julia Lajus

1011 Local responses to rinderpest in the Orange Free State republic, 1896-1897*; Phia Steyn*

1105 Naturalists of Zanzibar: Caleb Cooke and Robert Lambert Playfair in a 19th-Century Fish Tale*; Christian Jennings*

1108 Of Rocks and Reindeer: Making Sense of State-Socialist Modernization and the Environment*; Andy Bruno*

Session 2.2 **Hazards of Environmental Reforms: Forests and Modernity in Finland and Canada** — **SPs07**

Chair: Graeme Wynn *Commentator: Graeme Wynn*

736 Demand for Floating Channels and Roads – Finnish Forest Industry, the Infrastructure and the Environment, 1950–2000*; Jaana Laine*

740 Future in Fire? Anticipated Timber Famine and Heating Revolution in 19th Century Finland*; Timo Myllyntaus*

751 Mapping the Modern Urban Forest in 1960s Ottawa, Canada*; Joanna Dean*

Session 2.3 **Water: intellectual histories, research and policies: Examples from Japan, China, India and Ghana** — **205**

Chair: Ts'ui-jung Liu

1007 A transnational intellectual history of water culture in Japan*; Satoshi Murayama*

1008 Shifting perceptions. Water policies and environmental research in Northern Ghana.*; Irit Eguavoen*

1009 Environmental Cost of a Hydraulic Society: Revisiting the Damodar Valley Corporation*; ARABINDA SAMANTA*

1010 Water shortages as consequences of the past history*; Masayoshi Nakawo*

Session 2.4 **Environmental Histories of Militarized Landscapes in Britain, France and the United States** — **SPs08**

Chair: Dorothee Brantz

235 Environmental Discourses on British Military Training Estates: The SENTA Range and the Epynt*; Tim Cole*

246 From weapons to wildlife: the enigmantic nature of Rocky Flats, Colorado*; Peter Coates*

247 'Greening the MOD': A Case Study of Salisbury Plain*; Marianna Dudley*

252 Combat Ecologies: Environmental Histories of Militarism in Postwar France*; Chris Pearson*

Session 2.5 **Mapping Global Agricultural History 2** — **SPs12**

Chair: William I. Woods *Commentator: William E. Doolittle*

386 A comparative survey of intensive cultivation systems in non-state social contexts*; N. Thomas Håkansson*

483 Global agricultural systems in Eurasia 1000-1500 *; Janken Myrdal*

668 The introduction of cash crops and the plantation economy*; Ulf Jonsson*

Session 2.6 **Man's role in changing the face of a river. Large-scale modifications to river systems in pre-industrial societies and their social-ecological impact** — **SPs13**

Chair: Petra J.E.M. van Dam

233 From peat river to international trade route. The "birth" of the Western Scheldt estuary as seen from a social-ecological perspective (Belgium-The Netherlands, 12th-16th centuries) *; Tim Soens*

234 The Birth of an Unwanted River: Spaniards, Indios and the Zahuapan River of Colonial Tlaxcala, Mexico, 16-18th centuries*; Bradley Skopyk*

238 The Shifting Course of the Connecticut River in Early American Law and Culture*; Strother Roberts*

257 Storm Flooding, Economy and Environment: The Experience of the Tidal Thames 1250-1550*; James Galloway*

Session 2.7 **Climate Histories: New Sources, new approaches** **SPs14**
Chair: Christian Pfister

926 Connecting Arabic and European medieval documentary data for reconstructing climate *; Ruediger Glaser*
929 Taking Microclimate into Consideration. Comapring ships' logbooks and fort journals at Cape Coast Castle 1750-1800*; Stefan Norrgård*
964 Farmland and crops as providers of climate information in Belgium and the Netherlands during the 17th and 18th centuries*; Adriaan de Kraker*

Session 2.8 **From royal greed to national identity: The uses and abuses of Brazilian natural resources** **SP112**
Chair: José Augusto Pádua

918 Natural Monopolies [Brazilwood, Whales, and Diamonds]: The Unintended Conservationism of Royal Greed in Colonial Brazil*; Shawn Miller*
923 Caring about nature: the role of the FBCN in Brazilian conservation *; José Luiz Franco*
924 Hydro-businesses: Shaping Communities in the São Francisco River Basin of Brazil and the National Identity as an Agro-exporter Country.*; Lucigleide Nascimento*
931 Extrativism and legislation during the Empire – the Ilex forests in Southern Brazil *; José Paulo Eckert*

Session 2.9 **The State and the Evolution of Species: Lessons from Three Continents** **SP113**
Chair: Donald Worster

692 Getting to the Root of the Problem: The State University and the Plague of the Sap-Sucking Insect*; Kathleen Brosnan*
733 Blood Horses:Equine Breeding, Lineage and Purity in South Africa, c.1652 -1952*; Sandra Swart*
826 "When Elections Go to the Dogs: How Parliamentary Politics Drove Canine Evolution in England in the 19th Century" *; Edmund Russell*

Session 2.10 **At the intersection of community and industry: Case studies of Environmental Knowledges from Western Canada** **SP114**
Chair: Mark Stoll

323 Knowledge and Indigenous Health on a Canadian Reserve: A case study of the Mowachaht Muchalaht First Nation *; Paige Raibmon*
367 An Environmental History of Progress: Damming Canada's Peace and Columbia Rivers*; Tina Loo and Meg Stanley*
804 Mining Indigenous Canada: The Tahltan First Nation, Royal Dutch Shell, and Coal-Methane Gas Exploration in Northwestern British Columbia.*; Susan Roy*

Session 2.11 **State Perceptions of Fish and Fisheries: Three Centuries of Evolving Eco-cultural Relationships in France, Canada, and the United States** **202**
Chair: Bo Poulsen *Commentator: Liza Piper*

512 19th-century narratives about carp in Illinois: transformation of a species*; Glenn Sandiford*
522 "Fashioning a Freshwater Eden: Elite Anglers, Fish Culture and State Development of Quebec's 'Sport' Fishery"*; Darin Kinsey*
695 Duhamel du Monceau and the "Traité Général des Pêches": An Essential Source for the Study of Global Fisheries during the 18th Century.*; Levasseur Olivier*

Session 2.12 **Beyond Comparison: Tracing Environmental Networks and Connections Across Continents, Nations, and Times** **203**
Chair: Poul Holm *Commentator: Clapperton Mavhunga*

360 Fishy Populations: Maximum Sustainable Yield and the Demographic Paradigm in World Fisheries*; Dean Bavington*
361 History's Live Show: Human Civilization at the End of the Cheap Energy Era*; Dan Tamir*
368 On Mobility and Portability as Connectors of Times and Spaces*; Clapperton Mavhunga*

Session 2.13 **Under Darkened Skies: Mediterranean fascism and the environment** **204**
Chair: John McNeill *Commentator: Marco Armiero*

417 Green Rhetoric in Blackshirts: Italian Fascism and the environment *; Marco Armiero and Wilko Graf von Hardenberg*
583 The countryside betrayed? Fiction and reality of the agrarian discourse in early Francoist Spain*; Miguel Angel Del Arco*
831 The search for a blank canvas: the reclamation of the Agro Romano between ruralismo, corporatismo and (dis-)urbanesimo*; Aristotle Kallis*

Session 2.14 **Urban problems and rural connections** **102**
Chair: Lars Berggren

370 'Constructing Nature' – Urban recreation areas and the recreational use of nature in Malmö 1890-2008*; Per Eliasson*
385 Roots of the Green City: Reconsidering the 19th-Century Landscape Tradition in the United States*; Aaron Sachs*
413 Nineteenth Century Urban Live Food Markets: The Victorian Environment and Urban Development*; Robyn Metcalfe*

10:30 - 11:00 **Coffee/tea break** **Lobby of Falconer Hotel**

11:00 - 12:00 **Keynote lecture: Professor Poul Holm** **Audience Hall, Falconer Hotel**
Title: Sea Change. The Urgency of Oceans Past

Water covers seven-tenths of the planet but only recently have historians begun to study human interaction with the marine environment. We ask questions such as when and how did we choose to engage with the seas, what and how much did we extract? Did we impact ocean life, and in that process were we impacted ourselves? Examples will be drawn from the global History of Marine Animal Populations project. I shall argue that marine environmental history has come up with some answers to the questions and that this is a promising field for international and interdisciplinary collaboration.
The development of marine environmental history in no more than 10 years has been phenomenal. We now know the basic outline of the origins of commercial fisheries in Northern Europe, we have a good sense of developments in many regions around the globe during the last 500 years ranging from the Caribbean to the White Sea, from the American Pacific to New Zealand. However, the demands of the global fish market is accellerating the impact of human extractions from the oceans, especially in the deep seas and in tropical waters. The ultimate question upon us may therefore be how we as environmental historians engage with the needs of society?

12:00 - 13:30 **Lunch break** **Congress Lunch in Ground Floor Adjacent to Lobby of Falconer Hotel**

12:00 - 13:30 **SOLCHA business meeting** **203**

13:30 - 15:00 **Parallel Session 3**

Session 3.1 **Analyzing and planning urban environments: Parks, Sprawl and Climate** **SPs03**
Chair: Fredrik Björk

340 The Changing Mission of Urban Parks in the US*; stephanie pincetl*
988 A Neo Europe in the making – New Zealand's societal Metabolism 1840-2000*; Markus Gradwohl*
1073 Towards Climate Responsive Urban Groundwater Management Policy*; Hamza Gabriel*
1074 Shadow analysis: employing landscape- and planning history in order to curb sprawl*; Mattias Qvistrom*

Session 3.2 **Post-colonial India: Resources and their construction** **SPs07**
Chair: Ranjan Chakrabarti

1085 Environmental History is "His Story" – A Case Study from the Southern Western Ghats*; Shaju Thomas*
1086 Post-colonial Indian State and Indigenous Knowledge system in Arunachal Pradesh: A Case study of the Built Environment*; Jagdish Lal Dawar*
1087 Forest, community and hyderabad state: A study in environmental history*; Yallampalli Vaikuntham*
1088 Women, environment and the construction of past: Oral histories from rural Western India*; Shrikant Botre*

Session 3.3 **Using and abusing wild animals. Terrestrial and aquatic case studies** **SPs08**
Chair: Poul Holm

874 Cultural Behavior and Animals' Life: The Relationship between the Tribute and Asiatic Lions' Crisis (1400-1600)*; Lei Kang*
876 Wild Animals and Humans in Asia before 1900*; Peter Boomgaard*
1001 Estranged, Endangered, Extinct. Lessons from the Extinction of the Scandinavian Wolf*; Morten Tønnessen*
1002 GLobal Whaling Politics in the North Atlantic and South Pacific*; Karen Oslund*

Session 3.4 **War and Environment in New Zealand and the Pacific with particular attention to the Second World War'** **SPs12**

Chair: Richard Tucker *Commentator: Richard Tucker*

292 Contested Places: Weeds and 'Warfare' in the South Pacific*; Neil Clayton and Fiona Clayton*

293 'The Second world War and the Environmental History of the Pacific Islands-Tarawa: from an isolated atoll to a bargaining tool"*; Judith Bennett*

302 Nature's Counter Attack. War and New Zealand Environmental History*; Tom Brooking and Vaughan Wood*

Session 3.5 **Sustainable agricultural systems: historical soil fertility and farm management** **SPs13**

Chair: Verena Winiwarter *Commentator: Enric Tello*

562 Agroecosystems on the American Frontier: Material and Energy Systems and Sustainability*; Fridolin Krausmann and Geoff Cunfer*

577 Nutrient Balances and Magement of Soil Fertility in Andalusia, Spain (18th-20th*; Manuel Gonzalez De Molina , Gloria Guzman , Roberto Garcia , David Soto , Antonio Herrera , Juan Infante and Oscar González*

600 On the sustainability of the Mediterranean agro-ecosystems in Catalonia: land-use, fertilizing methods and nutrient balances from mid-19th century to the present*; Enric Tello , Ramon Garrabou , José Ramon Olarieta and Xavier Cussó*

Session 3.6 **Towards an Environmental History of Rivers: Early modern societies and riverine landscapes** **SPs14**

Chair: Dieter Schott *Commentator: Richard Hoffmann*

241 "The lands in question are not islands. They are simply shore-lands surrounded by water" Supporting claims to the shifting lands of the early-modern Rhône*; Pierre Claude Reynard*

262 What is a River in Merian's Eyes? Representation of society and riverine landscapes in early modern topographical literature*; Martin Knoll*

279 Rivers between Empires: Luigi Ferdinando Marsigli's 'Danubius Pannonico-Mysicus' as observation of a socio-natural site (the middle Danube river basin in the late 17th cent.)*; Martin Schmid*

Session 3.7 **Interpreting the past to anticipate the future: The contribution of environmental history to the climate change debate in Africa** **102**

Chair: Libby Robin *Commentator: Phia Steyn*

645 The future is not what it used to be: reconciling historical narratives of African environments with climate change projections*; Timm Hoffman*

648 Historical climate change in southern Africa as inferred from the population dynamics of Aloe dichotoma, a long-lived desert succulent tree*; Sam Jack , Timm Hoffman and Rick Rohde*

656 Climate change, cattle, war, pestilence and famine: Reading Central Namibian landscapes through repeat photographs from the Palgrave expedition of 1876*; Rick Rohde*

Session 3.8 **Waters, forests, development: Colonial and Postcolonial histories on three continents** **202**

Chair: Valery Forbes

915 Forests, Fields and Pasture: Environmental and Revenue Debates of land usage in Colonial Assam*; Suryasikha Pathak*

916 Developing International Development: DDT and U.S. Environmental and Social Engineering in the Rapti Valley of Nepal, 1952-1965*; Thomas Robertson*

1034 Environmental History of Watercourse Pollution: Kenya*; Ezekiel Nyangeri Nyanchaga*

1035 Water management in the Bahurutshe heartland in the context of shifting hydropolitical objectives in South Africa since the 1970s*; Jacobus Adriaan Du Pisani*

Session 3.9 **Justifying industrialization: hygienism between political economy and orientalism (XVIIIth-XIXth centuries)** **203**

Chair: Christoph Bernhardt

390 French hygienic discourse and orientalism: the making of a safe industrial society in a barbarous and miasmatic world (1800-1850). *; Jean-Baptiste Fressoz*

433 An environmentally-friendly industry? Environmental thinking in the utopians communities (1830-1848)*; François Jarrige*

492 Justifying industrial nuisances, Paris, 1770-1830.*; Thomas Le Roux*

Session 3.10	**Coming back to the Annals school** *Chair: Gregory Quenet Commentator: Franz Mauelshagen*	**204**
464	Historical geography at stake*; Brice Gruet*	
530	The (Non)-Reception of the American Environmental History by French Historians and Social Scientists in the 1970's and the 1980's: hypothesis for an explanation*; Nathalie Jas*	
589	Environment and History beyond the looking-glass of the Annales*; Alice Ingold*	
15:00 - 15:30	**Coffee/tea break**	**Lobby of Falconer Hotel**
15:30 - 18:30	**ICEHO Member meetings**	
15:30 - 16:30	**- IUFRO Business meeting**	**202**
16:30 - 18:00	**- ASAEH Business meeting**	**203**
17:30 - 18:30	**- ESEH Current board meeting**	**204**
Evening	**Optional social event**	

Thursday, August 6th — Room

Parallel Session 4

Session 4.1 **Revisiting Alfred Crosby's Ecological Imperialism from the Antipodes** — **102**

Chair: Jane Carruthers

208 Plants, mobilities, landscapes: reassessing environmental histories of botanical exchange*; Eric Pawson*

211 Reconsidering Ecological Imperialism in New Zealand: Luxury Plants and the Case of Asia, 1850-1920*; James Beattie*

212 Taxonomic Imperialism: The (Latest) Battle for Acacia*; Libby Robin*

Session 4.2 **Tropical forests: social uses and Environmental History in Brazil** — **202**

Chair: José Augusto Pádua

920 Atlantic Coastal Forest: a space where culture and ecology blend – a case study of a secondary urban forest, Rio de Janeiro (Brazil)*; Alexandro Solórzano*

921 History of landscape and landscapes without history: brazilian atlantic coastal forest*; Rogerio Oliveira*

922 The history of Araucaria Forests in southern Brazil *; Alessandra Carvalho*

Session 4.3 **Water management and the co-evolution of technologies, institutions and mentalities** — **Sps03**

Chair: Michiel Korthals

493 The co-evolution of technologies, institutions and mentalities, and the challenge of sustainable development*; Jozef Keulartz*

495 Towards reflexive and sustainable land and water management in Iran*; Mohammad Reza Balali*

499 Irrigation development trajectory in Nepal and evolution of technology and institutions *; Krishna Prasad*

686 Relations between hydraulics and social use in an irrigation field in Arequipa, Perú*; Eljakim Koopman*

Session 4.4 **World War II and the Cold War in the US, Britain, and Czechoslovakia** — **Sps07**

Chair: Edmund Russell *Commentator: Chris Pearson*

712 Recycling, Lend-Lease, and Public Opinion in Britain during the Second World War*; Peter Thorsheim*

719 "When you ride alone you ride with Hitler": Carpooling and Public Transit in Detroit during the Second World War*; Sarah Frohardt-Lane*

825 The Cold War Landscape*; Robin Rašín , Pavel Chromy and Josef Dufek*

Session 4.5 **Historical and Geographical approaches to Land-Use and Agriculture in Central Europe** — **Sps08**

Chair: Stefan Anderberg

984 Austro-Franciscean-Cadastre 1817-1861 - A unique source for environmental history in Central Europe*; Kurt Scharr*

989 Historical and Geographical Peculiarities of Agricultural Development of Forest Zone within East European Plain*; Olga Trapeznikova*

991 From capitalism to socialism and back again: a case study of Czech agriculture since 1918*; Petra Kuskova and Jan Kabrda*

Session 4.6 **Towards an Environmental History of Rivers: Cities and Rivers - Interfaces of Nature and Culture** — **Sps12**

Chair: Martin Knoll

242 The changing relationships between paris and the seine : A metabolic perspective, 1790-1970*; Sabine Barles*

301 Bridges and Ports: Interfaces in city-river relations*; Dieter Schott*

344 The Neva River in the Identity, Economy and Culture of "the Northern Capital" of Russia*; Alexey Kraykovskiy*

Session 4.7 **Grape and grain: tithes, harvest dates, prices – and late medieval-early modern climate** **Sps13**

Chair: Christian Rohr

867 Climatic variations in the Low Countries during the fifteenth century and their impact on economy and society*; Chantal Camenisch*

868 Analysis of late spring-summer temperatures of early modern Western Hungary based on vine and grain tithes and harvest dates *; Andrea Kiss*

869 Swedish grain tithes as a source for climatic reconstructions: 1540-1680*; Lotta Leijonhufvud*

870 The beginning of the grain harvest as a proxy for early summer temperatures, Norfolk c. 1270 AD - 1430 AD*; Kathleen Pribyl*

Session 4.8 **Water Management and Land-Use: An Interdisciplinary Study in Historical Ecology of an Agricultural Landscape in Southern Burgundy from the Middle Ages through the Present Day.** **205**

Chair: Scott Madry *Commentator: Carole Crumley*

625 Environmental risks and cultural knowledge in Burgundian agriculture*; Seth Murray and Carole Crumley*

795 Historic Ponds in Rural Southern Burgundy: Water management from the Medieval Period through the Present Day*; Elizabeth Jones , Scott Madry and Dennis McDaniel*

807 A Multi-Proxy Reconstruction of Environmental and Land Use Changes from Medieval Aged Reservoir and Mill Pond Sediments, Southern Burgundy*; Tamara Misner , Marie-Jose Gaillard-Lemdahl , Michael Rosenmeier and Eric Straffin*

Session 4.9 **In theft and law, life and death: animals in medieval Europe** **204**

Chair: Richard Hoffmann

881 De mortibus animalium: livestock pestilence in Carolingian Europe, c. 750-950 CE*; Tim Newfield*

882 Pig Husbandry in Late-Medieval England (1250-1400)*; Philip Slavin*

883 The Fish of the Sea in Late Medieval law*; Tim Sistrunk*

884 Hunting birds to eat in Italy, thirteenth to sixteenth centuries.*; Cristina Arrigoni Martelli*

Session 4.10 **In their own image? Comparative Perspectives on the perception of landscape and the environment** **Sps14**

Chair: Ranjan Chakrabarti

1051 Hydraulic utopias. Overall plan projects for french rivers development in the nineteenth century.*; Jean-Paul Haghe*

1052 "The Maximum of Wilderness": American Naturalists & the Image of the Jungle, 1880-1960*; Kelly Enright*

1053 Archival Currents: Rivers, Representation, and Landscapes*; Matt Dyce*

1054 Europeans 'Picturesque' Gaze: Landscape, Climate and Vegetations of the Himalayas: 1800-1900*; Mohammed Sohrabuddin*

Session 4.11 **Of coasts and harbours: Transcontinental perspectives** **Sp112**

Chair: René Taudal Poulsen

1020 Walking on Water: The Establishment of the Toronto Harbour Commissioners and the Production of Toronto's Port Industrial District, 1900-1912*; Gene Desfor*

1021 From Ecotone to Edge: The Changing Nature of a Coastal Environment*; John Gillis*

1022 The History of Taiwan's Fishing Ports and the Imagination of the Sea along the Number 2 Road of Taiwan*; Tsuo-Ming Hsu*

1023 Towards an ecohistory of the Firth of Forth*; Chris Smout*

Session 4.12 **Environmental conflict and anvironmental change: Methods and concepts** **Sp113**

Chair: Ken Cruikshank

960 "Global Climate Change and the Past, Present, and Future of Wetland Protection in California's Great Central Valley"*; Philip Garone*

1003 Economic Growth as a Cause of Environmental Change*; Sven Gaunitz*

1006 Environmental conflicts, collective goods and common welfare: Exploring links between environmental history and the social sciences*; Ute Hasenoehrl*

Session 4.13 **States of Nature: Venice, Russia, and Germany, 1700-2000** **Sp114**

Chair: John McNeill *Commentator: John McNeill*

188 German Scientists on the Russian Steppes: The Russian Academy of Sciences Expeditions of the late 18th Century*; David Moon*

793 Metropolitan Problems and the Rural Environment in Seventeenth-Century Venice: Iseppo Paolini's map of the Piave River*; Karl Appuhn*

797 Remaking the "Calabria of the North": Development, Pollution, and Environmental Politics in the Lower Elbe Region*; Frank Zelko*

Session 4.14 **Owning nature: Property rights and the environment – Urban** **203**

Chair: Finn Arne Jørgensen

351 Private Uses of Public Spaces: Los Angeles Beaches in the 1920s*; Sarah Elkind*

478 Condominium: The Rise of Property in the City*; Douglas Harris*

586 A Right to Clean Air? Property, Coal Smoke, and Nuisance Law in early modern London*; William Cavert*

10:30 - 11:00 **Coffee/tea break** **Lobby of Falconer Hotel**

11:00 - 12:00 **Keynote lecture: Science Journalist Anja Philip, M.Sc** **Audience Hall, Falconer Hotel**
Title: Communicating science - how to reach a public audience

Anja Philip, originally a cell biologist from the University of Copenhagen was involved in the establishment of the first outreach centre for science in Denmark - the Experimentarium heading a team of explainers and in charge of developing special exhibitions and communication workshops on scientific subjects. After 12 years at the Experimentarium she was asked to start a prime time science program for the national television broadcasting corporation, where for 7.5 years she was anchoring the 30 minutes science program every week meeting thousands of scientists and getting their message through to a wider audience. Today she is head of a team in the cancer society working to prevent skin cancer.

12:00 - 13:30 **Lunch break** **Congress Lunch in Ground Floor Adjacent to Lobby of Falconer Hotel**

12:00 - 13:30 **IWHA Business meeting** **202**

13:30 - 15:00 **Parallel Session 5**

Session 5.1 **Antarctica: A Continent for Environmental History** **203**

Chair: Adrian Howkins

609 All the Empire's Whales: Scientists, Bureaucrats, and the Construction of an Antarctic Marine Environment, 1913-1939*; Peder Roberts*

650 "Weather Central": Antarctic Science, Globalism, and Climate *; Kathryn Yusoff and Simon Naylor*

709 Creating a "continent for science": environmental history and the origins of the 1959 Antarctic Treaty*; Adrian Howkins*

Session 5.2 **Forests and Civilization** **102**

Chair: John McNeill

458 Ancient Deforestation Revisited*; J. Donald Hughes*

484 Forests and Warfare: The State of Research*; Richard Tucker*

506 Wood and Civilization*; Mauro Agnoletti*

1061 Slavery and deforestation: Brazilian perceptions during the eighteenth and nineteenth centuries*; José Augusto Pádua*

Session 5.3 **Sustainable consumption** **202**

Chair: Fredrik Björk

1043 Sustainability and Swedish Household Consumption since the 1950s: *; Kristina Söderholm*

1044 Cars, Consumer Psychology, and the Environment*; Tom McCarthy*

1045 Environment, consumption and citizens' responsibility since 1970*; Hilde Ibsen*

Session 5.4 **War minerals and chemicals: Aluminum, asbestos and agent orange in the environmental history of the 20th Century** **204**

Chair: To be announced *Commentator: Judith Bennett*

312 Aluminum, commodity chains and the environmental history of the Second World War*; Matthew Evenden*

313 Allies Burning for a Hinterland: Asbestos and the Second World War*; Jessica van Horssen*

942 Contested Knowledge: Science, the Body, and the State in Agent Orange Exposure Cases*; Ed Martini*

Session 5.5 **Ecological Imperialism Redefined: Agricultural Landscape Transformations in Response to Distant Markets** **Sps03**

Chair: Mats Widgren

537 Imperialism and agricultural intensification in the Andes: A long-term perspective*; Alf Hornborg and Ragnheidur Bogadottir*

606 Landscape change, social change: Market-driven dynamics and glocalized landscapes in pre- to post-colonial Sri Lanka*; Mats Mogren*

754 Ecologically unequal exchange, landesque capital, and landscape transformations: On the historical-political ecology of Kinmen Island and Orchid Island *; Eric Clark and Huei-Min Tsai*

Session 5.6 **Towards an Environmental History of rivers: Riverine landscapes as socio-ecological systems in transition** **Sps07**

Chair: Martin Schmid

258 Historical dimension of timber driving and floating in the German lowlands and the potential impacts on fish assemblages*; Christian Wolter*

263 The transfer of hydropower production from local to supra-regional scale: A case study from the Möll River in the 19th and 20th century*; Gertrud Haidvogl and Sabine Preis*

460 From commercial integration to marginalisation: Rivers in the Upper Austrian Eisenwurzen region, 1850-2000*; Simone Gingrich*

511 What can we learn from the historical co-evolution of human activities, rivers and fish communities in the last two centuries? Examples from French river basin*; Didier Pont , Jerome Belliard and Georges Carrel*

Session 5.7 **Cholera, Environment and Public Health** **Sps12**

Chair: Liza Piper

1058 Africa and the seventh cholera pandemic, 1971-2006: The dangers of a new pathogenic strain*; Myron Echenberg*

1059 Environment and Health in West Ham, 1895-1910*; Jim Clifford*

1060 Filthy Cities, Filthy Swamps: Cholera and the Transformation of Toronto's Waterfront in the Late Nineteenth Century*; Paul Jackson*

Session 5.8 **European agrarian and silvicultural landscapes from 18th-20th century: Denmark, Switzerland and Italy in comparative perspective** **Sp112**

Chair: Per Eliasson

1055 For a sustainable development: the rice growing in Lombardy and Northern Italy between public health and private interest (XVII-XVIII centuries).*; Matteo Di Tullio*

1056 Landscape Consequences of Agrarian Modernisation: The Example of Limpach in the Swiss Lowlands (1750-2000) *; Matthias Bürgi and Daniel Salzmann*

1057 Silviculture in Denmark during 1700-2000: the influence of social context, legislation and forest policy strategies on silvicultural practices*; Helle Serup and Jens Peter Skovsgaard*

Session 5.9 **Animals in environmental history** **Sp114**

Chair: Harriet Ritvo

248 The impact of cultural values on marine environment conservation *; Anne Husum Marboe , Poul Holm and Peter Calow*

303 Red coats and wild birds: military culture and ornithology across the nineteenth century*; Kirsten Greer , Laura Cameron and Joan Schwartz*

878 Our Friends in Nature – natural born friends and enemies of late 19th century Danish agriculture*; Anne Katrine Gjerløff*

Session 5.10 **Bio-invaders between the Old and the New World** **Sp113**

Chair: Michael Harbsmeier

291 Between a Rock and a Hard Place: Attitudes Towards 'Exotic' Species in Early Modern Europe*; Alix Cooper*

490 Changing paradigms – attitudes towards bio-invasion in Germany 1858 – 1945*; Iris Borowy*

514 Anekeitaxonomy: Botany, Place and Belonging*; Matthew Chew*

Session 5.11 **Environmental history of pollution and protection of seas and oceans** **Sps08**

Chair: Sarah Elkind

442 Guardians of the Atlantic: Ocean Pollution and NATO Environmentalism in the Cold War*; Jacob Hamblin*

559 Pollution of the Baltic Sea by Toxic Substances*; Tuomas Räsänen*

671 Interdisciplinary sources and methods to examine environmental history of seas and oceans *; Simo Laakkonen*

Session 5.12 **Employing Environmental History for Socio-Ecological Research I** **Sps13**

Chair: Christopher Boone

364 Losing Resilience in the Fight Against Floods in New Orleans*; Craig Colten*

450 South Phoenix: White Privilege and Path Dependence in the Making of a Contaminated Community*; Bob Bolin*

545 Everglades Environmental History: Integrating ecological and historical approaches*; Laura Ogden and Daniel Childers*

682 Growth Trajectories-A Study of the Phoenix Region*; Abigail York*

15:00 - 15:30 **Coffee/tea break** **Lobby of Falconer Hotel**

15:10 - 15:30 **Book Launch: Nature's End - meet editors Paul Warde & Sverker Sörlin** **103-5**

15:30 - 17:00 **Plenary poster session** **Audience Hall, Falconer Hotel**

Chair: René Taudal Poulsen

1030 Beer and Hops in late medieval and early modern Denmark*; Stefan Pajung*

1083 Changing With the Tide: Two Centuries of Water Diversion, Landscape Change, and Environmental Activism in California*; Rina Faletti*

1117 Civilising people and parks: Recreation and resistance in green urban areas*; Ebba Lisberg Jensen*

1120 Ecological-based water resource planning and management since 1974*; Henning Schroll*

998 Food & architecture: methodological insights from the study of food paths in New France with reference to Montreal (1663-1760)*; Leila Marie Farah*

890 Foresting a Grassland: Consequences of Planting Alien Trees in Lesotho*; Taelo Letsela*

891 Foresting a grassland: Exploring layers of meanings, perceptions and tensions between state institutions and community-based styles of tree management and use*; Tumelo Tsikoane*

889 Foresting a grassland: History and Policy Implications of Tree Planting in Lesotho, Southern Africa*; Kate B. Showers*

533 How extreme where the Floods of River Rhine in the pre-instrumental Period? A novel interdisciplinary approach for reconstructing and quantifying pre-instrumental floods.*; Oliver Wetter*

569 Interactive effect of fisheries and forestry on Atlantic salmon population abundance in the Russian North in the end of the 19th – beginning of the 20th cc.*; Yaroslava Alekseeva*

735 Interdsiciplinary research on landscape memory*; Jana Krcmarova*

1033 Landscape Transformations: Long-term Changes in the Woody Species Planted in Central Park, New York City and Fairmount Park, Philadelphia*; Robert Loeb*

1119 The 1990 peace dividend – a counterfactual hypothesis*; Rolf Czeskleba-Dupont*

1029 The Human Face of Sustainable Development:Lessons from West Medinipur,India.*; Abhijit Guha*

900 The Lucky Mc Uranium Mine: Visualizing an environmental badland in Wyoming.*; Robert Reynolds*

963 What We Talk About When We Talk About Salmon and Global Warming: The Shifting Narrative of Salmon Restoration and Preservation in the U.S. Pacific Northwest*; Jeff Crane*

17:00 - 18:30 **ESEH Ordinary General Assembly**

18:30 - 20:30 **Reception for the journals Environmental History and Water History (by invitation)**

Environmental History, published by the American Society for Environmental History and the Forest History Society, is the leading international journal for scholars, scientists, and practitioners who are interested in the rapidly growing field. Published in some form since 1957 it is the oldest and longest running journal in environmental history. It is dedicated to exploring the history of human interaction with the natural world. This reception will highlight the special issue on Canadian environmental history published with support from the Network in Canadian History & Environment.

Water History aims to encourage, promote, and foster historical understanding of the relationship between water and humankind. Published by Springer-Verlag with the International Water History Association, this reception will help launch this newest scholarly edition to the field of environmental history.

Co-sponsored by ASEH, FHS, NiCHE, IWHA and Springer-Verlag.

Friday, August 7th — Room

09:00 - 10:30 **Parallel Session 6**

Session 6.1 **Evolving food systems and environmental relations in the context of globalization and urbanization. Perspectives from early modern times to the present** — **102**

Chair: Bo Poulsen

377 Consuming Belize: Rural Belizean Environments, Modern Identities and Global Consumption*; Melissa Johnson*

494 Consuming the Environment in the Early Modern Caribbean*; Laura Hollsten*

602 Preserving Nature's Gifts: Gender, Sugar and Modernity in Sweden 1900-1940*; Fredrik Björk*

Session 6.2 **Reappraising Deforestation and Forest Conservation in 19th and 20th century New Zealand** — **Sps14**

Chair: Tom Brooking *Commentator: Tom Brooking*

260 'The Axe and the Lucifer Match': From Forest to Farm on Otago Peninsula*; Jonathan West*

274 Discourses of Deforestation in New Zealand 1920s to 1990s*; Michael Roche*

414 'Struggling to understand and protect New Zealand forests, 1868-1900'*; Graeme Wynn*

Session 6.3 **City Waters: Environmental Perspectives on the Urban Water Cycle in the Twentieth Century** — **Sp113**

Chair: Martin Melosi *Commentator: Martin Melosi*

973 Watering the Mega-City: Energy and Environment in Los Angeles, Mexico City, and Sao Paulo*; Harold Platt*

975 Flows of capital and flows of water through the industrialists: water supply in the city of Sabadell, Barcelona (1949-1966)*; Hug March Corbella*

976 Lessons from the Superpipe: water infrastructures and consumption dynamics in modern Puerto Rico*; Alejandro Torres-Abreu*

Session 6.4 **Intercontinental perspectives on urban environmental developments 19th-20th** — **202**

Chair: Maibritt Bager

1076 Environmental Impact of Industrialization and Urban Growth in Puerto Rico since the 1950s*; Carmen Concepcion*

1077 Urban infrastructure and environment in question: the different paradigms concerning sanitation that oriented the historical evolution of urban water management in Brazilian cities*; Ana Britto*

1078 Mediating Nature and Commerce on Toronto's Waterfront, 1833-1912*; Michael Moir*

1079 From Air Fields to Green Fields: Reclaiming Airports for Urban Ecology in Toronto and Berlin*; Sonja Duempelmann*

Session 6.5 **Organic Farming as Movement and Practice: The cases of Sweden, Australia and the United Kingdom** — **Sps03**

Chair: Stefan Anderberg

907 From Corporate Threat to Brand Value. The re-framing of organic milk in the Swedish dairy industry 1988-1995.*; Oskar Broberg*

908 Health, Environment and Australian Organic Farming*; Rebecca Jones*

909 The international aspirations of the British organic food and farming movement*; Erin Gill*

Session 6.6 **Rivers, Deltas Estuaries: Dealing with amphibian landscapes** — **Sp112**

Chair: Guillaume Drillet

945 Environmental Claims Makers, Salt Marsh Diking, and the Risk of Sea Level Rise in the St. Lawrence Estuary: A Real or Perceptual Threat?*; Matthew Hatvany*

1015 The delta of the Ebro: economic uses and changes in the ecosystems*; Fabregat Galcerà*

1016 Human Interaction and Changing River Environment; Examples from the Damodar River, India*; Kumkum Bhattacharyya*

Session 6.7 **Reconstruction of the European Climate in the Past Millennium Based on Documentary Data** **Sps07**

Chair: Rudolf Brázdil

319 Seasonal climate variability and famines in Medieval Europe (1200 to 1499)*; Christian Pfister*

326 European climate of the past millennium: potential of historical climatology for its understanding and reconstruction*; Rudolf Brázdil*

328 The 500-year reconstruction of European Climate derived from historical archives*; Petr Dobrovolny , Rudolf Brazdil , Christian Pfister , Ruediger Glaser , Aryan van Engelen , Danuta Limanowka and Andrea Kiss*

330 Using ships' logbooks to reconstruct past climates of oceanic regions: A case study for the north east atlantic (1685 to 1750)*; Dennis Wheeler*

Session 6.8 **Patterns of Resource Use in the Ottoman Empire in the 19th and early 20th Centuries** **Sp114**

Chair: Selcuk Dursun

734 Labor migrations and urban environment in Istanbul in the early 19th century*; Cengiz Kirli*

779 Population Displacements and Forest Resource Management in the Ottoman Empire*; Selcuk Dursun*

790 "Those Cattle Thieves": Immigrants, Land-Use and Violence in a Nineteenth Century Ottoman County*; M. Safa Saracoglu*

Session 6.9 **Plant, Animal and Human Disease in transcontinental perspective** **Sps08**

Chair: Anne Katrine Gjerløff

1037 The African Malaria Trials and the Global Eradication Campaign*; James Webb, Jr*

1038 An assembly of insects: The historical creation and circulation of an Anopheline collection at the Institut Pasteur in Paris*; Tamara Giles-Vernick*

1039 Raving Kats and Dogs : An Environmental History of Meerkat and Canine Rabies in Southern Africa*; Karen Brown*

Session 6.10 **Explorers, Scientists and Engineers and the Natural World: Panel 2** **Sps12**

Chair: David Moon *Commentator: April Summitt*

191 A Combination of Science and Economy: A. E Nordenskiold's Expeditions to the Siberian Rivers Obi and Yenisei in 1875 and 1876.*; Seija Niemi*

269 Producing the "River of National Unity": Nineteenth century visions of nature and culture in the São Francisco River Valley, Brazil"*; Renata Andrade-Downs*

1122 Perspectives from the Columbia River*; April Summitt*

Session 6.11 **The Development of Environmental Law in the Common-Law World** **Sps13**

Chair: Frank Uekoetter *Commentator: Frank Uekoetter*

228 Common Law, Civil Law and Precautionary Regulation: Lessons from the Alkali Act*; Noga Morag-Levine*

229 Pollution Law in Mandate Palestine*; David Schorr*

230 The National Environmental Policy Act before the U.S. Supreme Court: Behind the Curtains*; Richard Lazarus*

10:30 - 11:00 **Coffee/tea break** **Lobby of Falconer Hotel**

11:00 - 12:30 **Parallel Session 7**

Session 7.1 **Waste Histories since the end of the 19th Century: United States, Latin American and European Experiences** **102**

Chair: Geneviève Massard-Guilbaud *Commentator: Martin Melosi*

950 "Wasting" in the 1950s and 1960s: West German and French Cities in Comparison*; Heike Weber*

951 Constructing waste in a Latin American city: Bogotá at the turn of the XIX century*; Stefania Gallini*

952 Scrap and Refill: Antecedents to Irrational Municipal Recycling Policy in the Contemporary United States*; Samantha MacBride*

Session 7.8 **Territoriality and the Environment in Canada: Indigenous Case Studies** **Sp113**

Chair: Per Eliasson

298 "The Consequences of this promiscuous ownership": Island biogeography of a Mohawk reserve*; Daniel Rueck*

1093 Environmental Colonialism?: Environmental Protest and Logging in Clayoquot Sound, British Columbia*; Jonathan Clapperton*

1094 Indigeneity meets Industrialism: Contrasting and Colliding Views of a Canadian northern territory, 1870-1930*; Jean Manore*

Session 7.9 **Popular, cultural and scientific interpretations of the Russian landscape in the nineteenth and early twentieth centuries** **Sps07**

Chair: Julia Lajus

401 Scientific Debates on the Landscape Concept in the Stalinist USSR with some Comparisons to the UK*; Denis Shaw*

407 V.V. Dokuchaev and the emergence of landscape science in Russia*; Jonathan Oldfield*

550 The Experience of Landscape through a Coach Window: Guidebooks and National Identity in Russia during the First Half of the 19th Century*; Alexandra Bekasova*

750 Russian Nobility Provincial Estates of the 19th and early 20th centuries: *; Tatiana Liubina and Inna Leshchenko*

Session 7.10 **Perceiving Cities, Birds and the Scenery: Australia, the Netherlands and the Victorian Children's Press** **Sp112**

Chair: Jane Carruthers

1065 Environmental ideals and the contested productive spaces of Australian cities, 1890-1960*; Andrea Gaynor*

1066 Nine Ways of Seeing Nature in Early Sydney*; Grace Karskens*

1067 The Nature Scenery Act and the protection of nature in the Netherlands (1928- 1950)*; Wybren Verstegen*

Session 7.11 **Empire, Nation, and Environment: Sources and Methods for New Insights** **Sps14**

Chair: David Moon

446 Imag(en)ing Time Traveling Trees: Aerial Photography, GIS, Digitalization, and Re-Reading African Landscapes*; Emmanuel Kreike*

696 The Rhetoric of Water Law: Russian colonial experience and the problem of legal pluralism*; Ekaterina Pravilova*

705 Water, ecology and political economy in a colonial public work: the drainage of the Valley of Mexico in its rural environs, 1608-1900.*; Vera S Candiani*

Session 7.12 **Eminent Domain, Sustainability, and Resistance: Conflicting Claims to Forest, Mine, and Coast in Medieval Europe** **Sps08**

Chair: Richard Hoffmann *Commentator: Dolly Jørgensen*

437 Colonized Environments, Rural Resistance, and Moral Ecology in post-Conquest England and Late Medieval Orkney and Shetland*; Vicki Szabo*

513 The Roots of Eminent Domain in Natural Resources: Under and Over the Ground in Medieval France*; Richard Keyser*

570 Regalian rights in woods as a resource for mining in medieval Serbia*; Jelena Mrgic*

Session 7.13 **Marginalized Environments and Environmental Justice** **Sps12**

Chair: Maibritt Bager

1069 Toronto's Lower Don River Valley: A Social History of a Marginalized Environment*; Jennifer Bonnell*

1070 Access to Environmental Amenities in Baltimore, Maryland: Patterns and Processes, 1900 - 2000*; Geoffrey Buckley*

1071 Rushing to Market: Commodifcation, Marginality and the Place of the Stikine in the Klondike Gold Rush*; Jonathan Peyton*

1072 Environmental Justice: Process and Inequality*; Charles Lord*

12:30 - 14:00 **Lunch break** **Congress Lunch in Ground Floor Adjacent to Lobby of Falconer Hotel**

14:00 - 15:30 **Parallel Session 8**

Session 8.1 **Disposing of Cumulative Assumptions: Challenging Representations, Destabilizing Definitions and Tellling New Stories in the History of Waste in Europe and the US** **102**

Chair: Henry Nygård Commentator: Henry Nygård

864 Tidy but Dangerous. Disposal of household and industrial waste in Austria between 1950 and 1990 and what it can tell us about cleanliness*; Jakob Calice*

865 Cultures of waste and ideologies of materialism in state socialism*; Zsuzsa Gille*

866 Turning Waste into Treasure: the Practice and Ideology of Waste Utilization in Chinese Agricultural History *; Lihua Wang*

Session 8.2 **Perspectives on Forests in India** **203**

Chair: Paul Warde

969 Non- Timber Forest Products and Rural Livelihood An Empirical Study in the Districts of South West Bengal, India*; Jyotish Prakash Basu*

970 Livelihood, Sustenance and the Natural World in the Mountains: A Case Study of Darjeeling in the Eastern Himalayas*; Bijoy Kumar Sarkar*

972 Authority and Order in the Forest : Colonial India*; Ranjan Chakrabarti*

Session 8.3 **Water quality expertise form the mid-XVIIIth to 1914: local and scientific responses to a global challenge** **202**

Chair: Stephane Castonguay Commentator: Isabelle Parmentier

308 Biological and chemical research on water bodies in Berlin in the late 19th and early 20th century*; Karin Winklhoefer*

349 Water purity in France in the "Belle Epoque" : local solutions to a global-scale problem*; Stephane Frioux and Jean-François Malange*

383 Water quality assessment in France, mid 18th-mid 19 th century*; Patrick Fournier*

Session 8.4 **Environmental Risk and Insurance I: Medieval and Early Modern Approaches** **Sps03**

Chair: Franz Mauelshagen Commentator: Gregory Quenet

476 Managing environmental risks. Society and floods in the Upper Rhine Valley and Tuscany in the Renaissance (ca. 1270-1560)*; Gerrit Jasper Schenk*

622 Environmental History and the History of Early Insurances Against Natural Hazards (17th/18th century)*; Cornel Zwierlein*

662 Risk Management and Disaster Prevention in the Late Middle Ages. Facing floods in 13th to 16th century Central Europe*; Christian Rohr*

Session 8.5 **Salt of the Earth. Towards the environmental history of the salt production.** **204**

Chair: Harald Witthöft

466 Salt and landscape: towards the environmental history of the salt boiling industry of the Russian North.*; Margaret Dadykina and Alexey Kraykovskiy*

487 The environment and the labour conditions in the salt mines of Sol Ileckaya in the 18th c.*; Elena Shutikova*

Session 8.6 **Histories of Food and the Environment. Focus on Nutrients and energy** **Sps07**

Chair: Christian Pfister

954 Craving Energy: The Evolutionary Origins of Ecological Destruction*; Bartow Elmore and Andrew Meade McGee*

955 Anthropocene fishing, or what is the energy involved in herring fisheries past and present?*; Bo Poulsen*

956 Small is tasteful. Consumption patterns of eel in Northwestern Europe, 1300-1800*; Petra J.E.M. van Dam*

Session 8.7 **PhD roundtable** **Sps14**

Chair: Mogens Rüdiger

434 Beyond Colonialism: Towards a new environmental history in India *; M Arivalagan and A R Venkatachalapathy*

435 Relations between land use change and food consumption in the Philippines over the 20th century*; Thomas Kastner , Sanderine Nonhebel and Henri C. Moll*

782 The scientific knowledge and environmental NGOs: a historical approach*; Nina Kruglikova and Nigel Thrift*

Session 8.8 **Fuel, Fodder and Food: Meeting Life's Needs in Scotland, Faeroe, Iceland and Greenland c.850-c.1850** **Sp113**

Chair: Ian Rotherham *Commentator: William I. Woods*

660 Conflicting Needs, Adapting Demands: Fuel Supply, Improvement and Modernity in Scotland c.1750-c.1850.*; Richard Oram*

661 Sustaining historical grazing regimes in Scotland: common good versus common greed*; Alasdair Ross*

666 Rowing against the tide of environmental change? Norse home-field management across the North Atlantic region *; Paul Adderley*

Session 8.9 **Making Northern Nature: Hybrid Landscapes in Comparative Perspective** **Sps08**

Chair: Jocelyn Thorpe

398 Legal Landscapes: The Cultural Production of Nature in Canadian Law*; Jocelyn Thorpe*

432 Tales of Topographic Displacement*; Ari Lehtinen*

489 Rural landscaping and urban wilderness: On the making of Swedish 'nature' in the era of landscape management*; Katarina Saltzman*

604 Representations and recriminations of a landscape: An environmental history of the Oak Ridges Moraine, Toronto, Ontario, Canada*; L. Anders Sandberg*

Session 8.10 **Water, Grasslands, and NGOs: The Transformation of the Chinese Vision of Nature** **Sp112**

Chair: Susan Flader *Commentator: Susan Flader*

599 The Rise, Development, and Influence of the Environmental NGOs in China*; Xueqin Mei*

749 The Chinese and Mongolian Perception of Grasslands in the Late Qing Dynasty*; Guorong Gao*

813 The Pursuit of Harmony: The Dujiangyan Irrigation System and the Traditional Chinese Vision of Nature*; Shen Hou*

Session 8.11 **Source and Resources: Studies of Medieval Minds and Ecosystems** **Sp114**

Chair: Maurits Ertsen

885 Monastic responses to the theft of natural resources in medieval Germany*; Ellen Arnold*

887 Is shipbuilding to blame for? Issues for reconstructing local factors affecting the history of medieval Mediterranean forests*; Constantin Canavas*

Session 8.12 **Owning nature: Property rights and the environment – Rural** **Sps12**

Chair: Helle Serup

365 Property Rights and the English Royal Forests, 1649-1660*; Sara Morrison*

380 Making yourself at home in nature: The conflict between public access to land and leisure cabin ownership in Norway, 1850-2000*; Finn Arne Jørgensen*

615 Unsustainable Property Rights on Aboriginal Reserves on the Canadian Prairies, 1870 to 1910*; Tony Ward*

699 Maori intellectual property claims to indigenous flora and fauna in Aotearoa New Zealand: The living history of resistance and the WAI262 claim*; Stefanie Rixecker*

Session 8.13 **Environmental history and social justice: the case of Japan** **205**

Chair: Mika Merviö *Commentator: Kuninobu Kitao*

461 Japanese environmental history: narratives of sustainability*; Mika Merviö*

520 Environmental justice and ecological modernization in Japan – contrasting urban and rural communities*; Mutsuko Takahashi*

830 Environmental Social Justice Norms in Japan*; Miranda Schreurs*

Session 8.14 **The Transnationality of Environmental Desires: Locating Ecological Management Schemes in Local-Global Networks** **Sps13**

Chair: Liza Piper

587 Paradigms and Paradoxes of Abundance: The St. Lawrence River and the Great Lakes Region*; Lynne Heasley*

593 Conserving 'Native' Lands: Transnational Dialogues over Official Environmentalism in British Colonial Africa and the Native American Southwest*; Jacob Tropp*

726 Rewilding the Rio Grande: The Construction of the Bosque del Apache in the U.S.-Mexico Borderlands*; Marsha Weisiger*

879 History of Vicuña Management in the Peruvian Andes*; Keely Maxwell*

15:30 - 16:30 **Coffee/tea break** **Lobby of Falconer Hotel**

16:00 - 18:00	**ESEH Meeting of new board**	**203**
19:00	**Evening Banquet at Odd Fellow Palais**	

Saturday, August 8th, Malmoe

Room

7:00 **Check-in for the ferry to Malmö University. Departure at 7:15. Meeting place for check-in: Havnegade 39**

9:10 **Arrival in Port of Malmö next to conference venue: Orkanen Building.**

9:30 - 11:00 **Parallel Session 9**

Session 9.1 **Making Visible the Consequences of Nuclear War Preparations** — **Orkanen C: LUC231**
Chair: Hans-Åke Persson

896 The Nevada Test Site: Ongoing victimhood, complicity, and denial *; Dynette Reynolds*
897 First Nations and Nuclear Science History*; Linda Richards*
898 The Devil in Brokdorf. The West German Protestant Churches and the Protest against Nuclear Technology*; Michael Schuering*
901 The Canadian Nuclear Industry's Impact on Workers and the Environment*; Laurel MacDowell*

Session 9.2 **Knowing Germany's forests. The Role of Knowledge Systems for the Human-Nature-Interaction in Central Europe: 1750 to 1990.** — **Orkanen A: LUA227**
Chair: Franz-Josef Brüggemeier

213 From Damaged Vegetation to Dying Forests. The Creation of an Environmental Crisis out of Scientific Uncertainty, 1880 to 1970*; Martin Bemmann*
264 From Fuel Shortage to Sustainable Yield. Environmental Narratives, Social Conflict and the Evolution of Scientific Forestry in Germany 1750 to 1850*; Richard Hoelzl*
459 Searching for the Dying Forest. Forest Sciences and the Role of Experts in the German Waldsterben debate in the 1980s*; Roland Schäfer*
603 A Cultural Crisis. Negotiating Waldsterben in the political arena of West Germany in the 1980s.*; Birgit Metzger*

Session 9.3 **Single Paper Session** — **Orkanen A: LUA426**
Chair: Micah Muscolino

983 Spatial frameworks of land use and development: the environmental history of the Kanto Plain, Japan*; David S. Sprague*
1109 Taboo, Hunter Philosophy, and Land Ethics in Taiwanese Indigenous Fiction*; Chi-szu Chen*
1111 Distant powers and socio-environmental processes in mountain forests and logging towns - The case of Taipingshan, Taiwan*; Huei-Min Tsai*

Session 9.4 **Environmental Risk and Insurance II: Calculating Catastrophe in the Modern World** — **Orkanen C: LUC127**
Chair: Christian Rohr

400 Insuring Hail in Times of Global Change: Transformations of Hail Risk in 20th-Century Europe*; Franz Mauelshagen*
454 Nature's Casino? Flooding, Risk, and Insurance in European and American History*; Uwe Luebken*
488 Risk and Institutions: How natural hazards influenced the establishment of German crop insurance*; Frank Oberholzner*
565 Fire, Climate and the Fortunes of a Reinsurer, 1864-1906*; Eleonora Rohland*

Session 9.5 **To the Ends of the Earth: Extractive Capitalism and Environmental History in the World System** — **Orkanen D: LUD131**
Chair: Matthew Hatvany *Commentator: Alf Hornborg*

316 Unearthing rule: nature, colonial rule and the production of an extractive economy on the Zambian Copperbelt*; Tomas Frederiksen*
453 'The wildness is taken from the forest by the metalworks': The Political Ecology of Extraction in the Making of the Modern World-System, 1450-1800*; Jason W. Moore*
578 What drives the 'extractive frontier'? The City of London and the capitalisation of the mineral kingdom in the late 19th century *; Gavin Bridge*

Session 9.6 **Forests and Energy in northern and central Europe 1400-1850** — **Orkanen B: LUB423**
Chair: Ian Rotherham *Commentator: Richard W. Unger*

457 Woodland Exploitation in Central Europe 1400–1800: Changes vs. Stability*; Péter Szabó and Radim Hédl*
675 Holland's energy economy c. 1400-c. 1600*; Charles Cornelisse*
842 Wood and wood products in the English economy, c.1550-1750*; Paul Warde*

Session 9.7 **Environmental Movements between politics and activism: Examples from three continents** — **Orkanen C: LUC233**
Chair: Andrew Jamison

912 Ideology and the Environmental Movement in Canada: An Analysis of Pollution Probe, 1969-1979*; Ryan O'Connor*
913 The Rocky Road to A Red-Green Alliance*; Kunal Chattopadhyay*
914 War over Whales: Radical Environmentalist Organizations and Scientific Knowledge in Whaling Controversies*; Morten Haugdahl*

Session 9.8 **Indigeneous Peoples and the Environment** — **Orkanen E: LUE439**
Chair: To be announced

1047 Environment: A resource or a problem for the indigenous peoples movement?*; Jukka Nyyssönen*
1048 Globalization, Deforestation and the Disappeared Islanders: Historical perspective on today's challenges in Andaman and Nicobar Islands (An Indian Archipelago)*; Kavita Arora*
1049 "Sickness that Walks": Epidemiology, Indigenous Peoples, and the Ranching Frontier in Western North America.*; Jim Daschuk*
1050 Impact of environmental change on indigenous people in the nilgiris*; Nanditha Krishna*

Session 9.9 **The nature of a colony: Four perspectives on India** — **Orkanen D: LUD328**
Chair: Richard Tucker

731 Debating the local with reference to zoological natural history in British India*; John Mathew*
1089 Floods, local economy and the state in bengal c. 1770-1820*; Ujjayan Bhattacharya*
1090 Domesticating the hill stations of colonial India; prospects and predicaments*; Koushiki Das Gupta*
1091 A Sociological exploration of Energy Resources in Early Modern Rajasthan*; Mayank Kumar*

Session 9.10 **International Waterways and Management** — **Orkanen D: LUD222**
Chair: Kristian Gerner

532 Further and further away from Mother Nature. Industry, water pollution, and the Hungarian people in state-socialism. *; Viktor Pál and Petri Juuti*
560 Hydraulic engineering and landscape change : The example of the river "Schwarze Elster"*; Manuela Armenat*
1098 "'Paddle to the Sea': The United States and Canada Confront the Environmental Consequences of Incorporating the Great Lakes into a Worldwide Maritime Navigation System"*; Philip Scarpino*
1100 An inter-continental comparison between the environmental histories of two lake catchment sytems in montane environments of France and South West China. *; Darren Crook*

Session 9.11 **Appreciate and Appropriate: Toward a Transnational History of German and American Ecotourism and the Human Body** — **Orkanen E: LUE239**
Chair: Marcus Hall *Commentator: Marcus Hall*

521 Making Landscapes Consumable: Parkways in Germany and the United States, 1920-1970*; Thomas Zeller*
605 Consuming the Wild: German Nature Tourism and Myth of the Pristine in East Africa *; Thomas Lekan*
941 Losing our Sol? Elegies to the Sunlit Past in the Twentieth Century*; Christian Warren*

Session 9.12 **Environmental archaeology in France : acquisitions and perspectives** — **Orkanen F: LUF415**
Chair: Joëlle Burnouf *Commentator: Joëlle Burnouf*

620 Archaeogeography of planimetric dynamics in Western France (Vendée)*; Magali Watteaux*
624 Trees & Forests*; Anne Dietrich*

11:00 - 11:30 **Coffee/tea break** — **Orkanen: Ground floor**

11:30 - 13:00 **Parallel Session 10**

Session 10.1 **Toxic Chemicals, Food, and Transnational Concerns in the Post World War Two Era** — **Orkanen D: LUD131**
Chair: Joy Parr

357 Toxic legacies: the transnational mysteries of toxaphene contamination of Lake Superior.*; Nancy Langston*
563 "'We Know Too Much About Being Hungry and Not Very Much About This Mercury': Mercury, Fish, and Environmental Justice in Grassy Narrows (Canada), 1962-1974"*; Michael Egan*
567 Japan's Kamioka Mine: Engineering Human Pain in the Hybrid Environments of the Jinzū River Basin*; Brett L. Walker*
594 Radioactive Reindeer in Sweden and Russia*; Jenny Leigh Smith*

Session 10.2 **PhD roundtable: Colonial environmental histories** **Orkanen A: LUA227**
Chair: Maurits Ertsen

183 The Environmental History of the German settlement in the South of Brazil in the 19th century*; Juliana Bublitz and José Augusto Pádua*

273 Forest, Frontier and Wilderness: The making of Naga Environmental History (1870-1990)*; Debojyoti Das and David Mosse*

623 Knowledge, Power, and Matter: a Global Perspective on Colonial Forestry in German East Africa, 1885-1918*; Kreye Lars*

Session 10.3 **Single Paper Session** **Orkanen A: LUA426**
Chair: Guillaume Drillet

1112 Making sense of the 'Rabbit Acts': An exploration of the efficacy of historic law in controlling an environmental catastrophe*; Sue Hughes*

1113 Conceiving Fairways: Golf Course Development and Transforming Land Use in Northeastern North American in the 1920s*; Elizabeth Jewett*

1114 Science, politics and the discourse on historic responsibilities in climate negotiations*; Mathias Friman*

Session 10.4 **Back to the Future: Environmental Histories and Present-day Environmental Problems** **Orkanen C: LUC127**
Chair: Christopher Morris

992 Learning to Live with Water: Post-Katrina New Orleans and the Lessons of the Past*; Christopher Morris*

994 "Gone with the flow": Rebuilding a community after flooding in London, Canada*; Mathew Novak*

1063 Developmental Modernity: Governmental Reasons of Separating 'Man' and 'Nature' under Colonial Conditions*; Amruth M.*

Session 10.5 **National Parks on two continents** **Orkanen E: LUE323**
Chair: Ts'ui-jung Liu

965 Political Impacts on the Establishment of National Parks in Taiwan*; Hua-pi Tseng*

966 Taiwan's National Parks Development since World War II*; Chang-yi Chang*

967 The National Park Concept in Spain: Patriotism, Education, Romanticism and Tourism*; Jose Somoza Medina*

Session 10.6 **Many Paths towards One Goal: 1970's Energy Policy in Europe, Japan and the United States** **Orkanen B: LUB423**
Chair: Joseph Pratt *Commentator: Joseph Pratt*

236 The Fate of American Energy Conservation Policy*; Robert Lifset*

237 West European responses to the energy crisis in the 1970s*; Mogens Rüdiger*

240 "A Long-Range Vision": Changes in Japanese Energy Policy, 1973-1982*; Christopher Dietrich*

Session 10.7 **South American Environmental Histories: National and Transantional Linkages** **Orkanen C: LUC231**
Chair: Alf Hornborg

1101 Amazon Rainforest Environmental History*; Isabel Madaleno*

1102 Land cover change and living conditions in colombia*; Germán Márquez*

1103 "The First Green Revolution: How Chile and Peru Fertilized Global Agricultural Expansion, 1845-1930"*; Edward Melillo*

1104 Fashion Hats, Beautiful Birds, Natural Consequences: the Influence of the International Trade of Feathers in Colombia's Social and Natural Environment*; Camilo Quintero*

Session 10.8 **Karelia as an object of governmental good intentions towards natural and human environment in the retrospect** **Orkanen C: LUC233**
Chair: Irina Chernyakova

847 Was the governmental prohibition of slash-and-burn a reasonable solution for Northern Karelia in the end of nineteenth century?*; Oleg Chernyakov and Irina Chernyakova*

849 The development of fish resources in the economy of Early Modern Karelian society (limits and informative potentiality of written sources)*; Evgenia Suslova*

850 The industrial objects and transport system in Karelia in the beginning of eighteenth century: human activity and the local environment changing*; Alexey Sobisevich*

Session 10.9 **Science, utopia and landscape production : comparative perspectives on the materialization of environmental knowledge** **Orkanen D: LUD328**

Chair: Mark Stoll

310 Erasing Industrial Pasts to Manufacture Natural Settings: The decontamination and embellishment of rivers in Quebec since 1945 *; Stephane Castonguay*

315 Ecological engineering" at the Museum of Natural History: the administration of nature in the Aquitaine Region between 1966 and 1968*; Florian Charvolin*

317 The National Park of the Cévennes : from natural habitat to country, 1970-2004*; Blanc Guillaume*

318 From Timber Cutting To Precambrian Wonders : The Ecological Reinterpretation of La Mauricie National Park's Landscape History, 1969-1979*; Olivier Craig-Dupont*

Session 10.10 **Fertile Ground: Rooting Race and Gender in Environmental History** **Orkanen D: LUD222**

Chair: Christof Mauch

449 The Lives and Gardens of Three American Women: Constructing Race and Gender Identity in the Natural World*; Cindy Ott*

474 "Encountering the Isthmian Tropics: Race and Space during the Gold Rush Migration through Panama"*; Paul Sutter*

542 Heavenly Bodies: "Manned Space Flight" and the Women's Movement*; Neil Maher*

Session 10.11 **Destinations Known: Consuming Nature and History in North America** **Orkanen D: LUD337**

Chair: Bill Parenteau *Commentator: Bill Parenteau*

210 A Landscape . . . with Figures: Tourism and Environment on Prince Edward Island, Canada*; Edward MacDonald*

225 "The Very Atmosphere of the Place": History, Nature, and Audience at L'Anse Aux Meadows*; Claire Campbell*

1097 The Battle for the Fringe: Culture and Nature in an Interior Borderland*; Merle Massie*

Session 10.12 **European Studies as Environmental History: A Roundtable on Methods and Dilemmas** **Orkanen E: LUE439**

Chair: Geneviève Massard-Guilbaud

470 European Environmental Problems and their perceptions*; Franz-Josef Brüggemeier*

651 The Nation in "European" environmental history*; Marcus Hall*

655 Considering Europe Whole*; Douglas R. Weiner*

Session 10.13 **National and transnational networks shaping environmental policy** **Orkanen E: LUE239**

Chair: Martin Melosi

819 In the Steps of the North American Indians: Woodcraft Roots of Czech Environmentalism*; Petr Jehlicka*

980 The origins of EU environmental policy in the 1970s. How transnational networks shaped perceptions and advanced environmental action*; Jan-Henrik Meyer*

981 From Modernization to Europeanization: Rhetoric & Reality in Spanish 20th c. Environmental Policy*; Sarah Hamilton*

982 The Evolving Legal Framewortk for Global Water Governance*; Joseph Dellapenna*

13:00 - 14:00 **Lunch break** **Orkanen: Ground floor**

14:00 - 15:00 **Roundtable - Northern contributions to environmental history** **LUD 138**

Moderator: Eva Jakobsson
Contributions from: Timo Myllyntaus, Sverker Sörlin, Finn Arne Jørgensen and Nancy Langston

15:00 - 15:40 **Plenary closing session** **LUD 138**

Chair: Per Eliasson

Performances by the Malmö University Academic Choir

Addresses by:
Malmö city commissioner, Lari Pitkä Kangas
The local organizing committee, Bo Poulsen & Fredrik Björk
Chair of the program committee, Verena Winiwarter
Chair of the preparation committee, Steven Anderson

16:00 - Post-congress tour: Malmö - An Urban Environmental History Tour (advance registration compulsory)

Sunday, August 9th

Post-congress tours

Abstracts

183 **The Environmental History of the German settlement in the South of Brazil in the 19th century**

Juliana Bublitz, julibublitz@yahoo.com.br, Federal University of Rio de Janeiro (UFRJ)
and José Augusto Pádua, jpadua@terra.com.br, Professor of Federal University of Rio de Janeiro

Between 1824 and the beginning of the twentieth century, thousands of European immigrants crossed the Atlantic Ocean and settled down in colonies in the South of Brazil. That occupation process implicated deep ecological alterations in the regional ecosystems, mainly through an agriculture based on fires, indiscriminate hunt of wild animals and wood exploration.
These settler communities were created in the forest areas of the province of Rio Grande do Sul and were considered the source of the regional and economical development. The environmental impact of that process, however, was little explored by the regional historiography. In that way, in this study, I intend to analyze the German colonization in southern Brazil, through perspective of the environmental history.

188 **German Scientists on the Russian Steppes: The Russian Academy of Sciences Expeditions of the late 18th Century**

David Moon, david.moon@dur.ac.uk, Durham University

In the late 1760s the Russian Academy of Sciences organised scientific expeditions to the steppes. The main scientists were Germans: Gmelin, Gueldenstaedt and Pallas. They were charged with finding and describing natural resources that could be exploited for the benefit of the Russian state and its population. They drew on contemporary European ideas and described the plants and animals, the land, and the population and its economic, social and cultural life that they encountered. All three waxed lyrically about the fertile black earth and the enormous potential for agriculture, especially grain farming, on the steppes. In subsequent decades, the Russian state promoted agriculture on the steppes. The expeditions also laid the foundations for 'modern' scientific research on the steppes, in particular, a century later, Vasilii Dokuchaev's pioneering work on soil science and steppe ecology.

Samuel Georg Gmelin, Puteshestvie po Rossii dlya issledovaniya trekh tsarstv estestva, 2 parts (Spb.: Imperatorskaya Akademiya Nauk, 1771-7)

Johann Anton Gueldenstaedt, Reisen durch Russland und im Caucasischen Gebuerge, 2 vols (Spb., 1787-91)

Peter Simon Pallas, Travels through the Southern Provinces of the Russian Empire, in the years 1793 and 1794, 2 vols (London: Longman, 1802)

David Moon, 'The Environmental History of the Russian Steppes: Vasilii Dokuchaev and the Harvest Failure of 1891', Transactions of the Royal Historical Society, 6th series, 15 (2005), pp.149-74

191 **A Combination of Science and Economy: A. E Nordenskiold's Expeditions to the Siberian Rivers Obi and Yenisei in 1875 and 1876.**

Seija Niemi, seasni@utu.fi, School of History

Adolf Erik Nordenskiold (1832-1901), a Finnish/Swedish scientist and explorer made totally ten scientific expeditions to the Arctic regions. Best known is his sailing through the North-Eastern Passage 1878-79. As preparations for this expedition he made two voyages to the Siberian rivers Obi and Yenisei in 1875 and 1876. His main financiers were Alexandr Sibiriakoff, a Siberian merchant from Irkutsk and Oscar Dickson, a Swedish wholesaler from Gothenburg. Their goal was to exploit the economic potentials of Siberia; Nordenskiöld had counted the area of Obi-Irtysh Rivers' to be 3,445 million sq. km, Yenisei's 2,712 sq. km, and Lena's 2,395 sq. km. The area covers more than the half of the whole Russia. In 1876, parallel with the Arctic expedition, Nordenskiold sent five Swedish and Finnish scientists to the Yenisei to investigate the possibilities of transporting grain from the upper reaches of the river to Europe via the Arctic Ocean. They made also fertility surveys on the soil and examined the navigability of the river. I will discuss if and how Nordenskiold was able to combine the scientific and economic goals and how he used his environmental literacy in this quest. Environmental literacy is an organized way to think about environment relating to knowledge, understanding, attitudes and active involvement. It requires the ability to think beyond the conventional categories and, in changing conditions, is a continuing process.

Hares, Minna, Anu Eskonheimo, Timo Myllyntaus & Olavi Luukkanen: Environmental literacy in interpreting endangered sustainability. Case studies from Thailand and the Sudan. Geoforum Volume 37, Issue 1/2006, 128-144.

Nordenskiöld, A. E., Resplan för en expedition till Jenisej år 1876. Utrustad af Herrar Oscar Dickson och Alexander Sibiriakoff. Stockholm 1876.

Nordenskiöld, A. E., Redogörelse för en expedition till mynningen af Jenisej och Sibirien år 1875. Bidrag till K. Svenska Vet. Akad. Handlingar, Band 4 N:o 1, F. A. Nordstedt & Söner, Stockholm 1877.

Orr, David W., Ecological Literacy. Education and the Transition to a Postmodern World. State University of New York Press, Albany 1992.

204 **Long-term socio-ecological research of a European watershed: Towards an environmental history of the Danube River Basin (ENVIRDANUBE)**

Martin Schmid, martin.schmid@uni-klu.ac.at, IFF-Center for Environmental History
Gertrud Haidvogl, gertrud.haidvogl@boku.ac.at, University of Natural Resources and Applied Life Sciences Vienna (BOKU); Institute for Hydrobiology and Aquatic Ecosystem Management; Vienna, Austria
Martin Knoll, knoll@pg.tu-darmstadt.de, Technical University Darmstadt; Institute of History; Darmstadt, Germany
József Laszlovszky, laszlovj@gmail.com, Central European University; Department of Medieval Studies; Budapest, Hungary
Mark Graham Macklin, mvm@aber.ac.uk, Aberystwyth University; Institute of Geography & Earth Sciences; Centre for Catchment & Coastal Research; River Basin Dynamics & Hydrology Research Group; Wales, United Kingdom
and Verena Winiwarter, verena.winiwarter@uni-klu.ac.at, Alpen-Adria University Klagenfurt; Institute of Social Ecology; Center for Environmental History; Vienna, Austria

With c. 81 million inhabitants and more than 800.000 km2 covering currently 19 states the Danube river basin is the most international river basin in the world. Its multilingual character is one of the reasons for the rather poor current research status compared to other major rivers and watersheds in Europe and beyond. Following in the footsteps of Richard White's 1995 study on the Columbia River, ecologically informed histories of Rhine (Cioc 2002; Blackbourn 2006) and Rhone (Pritchard 2004), have shown the potential of watersheds as an organizing principle of environmental history.
The Danube riverine landscapes have been the site of human interventions into land-cover and hydrology for millennia. A fascinating diversity of lifeworlds has developed along its banks, from urban agglomerations and power centers on the places of Roman fortresses such as Vienna or Budapest to systems to tap the river's energy such as hydropower stations like the "Iron Gate"; from agricultural environments which create runoff and thus potential eutrophication problems, to industrial complexes using and polluting the river, up to riverine forest landscapes, which are nowadays seen as rather "natural" repositories for biological diversity. Adding a watershed perspective, that is, looking beyond the immediate riverine surroundings to the larger area of nested catchments connected by their common waters, brings even more actors, their interests and potential conflicts into consideration.
The poster introduces ENVIRDANUBE, an emerging research framework aimed at developing the growing interdisciplinary interest in an integrated environmental history of watersheds into a concerted, multi-national research effort on the Danube river basin. The poster presents the status quo of ENVIRDANUBE, the formation of an appropriate consortium and a conceptual common ground for such an interdisciplinary research effort. River section specific key research questions for the upper, middle and lower Danube including the delta and overarching research topics for the whole basin are presented, possible case studies along the rivers course are envisaged.
By trying to understand the intertwined histories of humans and the river in several cases representing the main driving forces of environmental impact and change along the river (such as urbanization, industrialization, warfare and migration) ENVIRDANUBE wants to base sustainability issues on a long-term view of the river as a socio-ecological system.

References:

Richard White. 1995: The Organic Machine. The Remaking of the Columbia River. Hill and Wang.
Marc Cioc. 2002: The Rhine. An Eco-Biography, 1815-2000. University of Washington Press.
David Blackbourn. 2006: The Conquest of Nature. Water, Landscape and the Making of modern Germany. Jonathan Cape.
Sarah B. Pritchard. 2004: Reconstructing the Rhone. The Cultural Politics of Nature and Nation in Contemporary France, 1945-1997. French Historical Studies. Volume 27, Number 4, Fall 2004, pp. 765-799.

208 **Plants, mobilities, landscapes: reassessing environmental histories of botanical exchange**

Eric Pawson, eric.pawson@canterbury.ac.nz, geography

This paper seeks to reassess Crosby's thesis of ecological imperialism, and the seductively simple picture of plant movements and the remaking of landscapes that he drew from it. It does this from a range of interdisciplinary perspectives, drawing on the emerging literature on mobilities in social science, the reassessment of ideas of core and periphery in imperial history, as well as biological writing about plant movements. It argues that such flows were integral to the annexation of nature by culture that characterises modernity. Using the metaphor of the web, the multi-directional complexity of these flows is assessed, such as those across and around the Pacific. The calculative rather than seemingly accidental dissemination of plant materials is discussed, focusing on the role of companies, such as those producing seeds, and a well developed regional systems of nurseries, in order to enlarge the usual argument about the importance of networks of

botanical gardens. Elements of the refashioned landscapes that resulted are identified in order to reveal some of the tensions of order, mobility and hybridity that also characterise modernity.

210 **A Landscape . . . with Figures: Tourism and Environment on Prince Edward Island, Canada**

Edward MacDonald, gemacdonald@upei.ca, University of PEI

An "Old World" pastoral landscape has long permeated the tourist appeal of Canada's smallest province, Prince Edward Island, and shaped its cultural identity. Within the meta-landform of Canada, historically defined in terms of harsh extremes both of climate and geography, Prince Edward Island is an anomaly, not only because of its small scale (566,572 hectares), but also, its absent "wilderness"; roughly 95% of the land mass is arable land. Contemporary tourism packaging continues to exploit this difference. Canada's other island province, Newfoundland, markets itself as the ends of the earth; neighbouring Prince Edward Island is "the gentle island." This paper will use Prince Edward Island as a case study to explore the nexus between culture, landscape and tourism. Tourism promotion on the island began in the 19th century by extolling the health benefits of salt-sea breezes for well-heeled travellers fleeing the summer swelter of urban America, but by the interwar period tourism literature had begun to equate the arcadian countryside created by European colonization with a pre-industrial, rural order, a people embodied in their landscape. Pastoral people and landscape were widely promoted in the novels of expatriate Islander L. M. Montgomery, and the image was compounded by an island-born insularity that accentuated a sense of "otherness," both spatially and temporally. Postwar tourism marketing could thus eulogize the physical and cultural consequences of economic stagnation as a restorative, anti-modernist escape from urban-industrial angst for newly mobile North Americans. While visitors could satisfy their need for "authentic" cultural experience, locals were confronted with the cultural identity that tourism marketing imposed on them. The limits to touristic commodification were demonstrated in the 1970s, when local resistance defeated an effort to convert eastern Kings County, including its rural populace, into a new national park. Significantly, when an annex to the PEI National Park was created in the region a generation later, its over-riding motive was largely the preservation of the environmentally sensitive Greenwich sand dunes, a surviving fragment of provincial wilderness. In the new millennium, created landscape and associated identity -- and the tourism industry that packages them -- face a new challenge, as economic pressures drive the farmers that fostered both out of business. This paper is intended as part of a panel designed to compare and contrast different historic environments and heritage tourism along the North American seaboard.

211 **Reconsidering Ecological Imperialism in New Zealand: Luxury Plants and the Case of Asia, 1850-1920**

James Beattie, jbeattie@waikato.ac.nz, University of Waikato

Nineteenth century New Zealand provided a crucial case study for Alfred Crosby's argument that 'ecological imperialism', as much as technological and military advantage, advanced the expansion of the west. For Crosby, New Zealand furnished a classic case study of the successful development of 'Neo-Europes' through the expansion of European colonisation and the organisms they brought with them.

This paper modifies Crosby's findings regarding New Zealand's 'ecological imperialism', in the process adding to wider debates on the environmental history of empire. First, it complicates Crosby's portrayal of Europeans as confident agents of imperialism, showcasing instead the very many environmental anxieties also occasioned by acclimatisation. Second, it examines the introduction of non-European plants into New Zealand. Asian species, so this paper argues, were highly sought-after commodities in New Zealand, especially after the 1870s. These commodities had a high cultural value, signifying the growing wealth and status of many settlers, as well as the permanency of European settlement. Their popularity also significantly complicates another aspect of Crosby's argument, by demonstrating that it was not solely European species coming into New Zealand. Demand for these plants further illustrates that plant transfers did not follow a linear, one-way path, as Crosby implies, but instead took infinitely more complex routes, being adapted and channelled more often than not through institutions and individuals.

References
Alfred Crosby, Ecological Imperialism: The Biological Expansion of Europe 900-1900, New York, reprint, 1994.

212 **Taxonomic Imperialism: The (Latest) Battle for Acacia**

Libby Robin, libby.robin@anu.edu.au, National Museum of Australia

Both South Africa and Australia have long associated the genus Acacia with national pride. In the early twentieth century both countries used its distinctive golden flowers as markers of nation. In South Africa's case, Acacia (the 'doringboom', probably A. karoo) forms a garland that encircled the arms on the Governor-General's flag in 1910, and was chosen as the representative of South Africa on the Coronation Stole for King George V in 1911. Australia had its first 'Wattle Day' in 1838, and Acacia pycnantha (Golden Wattle) appeared on the Australian Coat of Arms and postage stamps from 1912. Thus even then, intercolonial rivalries took botanical form.

Alfred Crosby famously dissected the various ecological transfers that accompanied the imperial endeavour and that so profoundly transformed the natural and cultural environments of many conquered regions. This paper extends Crosby's ideas into the current era and into the intellectual as well as the physical environments. For

not only have Australian acacias invaded many other habitats, among them southern Africa, Europe and South America, but in the case of this genus the notion of imperialism has extended more recently even to the international scientific arenas that govern nomenclature.

The genetic revolution created the latest battle for Acacia. Through new cladistic techniques, taxonomists have established that the genus Acacia (consisting of well over one thousand species) is a complex assemblage that needs revision and division into at least three large groups and two smaller ones. The taxonomists recommended therefore that the genus be split accordingly. Acacia comes from the Greek word for thorns, and the first Acacia named (the type specimen A. nilotica) had the distinctive sharp thorns that have been adopted by Africans as 'signature trees'. But the vast majority (over 1,000 species) are endemic to Australia, and these mostly do not have thorns. In Australia the vernacular name 'wattle' is very important, but elsewhere in the world the flowers are usually known as mimosa (or acacia, for example in Latin America).

The scientific question of what should happen to the name 'Acacia', with its rival national symbolisms and combative accusations of biological and scientific 'imperialism', was fiercely contested. In terms of priority, scientific history was with South Africa but species numbers and economics lay with Australia for the vast majority of species are to be found there and the timber and horticultural industries are both economically significant. Much of the battle was conducted on the imperialistically-named (Australian) website, World Wide Wattle.

In this paper we will review the place of nationalism in science and discuss the new biological imperialism of the twenty-first century.

213 **From Damaged Vegetation to Dying Forests. The Creation of an Environmental Crisis out of Scientific Uncertainty, 1880 to 1970**

Martin Bemmann, martin.bemmann@geschichte.uni-freiburg.de, Faculty of Humanities

This paper deals with the dissemination, acceptance and use of knowledge about so called "Smelter Smoke Damages" in forests within the German society between the 1880s and 1970s. During the whole period, the knowledge about effects, assessment and valuation of damages within this special subject of Forestry, Chemistry, Botany, Pedology, as well as technical and juridical science was characterized by a high level of uncertainty. In contrast, numerous lawsuits on this issue between industrialists and forest owners required a clear analysis of causes and effects which were demanded from "experts" in expertises. Therefore, the main questions are: Which consequences resulted out of this disproportion between the offered uncertainty and the demanded certainty for the interpretation of the phenomenon "negative consequences of anthropogenic air pollution for the vegetation" within different parts of the German society? And, what did this imply for the relationship between experts and laymen? The thesis of this paper is that mainly due to this disproportion the originally economical-juridical problem, which only concerned persons directly involved (industrialists and forest owners), evolved into an environmental problem, which affects potentially the whole society.

225 **"The Very Atmosphere of the Place": History, Nature, and Audience at L'Anse Aux Meadows**

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On the north shore of Newfoundland lie a cluster of low-lying, windswept mounds. The grassed-over mounds are nearly undetectable, dwarfed by the rugged Atlantic coastline around them. Yet they are recognized as the oldest European settlement in North America, the Vinland of the Icelandic sagas, and Canada's first World Heritage Site. Descriptions of landscape pervade the sagas; the dramatic setting lures tourists today; and the coastal situation poses unique managerial problems. Environmental history is everywhere at L'Anse aux Meadows, as fundamental and yet as unremarked as the archaeological remnants of Vinland itself.

Scholars have long speculated as to where Vinland might have been. They read the sagas for descriptions of coastal landmarks; propose likely sailing routes based on currents and winds; or use paleoecological methods and radiocarbon dating (Wallace, 2003; Lewis-Simpson, 2003). Environmental history lies at the heart of the study of the Norse Atlantic, but L'Anse aux Meadows is the tangible expression of its multidisciplinarity.

But does the site speak to the relationship between environment and history? Certainly interpretation plays to traditional, heroic ideas of a rugged Canadian northland and the age of exploration. Even the story of its rediscovery and excavation in the 1960s is cast in these terms (Ingstad, 2001). Sold as the "Gateway to the New World," it suits Newfoundland and Labrador's niche image in tourism advertising. But while the site capitalizes on coastal ambiance, an array of questions about the historical North Atlantic remain undiscussed. With concepts like globalization and climate change now part of the daily vernacular, this seems a wonderful opportunity to discuss environmental cycles and past occupation of a northern environment. (And with aboriginal land rights a central piece of Canada's northern policy, the "skrælings" deserve re-examination).

This environment also presents critical challenges in site management. Fully 60% of the designation is marine, and includes such intangibles as "a landscape reminiscent of the Viking areas in Greenland and Iceland" (Parks Canada, 2003). Our experience with managing historic sites on both points – a coastal littoral, and "sense of place" – is limited, as is our ability to convey a particular historical moment in an ever-changing setting. Parks Canada is also caught between a mandate for ecological integrity and the realpolitik of competing resource interests on the shoreline. L'Anse aux Meadows was born of a practice of using reconstructions as economic

engines in underdeveloped areas. At what cost is the development of historic sites? The best-preserved sites lie protected by isolation in the boreal north; can their ecologies bear a global audience?

With only one study on Canada's national historic sites (Taylor, 1991), this is an important site of application for environmental history in the field of public history.

226 **Contested Domains: the Cosmic Significance of the Soviet Space Dogs**

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Although most Americans remember Neil Armstrong's steps on the moon in 1969 as the definitive triumph of the space race, the first major milestones of this unique Cold War contest were claimed by the Soviets. Many of these records – from the initial clandestine launches of "rocket dogs" in 1951, to the highly publicized, doomed voyage of "Laika" in 1957 and the celebrated journey of "Belka" and "Strelka" in 1960, belonged to the dogs Soviet scientists used to make space travel a reality for human beings. Beyond their scientific significance, the space dogs captured the public imagination in ways that reinforced Cold War rivalries and celebrated human technological advances, while also raising questions about the ethical treatment of animals and the relationship between dogs and humans. This essay suggests how scholars in a range of fields, including environmental history, cultural studies, animal studies, and science and technology studies, might use the space dogs' histories to gain insight into the public culture of the Cold War, the cultural and biological relationships between humans and domestic canines, and the ways that space exploration reinforced and challenged human understandings of and assumptions about "nature" and the environment.
Like other human and animal experimental subjects, the space dogs served as "boundary objects" marking the overlap between intersecting social worlds and realms of knowledge. Donna Haraway's understanding of "companion species," which emphasizes the complex material and semiotic interdependence between people and dogs "bonded in significant otherness," helps illuminate the role of dogs as historical actors in a drama that intertwined humans and animals in public and politically charged ways. The implications of enlisting dogs in humans' quest to conquer outer space are further clarified by research in ethology and environmental studies that charts the mutable linkages between humans and dogs as commensal species partnered in co-evolution. The Soviets' practical efforts to transcend the bounds of earth's environment approached space both as an extension of the "nature" humans had subdued on Earth and as a decidedly "unnatural" or certainly inhospitable realm that might be exploited if not conquered. Following Susan Buck-Morss, this paper uses images as a "way of seeing the past," to suggest that the anthropomorphized celebrity of the canine cosmonauts situated the space dogs at the nexus of the fundamental yet contested domains of human vs. animal and terrestrial vs. (outer) space. Just as the complex global celebrity surrounding the dogs in the early years of the space race hinged on the dogs' multivalent resonance as "boundary objects," the dogs' significance to a range of contemporary scholarly perspectives highlights the porous nature and attendant ambiguities of the boundaries between the social, the environmental and the human.

228 **Common Law, Civil Law and Precautionary Regulation: Lessons from the Alkali Act**

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The precautionary principle (PP) is at the heart of comparative environmental policy debates. It is a core precept of European Union (EU) policy and a source of tension with the United States where the principle has encountered significant resistance. The origins and significance of this divergence are in dispute. Where some see the PP as symptomatic of deep-seated differences between American and European approaches to environmental policy, others have construed the contrast between Europe and America as "false, even illusory." Both sides of this debate share three assumptions, however. The first frames the relevant comparison in reference to attitudes towards risk; the second treats European precautionary thinking as a recent phenomenon; and the third lumps England together with continental Europe for the purpose of this discussion. This paper calls all three of these assumptions into question. I argue that the principle at issue is one of differing regulatory philosophies rather than divergent assessments of risk. The relevant disagreement between the two regimes is over the legitimacy of regulatory interventions in the absence of scientific proof of harm. Understood this way, the debate over precaution bears strong resemblance to late 19th-century divisions over the relationship between nuisance law and the police power. Significantly, this question was at the heart of debates over the importation of continental cameralist models of public health regulation both in England and the United States. In England these tensions gave rise to a distinct, hybrid approach to the regulation of air pollution under the Alkali Act of 1863, which differed from the uniform licensing measures that characterized contemporary continental regulation. Viewed through this lens, differences in legal traditions emerge as a key explanation for patterns of cross-national divergence over precautionary regulation both between the United States and the EU, and between England and some of its counterparts within the EU.

229 **Pollution Law in Mandate Palestine**

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Controls on air and water pollution are often thought to be chiefly a product of the late twentieth century, as well as one of industrialized societies. Yet pollution law has been part of various legal systems, including the colonies making up the British Empire. While the history of law in the British Mandate for Palestine is usually seen through the lens of the Jewish-Arab conflict or in terms of imperial defense and development, the study of environmental law in Mandate Palestine reveals that officials and residents were concerned as well with the

more mundane subjects of public health and environmental protection, and devoted considerable attention to them.

This paper will explore the enactment and implementation of pollution legislation in Palestine under British rule (in the period 1917-1948), in particular various water-related ordinances and the Public Health Ordinance, 1940. Paying attention to different attitudes among the country's Arab and Jewish populations, as well as different layers and departments of colonial officialdom, the paper will examine the motivations and assumptions behind the enactment of legal controls on pollution, the ways in which legislation in Palestine was similar to and differed from the law in other colonies and in the metropolis, and the ways in which pollution control law reflected hopes and anxieties regarding modern phenomena such as heavy industry and the automobile.

230 **The National Environmental Policy Act before the U.S. Supreme Court: Behind the Curtains**

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The National Environmental Policy Act of 1969 has long been trumpeted as environmental law's "Magna Carta" in the United States, with its sweeping declarations for safeguarding the natural environment for future generations. Yet, its reception before the United States Supreme Court has been less than welcoming. The Court has heard fifteen cases in which NEPA's requirements have been at issue. In every case, the petitioner is seeking review of a lower court ruling in favor of environmentalists. The Court has not once granted review at the request of environmentalists when they are seeking High Court review after losing in the lower courts. And, in all fifteen NEPA cases that the Court has heard, the Court has ruled against the environmentalists. Indeed, the environmentalists have not received a single vote of a single Justice since 1976.

This paper explores the papers of five different Supreme Court Justices – Justices Harry Blackmun, William Brennan, William Douglas, Thurgood Marshall, and Lewis Powell to try to shed light on the Court's seemingly lop-sided treatment of NEPA. This includes the confidential memoranda and other correspondence written within and between chambers during the decisionmaking process. It also includes not only notes written by individual Justices during oral argument, but lengthy notes on what each Justice said during their confidential deliberations.

233 **From peat river to international trade route. The "birth" of the Western Scheldt estuary as seen from a social-ecological perspective (Belgium-The Netherlands, 12th-16th centuries)**

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Between the 12th and the 16th century a small peat river called the Honte, draining an extensive area of peat bogs in the delta of the rivers Rhine, Meuse and Scheldt, turned into the Western Scheldt – the main river mouth of the river Scheldt and one of the largest commercial waterways of North-West Europe. This transformation enabled the rise of Antwerp as main maritime gateway of Europe in the 16th century, but at the same time caused long-lasting environmental and social disequilibria in the adjacent territories. The general geophysical processes steering the evolution of these coastal wetlands during the Holocene period are well known (Vos and Van Heeringen 1997), but the chronology, the topography and the causes of this huge transformation are much less clear (de Kraker 2002). As with most radical transformations in wetland areas during the two last millennia, direct and indirect human interventions seem to be crucial (Rippon 2000). This paper presents the results of a research project exploring the possibilities of Geographical Information Systems (GIS) to map and explain the evolution of the Western Scheldt from the present-day situation back into its "genesis" in medieval times. Making full use of the unique historical cartographic evidence available from the late 15th century on, we try to explain the birth of the Western Scheldt estuary by linking natural processes in the area to human interventions and by locating them in time and place. In the medieval period human intervention in the delta was intensive. In a direct way, the organisation of trade and transport networks introduced canalisation; dredging and port development; the energy-supply of the booming towns of the medieval Low Countries necessitated the exploitation and annihilation of the peat bogs in the area, followed by a considerable shrinkage of soil levels. More gradually, drainage and embankment for arable farming equally modified the former wetlands, separating the "dry land" from the "wetland", and sometimes quite paradoxically, leading to an increase in flood risk and an expansion of the river. Finally the use of the river as a political and military frontier often proved to have a catalytic effect, introducing military inundations, neglect of river management and abandon of settlement (Soens 2005). We will also point at the important social implications, both for the rural area that was endangered by the extension of the Western Scheldt (changes in flood risk; adaptations in drainage and flood control systems, but at the same time increased possibilities for commercialisation); and for cities and trade networks that made full use of commercial opportunities introduced by the transformed river system. Finally, we will look at the changing ecosystem services the river could offer, trying to link the medieval river transformation to present-day debates about the restoration of ecosystem services in the Scheldt-estuary (Meire and Van Damme 2005)

234 **The Birth of an Unwanted River: Spaniards, Indios and the Zahuapan River of Colonial Tlaxcala, Mexico, 16-18th centuries**

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This paper explores the social and ethnic disequilibrium that resulted from a radically transformed hydrological network in the colonial province of Tlaxcala, Mexico. When the Spaniards arrived in Tlaxcala in 1519, the Zahuapan was much less a river than a series of interconnecting streams and wetlands. Massive soil movement in the 17th century resulted in deltaic formation in floodplains, and eventually, the creation of raised fluvial channels that moved water quickly through and out of lowland depressions. In the process, a unified Zahuapan River was created. The new hydrology changed land use and access to water for people and livestock. Water became scarce in the dry season and fluvial dynamics became much more impetuous, making livestock raising, irrigation, and power generation far more difficult and contentious. Moreover, as the river's channel shifted within its deltaic deposits, land owners quickly realized that they would need to fight in the courts to see that properties that once bordered the river (or wetland) continued to have access to the Zahuapan. While I argue that the environmental consequences of the birth of the Zahuapan were undesirable for all ethnicities and social classes, this paper will explore the way these changes played out within the context of a colonial society that was deeply divided by social and ethnic inequalities.

235 **Environmental Discourses on British Military Training Estates: The SENTA Range and the Epynt**

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There is growing interest within environmental history on the environmental impact of military land use. (Russell and Tucker 2004) As part of a comparative panel spanning France, Britain and the United States, this paper examines a UK-based case study in order to contribute to broader debates on military environmental credentials. The paper offers an environmental history of one Ministry of Defence (MoD) training estate – Sennybridge on the Epynt plateau in mid Wales – from its seizure for military use in 1940 through to the present. In part the paper examines the evolving environmental discourses that the MoD have articulated about this place. (Woodward 2001) But it does more than this, given that Sennybridge was created through forced expulsion of its predominantly hill-farming population. (Hughes 1998) It is not alone in being a military site with a history of expulsion and protest. (Wright 2002) But what is particularly striking about Sennybridge are the ways in which the discourses of the dispossessed and the inheritors of their tradition have clashed with the ways in which the military describe this site. Within memoir literature and memorial architecture, the seizing of the Epynt for military training has been portrayed as emptying a living valley and leaving it dead. In contrast, the military offers a view of the valley as a place full of biodiversity, arguing that emptying the valley of its farmers was critical in ensuring and safeguarding its contemporary ecological significance. Although primarily interested in offering an environmental history of the contrasting discourse articulated about Sennybridge, this paper also seeks to get beyond the rhetoric and examine the historical realities of the claims and counterclaims on this place. In particular, is there more to military environmental discourse than mere self-justificatory 'greenwash'? Was human loss at this place nature's gain?

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236 **The Fate of American Energy Conservation Policy**

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In the fall of 1973, the Arab members of OPEC embargoed supplies of oil toward customers supportive of Israel. This unveiling of the "oil weapon" was a response to American and western support for Israel in the Yom Kippur War and demonstrated both the market power of OPEC and the world's energy producers. In The United States, the result was a significant run up in the price of oil, and the unusual and deeply unsettling experience of gas lines.

The American government responded to the crisis by: aiding efforts to increase the supply of oil from non-OPEC sources, encouraging the use of coal and alternative forms of energy in place of oil and by addressing the issue of consumption. Indeed, some have argued that this "energy crisis" was essentially a consumption problem. Understood in these terms, the solution would appear to lie with efforts to increase energy efficiency and to conserve existing sources. These were precisely the policies that had long been advocated by the environmental community.

The environmental critique of unchecked growth in energy consumption found expression in a number of books which all pre-dated the oil embargo: The Club of Rome's, The Limits to Growth, Paul Ehrlich's, The Population Bomb, and E.F. Schumacker's, Small is Beautiful were among the more popular. While the environmental benefits to reigning in energy consumption were being promoted, the changed political and economic climate fostered by the oil embargo inspired additional studies which suggested that energy efficiency and conservation could also have a positive impact on the nation's economy and national security. S. David Freeman's 1974 Ford Foundation Report, A Time to Choose, and the 1979 publication Energy Future, Report of The Energy Project at the Harvard Business School by Robert Stobaugh and Daniel Yergin all strongly argued for energy conservation and increased efficiency, but they did so by stressing the economic not the environmental benefits.

This paper will examine the success and failures of American conservation policy; policies that would carry significant consequences. For as the world's largest consumer and producer of energy (and therefore its largest CO2 emitter), the recent history of American energy policy plays a critical role to understanding both security of supply concerns (which contextualizes current U.S. involvement in the Middle East) and environmental problems of international concern such as climate change.

237 **West European responses to the energy crisis in the 1970s**

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The paper examines the British and the Danish responses to the energy crisis. The British case is important because UK earlier than other West European countries chose a market driven approach towards the energy sector, while Denmark decided to change the energy mix and resulted in delinking growth of GDP from growth in energy consumption. The two cases indicate that an assessment the energy policy in the 1970s is quite complicated: a focus on supply security can fuel environmental problems (e.g. the substantial Danish CO2 emission), while a focus on low prices may harm the maintenance of the energy system and therefore the supply security

238 **The Shifting Course of the Connecticut River in Early American Law and Culture**

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This paper examines the impact of European settlement and economic activity on the Connecticut River Valley of New England during the relatively short time-period from the first Dutch settlements in 1619 to the beginning of industrialization and the start of the canal-era at the turn of the nineteenth century. The paper argues that even prior to the proliferation of manufactories and canal projects, Euro-American impact on the ecosystem of the Connecticut River was significant enough to necessitate both a cultural and a legal shift from "frontier" conditions characterized by material plenty to a system of resource regulation more closely akin to the English models from which most early Connecticut Valley settlers had immigrated.

Seventeenth-century clearing of the land for agriculture increased the run-off rate of water, in turn increasing the flow of the river, resulting in a faster, straighter, deeper river by the turn of the eighteenth-century. In some areas, shifts in the River's course drained marshlands, "improving" those lands for agriculture without the need of direct human labor. In other areas, these cuts inundated valuable farmland or even bisected towns.

Demographic shifts in the human populations living along the River greatly impacted the fish populations of the region. Introduced diseases initially resulted in plummeting Native American populations in the first half of the seventeenth century, resulting in temporary population explosions in many of the fish species that River Indian communities depended upon for subsistence. New European settlers eagerly exploited the newly bountiful river fishery, assuming their large catches to be the natural state of their new wilderness homes. English over-fishing in the closing decades of the seventeenth century contributed to the negative impact of changing river dynamics – rendering large stretches of river habitat incapable of supporting populations of fish that depended upon slow, turbid waters for spawning - to bring about a much commented upon crash in fish populations by the beginning of the eighteenth century.

The paper will examine how Euro-American and Indian communities living along the river responded to these changes by reshaping both their economic and their legal systems. In the case of the English, specifically, it will trace the manner in which environmental changes contributed to the shift from communal rights to resource use towards an almost complete reliance upon private property rights - two examples being the shift from communal rights to collect firewood in lands described as "marshes" towards reliance on private property in wood and timber and the shift form communal river fishing to the construction of private fishponds.

240 **"A Long-Range Vision": Changes in Japanese Energy Policy, 1973-1982**

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The emphasis on environmental history in foreign relations history is especially apt for the study of the national links within the political economy of international energy. Postwar technological and environmental transformations changed the international distribution of power: fears of finite supplies stimulated economic competition and concerns about environmental permanence. [1]
As a result of the 1973-1974 oil embargo, Japanese energy policy transformed rapidly: the government immediately enacted strategic conservation programs. The government also broke with the United States on support of Israel, made direct deals with Middle East producers, encouraged the development of alternative energy, and began to import substantial quantities of oil from China. Most importantly, Japan began pour capital into the modernization of its knowledge-based economy. By the second oil shock in 1979, the composition of energy demand changed dramatically.
This study uses government reports and contemporary industrial and economic journals to analyze the policy response to the oil shock. [2] Policy change had environmental effects: government planners resolutely moved the economy toward less energy-intensive industries, emphasizing technology and knowledge-intensive development through a series of "long-range visions" of national industry. [3] The paper examines two specific policies: the forced shift towards the manufacturing of less gas-intensive vehicles and the provision of alternative sources of energy, especially liquefied natural gas and nuclear energy. The paper examines these

policies within the dominant trends of conservation and increased capital development: although oil imports were at the same level as in 1970, annual economic growth surpassed energy demand growth by 1979. Japanese policy also had international environmental ramifications. The paper concludes with an analysis of the link between Japanese policies and the global context of dropping growth rates, rising consumer prices and inflation, and environmental movements. In the coordination of macro-economic policies between developed countries through groupings like G7/8 and the International Energy Agency, groups in other developed countries viewed Japanese energy use as an example of pragmatic balance between growth and conservation.

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[3] Japan External Trade Organization, ed. Japan's Industrial Structure: A Long Range Vision (Tokyo, 1975).

241 **"The lands in question are not islands. They are simply shore-lands surrounded by water" Supporting claims to the shifting lands of the early-modern Rhône**

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The constantly changing geography of rivers carrying a great sedimentary load posed great challenges to the well-regulated agrarian societies of the early-modern age. The erratic yet recurrent appearance and disappearance of islands, the frequent remodeling of shores, or simply the unpredictable effects of even mild floods triggered countless claims and counter-claims from tenants, owners, seigneurs, and royal officials. Jurists had long reflected on the ways in which the losses and gains of so many parties could be adjudicated, reaching, naturally enough, to Roman precedents. Yet, these precedents, however well documented, rarely solved these disputes effectively, given the complexity of the power equilibria at stake. In the eighteenth-century, efforts were made to further ground arguments in natural law. Reflections on the nature of the phenomena at the heart of these disputes were increasingly seen as a superior recourse. Yet, not surprisingly, the range of explanations available for the vagaries of river lands or, more daringly even, the evolution of a fluvial landscape over several centuries, remained very open.
This paper will focus on a series of disputes triggered by the changing shores of two distinct sections of the river Rhône - upstream, east of Lyon, and downstream, south of Valence, over the seventeenth and eighteenth centuries. These two regions, although relatively close in many ways, adopted distinct interpretations of the natural forces behind the conflicting claims. This contrast is documented in the opinion of "experts", but also in the statements of witnesses standing for social memory, as well as in representations - generating, for instance, two different types of map, at a time when mapping conventions remained fluid. Along the upper Rhône, floods were seen as opening new beds, carving new islands by separating one area from another, and abandoning other channels, thus reshaping existing islands and shore lines. In the more southerly interpretation, floods were said to erase established islands, leave new gravel banks that quickly expanded, as well as remodel shore lines in a downstream dynamic. More than geography, distinct socio-economic conditions, and most notably distinct types of land tenure and land usages, shaped two different perspectives on similar environmental phenomena. In both cases, the goal was to support a contingent form of stability compatible with local traditions, practices, and power structures.

242 **The changing relationships between paris and the seine : A metabolic perspective, 1790-1970**

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Material flows constitute the most evident links between cities and rivers. The understanding of the social dimension of those flows, together with their natural one can contribute to analyse the interactions between society and nature, city and river. The aim of the proposed talk is then to analyse metabolic interaction between Paris and the Seine during the industrial era, 1790-1970, a period marked by strong population growth, technological changes, and the absence of specific legislation on environmental issues. The viewpoint focuses on exchanges of waters and wastes between city and river, quantifying them and tracing their evolution in the light of the strategies implemented by the stakeholders in charge. The study combines industrial ecology, local history and the history of technology.
From 1790 to 1850, the removal of human excreta aimed not only at improving urban hygiene, but at producing the fertilizers needed in rural areas. Discharging them into the river was out of the question. But after the 1860s, several factors upset this exploitation. Even so, Parisian engineers continued to process sewage using techniques that would not only ensure hygiene but also conciliate economic and agricultural interests: combined sewerage system and sewage farms. Both of these early periods are thus noteworthy for a relative limitation of the river's deterioration by urban wastes. Not until the 1920s, when domestic water supply had become the standard and excreta came to be considered as worthless waste, was the principle of valorisation abandoned. This led to important and long-lasting pollution of the Seine, aggravating the industrial pollution that had been in evidence since the 1840s.

246 **From weapons to wildlife: the enigmantic nature of Rocky Flats, Colorado**

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This paper explores the growing recognition since the 1970s of the high ecological value that can co-exist with some of the most contaminated land in the USA. The strange phenomenon of 'weapons to wildlife' is examined with reference to a particular place, whose most recent and most curious chapter of history remains to be studied. At Rocky Flats, a weapons components producing facility 24 kilometres northwest of Denver, plutonium triggers were manufactured between 1952 and 1989 (Ackland 1999). The most ambitious toxic clean-up operation in US history was wound up here in 2005 and the 6,000-acre Rocky Flats National Wildlife Refuge became the latest addition to the US national wildlife refuge system in 2007. For beyond its heavily polluted core, within its extensive buffer zone, the militarized environment of this sinister Cold War 'death factory' protected flora and fauna from suburban sprawl and other customary processes of development that marginalized wild nature elsewhere in Colorado. Increasingly in the United States, and beyond, the 'unofficial' nature of former nuclear/militarized places has been favourably compared to that of non-militarized sites and the 'official' nature formally protected and showcased within national parks (Wills 2001). Who, though, was most instrumental in pushing for the extension of formal protection to de facto wildlife reserves? Environmentalists and wildlife conservationists or the pro-nuclear lobby, military establishment and residential developers/local boosters (the latter viewing the new refuge as a prime urban amenity and visitor attraction)? And how were the different cases for the 'weapons to wildlife' conversion constructed and articulated? Also, how do the site's successive and multiple layers of identity – as ranchland, weapons factory, place of work, rallying point for anti-nuclear protest, and mecca for biodiversity – compete for attention in recent discourses? As part of an explicitly comparative panel that examines similar themes with reference to Britain and France, this paper aims to link an American case study with wider debates about the status of militarized landscapes as unexpected reservoirs of high 'green' value and the decommissioning and conversion of former military lands.

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247 **'Greening the MOD': A Case Study of Salisbury Plain**

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Tanks thunder across the rolling chalk grassland of Salisbury Plain. The largest of the UK Army Training Estates, it is the only one judged capable of withstanding the impact of the full range of military weaponry. Used throughout the year, for artillery firing, large-scale tactical training and tank manoeuvres, this is, at first appearance, a site given over entirely to the full destructive force of modern military training.

And yet, when the tanks have receded, in their tracks small pools of water collect. These form ideal habitat for the Fairy Shrimp, a delicate translucent crustacean, classified 'vulnerable' but flourishing in this most unexpected of environments, reliant on the tracks of tanks to distribute their eggs as well as gouge out their homes in the Plain's chalky earth.

The idea of the military site as an 'ironic' nature reserve, pioneered by environmental historians, is now being employed on Salisbury Plain by the military itself. Providing an alternative to conventional perceptions of military land use as invariably destructive, the presentation of the Plain as an ecologically diverse nature haven is evident in Sanctuary, a glossy wildlife magazine published annually by the British Ministry of Defence (MOD). Reporting military conservation projects and featuring soldiers' wildlife photos, there is very rarely a tank or gun in sight.

This paper critically examines the increasing attention to environmental values within the MOD, asking whether this constitutes a genuine 'greening' or, as Rachel Woodward has argued, a 'greenwash,' whereby a military-environmentalist discourse is used to justify a military presence in the countryside. This paper applies central themes in international studies of militarized environments to a local case study. Focusing on Salisbury Plain, I investigate the development of the military use and portrayal of its landholdings since 1945, encompassing a deepening sense of ecological crisis, the rise of environmentalism, and the end of the Cold War as vital elements shaping both perceptions of the military and the environment. As well as looking at the claim that the MOD is exploiting the (only recently recognized) environmental wealth of its training estates to enhance its public image, this paper also considers the proposition that the biodiversity value of the military landscape now makes demands of its human owners and occupants. With environmental impacts assessments required for training exercises and the protected Sites of Special Scientific Interest dotting the Plain, has the environment begun to outmanoeuvre the military to its advantage?

248 **The impact of cultural values on marine environment conservation**

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Based on a case study in the Denmark this paper examines the impact of cultural values on the formulation of management plans and their implementation as regards national and international protection and conservation regimes for the marine environment. Cultural values are fundamental for conservation targets and significantly influential in the process of design and management of conservation, protection and restoration of marine biodiversity.

Understanding value systems is important to make management strategies effective and to prevent political discussions about nature and the value of nature that are often stretched between exploitation and conservation strategies.

The objective of the paper is to look at socio-cultural valuations through historical analysis of management decisions for biodiversity conservation, identifying different interest groups and stakeholders; and analyze which values have been more influential, revealed by the decision taken. Cultural values are seen as expressions of cultural heritage and identity. Cultural values are identifiable and measurable whereas cultural heritage and identity is not measurable and often not outspoken. Data from the first half of the 20th century are collected from local, national and international policy documents on nature protection and conservation management for the case study area, the Danish Wadden Sea.

This project is a part of the socio-economic theme 3 of EU-network of excellence Marine Biodiversity and Ecosystem Functioning (MarBEF).The approach of the valuation studies undertaken by theme 3 were published in 2007 in an article on the identification, definition and quantification of marine biodiversity (1). The classification of the cultural goods and services was applied from the Millennium Ecosystem Assessment (MA) and Hein et al (2).

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251 **"Explaining the Spill: Reactions of Exxon and the Bush White House to the Exxon Valdez Environmental Disaster"**

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The Exxon Valdez oil spill of 1989 has often been called the worst environmental incident in U.S. history—or even in the history of the world. George H. W. Bush, who had campaigned with a promise to the be "Environmental President," found that promise tested mere weeks into his term, when the Exxon ship came to grief in Alaska's Prince William Sound. Bush dispatched U.S. Secretary of Energy Samuel Skinner to the scene to coordinate federal, state, corporate, and private action. Swift and strenuous though the response was, environmental criticisms began almost immediately. Exxon headed the list of targets, but it was joined by the broader oil industry and the Bush White House, which also came under public fire. Considering Exxon's appearance before the United States Supreme Court early in 2008, it is clear that the Exxon Valdez story still awaits its legal conclusion. The environmental consequences of the spill have likewise endured.
This paper explores reactions to the Exxon Valdez spill by Exxon and by the Bush Administration. It draws from the Exxon papers in the ExxonMobil Historical Collection (EMHC) in the Center for American History at the University of Texas at Austin, and from documents in the George Bush Library at Texas A&M University. The resulting analysis evaluates the actions of Exxon and the Bush White House, paying special attention to how the oil company and the Administration portrayed those actions—and the environmental ramifications of the spill—in public venues. For greater context, the paper uses other EMHC documents to make a brief comparison to the corporate and governmental reactions to two other oil spills: (1) the Santa Barbara spill of 1969, a seminal moment in the history of the U.S. environmental movement; and (2) the wreck of the Atlantic Empress off the coast of Tobago in 1979, an almost forgotten incident that was the largest tanker oil spill in history. What emerges from this study is a better understanding of the environmental rhetoric of corporations and the Federal government as they evolved across a crucial period of U.S. environmental history. This improved understanding allows us to better situate the Exxon Valdez disaster in the broader history of oil spills, and in the broader history of U.S. corporate rhetoric on the environment.

252 **Combat Ecologies: Environmental Histories of Militarism in Postwar France**

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From the camps of Suippes and Mourmelon in Champagne to those of Larzac and Canjuers in the South, army bases, training grounds, and firing ranges pepper the French landscape. Mobilised to mentally and physically prepare French armed forces for combat, these sites are simultaneously secretive, dangerous, toxic, and – in places – celebrated for their biodiversity. Yet compared with research in the UK and North America (Childs, 1998), French historians and geographers have rarely peered through the barbed wire to examine these militarized landscapes. To redress this imbalance, this paper's focus is the environmental history of the French defence estate since 1945.

This paper traces the historical relationships between militarism, environmentalism, local communities, and nonhuman actors. It argues that the French military has, in part, emerged and changed through contact with the environment and shifting ideas about nature, not least the advance of the "light-green" society (Bess, 2003). At the same time, it has maintained or transformed particular habitats. Based on extensive archival research and landscape visits, this paper shows how base commanders, military engineers, and soldiers have had to take nonhumans into account. This has ranged from assessing the geology, habitat, and climatic conditions of possible base locations to managing animal populations. Defence officials have also had to grapple with the charged symbolic meanings of nonhumans; protesters against the extension of Larzac camp in the 1970s mobilised sheep as representative of peaceful farming in opposition to the army's destructive tanks.

Echoing developments elsewhere, the French military has responded to the presence of endangered habitats and species on its lands and wider public environmental concerns by introducing a range of environmental measures in recent years. These include the establishment of protected sites (a section of Camp de Bitche in North Eastern France even forms part of an UNESCO bioreserve) and signing protocols with the Ministry for the Environment (in 1995 and 2003). This paper critically examines the military's environmentalism, which represents a heightened awareness of its own environmental context.

By arguing that militarism cannot be separated from its environment, this paper suggests that environmental historians need to pay more attention to the interminglings of humans and nonhumans, rather than opposing "social" and "natural" agencies (Whatmore, 2002). It also provides vital historical context to pertinent and contentious issues of military land use (Davis, 2007).

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256 **Valuing the Environment: The Philippines War Damage Commission 1946-1951**

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Wars are increasingly costly affairs: Not only are they more and more expensive to fight but they are also giving rise to larger and larger claims for compensation. The Second World War is still the costliest human conflict in real terms given its global geography and its total nature and it also spawned an enormous number of claims for damages to persons and properties.

In the case of the Philippines, an American colony till 1946, President Franklin Roosevelt promised its peoples that they would be paid for everything they lost right down to the last nipa hut and last carabao. The Philippines was one of the most fought over countries of the war suffering Japanese attack, three years of occupation and then an American invasion and reoccupation, all of which were fiercely contested. Large parts of the most densely inhabited and intensively farmed areas of the country were devastated and much of the capital, Manila, was left in ruins including the old Spanish citadel that remains largely that way till today. Under the Philippine Rehabilitation Act of 1946, a War Damage Commission was established to investigate, assess and compensate these losses. The most common claims made were based upon the total or partial destruction of small houses, simple tools, work animals (mainly carabaos, pigs and chickens), and stocks of wood. Others, however, were for much larger amounts and included corporate and business losses and damage to public property and utilities.

This paper looks at how wartime damage to the Philippine environment was assessed and how such losses were calculated at both a personal and societal level. It explores what war meant for the people most affected, not the combatants per se but those whose fields, homes and businesses provided the battlefields where these conflicts were played out. Also, by examining the decisions of the Commission, it tries to unravel the value systems at work by assessing the worth attached to certain aspects of the environment over others because of some defined characteristic such as utility, property, usufruct, or rights. War, it seems, often makes us value the environment more than peace does.

257 **Storm Flooding, Economy and Environment: The Experience of the Tidal Thames 1250-1550**

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The lands bordering the tidal river Thames and its estuary were among the most economically developed parts of medieval England, strongly influenced by the demands of the city of London. Much of the zone of alluvial saltmarsh bordering the estuary had been embanked and converted into highly productive pasture and arable land by the thirteenth century. However, an apparent increase in the frequency of North Sea storm surges,

allied to agrarian recession and population decline, made these lands less profitable to defend in the fourteenth and fifteenth centuries. Some areas reverted to inter-tidal conditions following the breaching of sea- and river-walls. These changes also impacted upon the Thames fisheries, and may have accelerated the over-fishing of some brackish-water species as new weirs were established on flooded marshland.

This paper arises from an ongoing investigation of the lower Thames area and will examine the incidence of surge-related flooding here across the three centuries 1250-1550. It will explore the complex interaction of economic, social and environmental factors in changing the pattern of land-use during the later middle ages. The role of the city of London, which had vital interests in the Thames navigation as well as in the supplies which could be drawn from the coastal and river-side zone, will be considered. The paper will draw primarily upon documentary evidence, particularly that contained in manorial records and the records of the English crown, supplemented by early map and archaeological data. Parallels and contrasts will be sought in the experience of other, more extensive coastal marshland regions of England and the Low Countries.

258 **Historical dimension of timber driving and floating in the German lowlands and the potential impacts on fish assemblages**

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The medieval large scale clearings are often considered as first significant human impact on river systems throughout Europe, since they significantly raised bank erosion, changed sediment transport, and modified temperature and light climate. But, clearings and raising demands for wood caused a corresponding problem, that of log transport commonly by floating. Evidence emerged, that especially in smaller brooks and rivers the direct impacts of timber transport on aquatic communities significantly increased those of the general, clearing-induced alterations of river hydrology.
In the 16th century timber became expensive enough, that it was economically efficient to use and improve even smallest brooks in the German lowlands for log driving or floating (Goldammer 1997, p. 60). These improvements typically included channelization, blocking of oxbows, removal of obstacles and aquatic plants, construction of embankments and deflectors, and dredging. In addition splash dams and storage ponds have been constructed along the float ways to drive the log by flush waves (Goldammer 1997, pp. 165-167). Therefore, log driving should have dramatically impacted aquatic communities and potentially caused the decline and local extinction of migratory fish used to spawn in headwaters. A brook full of logs pushed downstream in a mixture of mud and water constitutes a hostile environment for all kinds of aquatic organisms. The specific water management for log transport was probably the most important stressor. Headwater spawning grounds become accessible for fish at higher discharges, whilst at low water levels the hatched fish larvae benefit from shallower, low flowing habitats. Log driving impacted on both life stages. It directly hampered the immigration of spawners, because it was also typically performed at higher discharges. In the natural low water season the remaining discharge was stored in ponds or blocked weirs for the next log driving, which reduced the remaining nurseries for juvenile fish to a minimum.
After log driving in small lowland brooks had lost its importance in the 17th century, these brooks were able to recover, sometimes to an extent which is our days considered as pristine or natural. However, several fish species did neither recover nor were able to colonize the headwaters again, but these impacts are widely unrecognized and forgotten today. These hidden changes may bias modern impressions of natural fish assemblages or references fish faunas and influence targets for river restoration.
Historical maps have been thoroughly analysed for signs of log driving to reconstruct its historical dimension aiming to assess its potential impacts on fish assemblages as well as to reconstruct the natural range and distribution area of several fish species.

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260 **'The Axe and the Lucifer Match': From Forest to Farm on Otago Peninsula**

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This paper describes human interaction with the diverse broadleaved/podocarp forests of the Otago Peninsula. Both Maori and Pakeha have made the Peninsula a focal point of settlement, and ownership of the Peninsula remains split between Maori and Pakeha. The Peninsula therefore provides a rare example of a distinctive landmass divided into two cultural landscapes, with two radically different systems of property, upon which different forest histories evolved. The paper argues the Peninsula provides a microcosm that illustrates many key themes of broader forest histories in New Zealand and in other colonial contexts, and in several instances suggests a more nuanced interpretation is needed. For example, early Maori did not burn forest on the Peninsula as they often did elsewhere; nor did early European settlers fear the forest. Admiration of the forest's beauty was widespread, many nineteenth settlers worried forest clearance was too extensive and uneconomic, and an increasing number lamented the aesthetic and ecological results of clearance. These are the seeds of contemporary concern amongst both Maori and Pakeha to reforest the Peninsula.

262 **What is a River in Merian's Eyes? Representation of society and riverine landscapes in early modern topographical literature**

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When Anton Wilhelm Ertl described the alpine river Inn in his "Chur-Bayerischer Atlas" in 1687, he used a highly anthropomorphized language. River Inn gets 'drunk' from the alpine rivers flowing into its course between the swiss headwaters and its own confluence with the Danube in Passau. Meeting the 'gentle' Danube, the 'rough' Inn objects to intermingle its waters with those of Danube over serveral hundred meters. In a more prosaic manner Martin Zeiller, author of most of the texts in Matthaeus Merian's mid-seventeenth-century regional topographies, describes the same site. But he underlines the importance of the two rivers as 'natural' fortifications for the city of Passau situated on a peninsula.
Early modern topographical literature is part of a new scientific and artistic interest for the physical world. It describes places, settlements, regions or countries recognizing their geographical as well as their legal, socio-economic and cultural characteristics in a mix of cartography, texts and graphical representation. Topographers had a 'hydrographic' perception of regions and landscapes. In many of their descriptions rivers play a dominant role for defining regional and territorial framework.
Riverine landscapes are both, "cultural images" (D. Cosgrove), sites and products of human activity dealing with nature. In premodern societies rivers were object to a multiplicity of even competing options of use, thus they were driving forces for legal regulation and institutionalisation of political power. Due to their fluvial dynamics untrained rivers strongly influenced land use systems and urban development on their banks. How is this reflected in early modern topographical literature? Do the reactions on advantages, problems and risks that are bound to the existence of settlements along the Danube and its tributuaries, the area under investigation, provoque similar or rather different responses in different regions? Do the texts indicate some kind of common mentalities or regional identities? Methodologically the study is based on an integrated analysis of cartographic, graphic and textual representation and a comparative approach.
Environmental history is not comprehensive without also being a history of human perception of nature. Topographical literature is an important type of historical record that provides us this kind of information. Studying the upper Danube river basin from the river's headwaters in Swabia to Vienna, this paper explores how riverine landscapes as "socio-ecological sites" (V. Winiwarter, M. Schmid) are represented in early modern topographical literature. Within a multi-disciplinary set of approaches of science and humanities towards an environmental history of rivers, the paper is a contribution emphasizing the importance of a cultural history approach.

263 **The transfer of hydropower production from local to supra-regional scale: A case study from the Möll River in the 19th and 20th century**

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In alpine areas, hydropower has always been the most important energy resource for agrarian societies. Economic development depended on the possibilities to exploit rivers for energy supply. Up to the 20th century, hydropower was used directly by mills; energy production and consumption coincided spatially. The technological innovations in the second half of the 19th century enabled the transformation of hydropower into electricity and its long-distance transfer to remote consumers. This transition fundamentally changed the interactions between rivers and societies. Hydropower has remained the key energy source in Austria until today, in contrast to other resource components of alpine rivers which vanished, like e.g. transportation of goods due to the exchange of aquatic communication routes by terrestrial ones.
In this presentation, changes in energy production and the consequences for the role of rivers for societies is demonstrated based on the Möll, an alpine river in the Danube catchment in Carinthia. Traditional hydropower required numerous dams and facilities. Management was adapted to the natural conditions of the Möll and its tributaries, which are characterised by high slope, high flood discharges and corresponding sediment loads especially during flood events. In the early 19th century, a total of 750 constructions were registered for 24 communities in a cadastral survey. These supplied mostly local crafts and some industrial facilities with energy. About 40 % of the buildings in the valley had their own flour mills, and almost 50 % had independent hydropower production. Nevertheless, in the 19th century, differences in the numbers of constructions and in their management were evident in the various municipalities. These local distinctions mainly reflected the economic growth of particular villages during early modern times, when mining for gold and silver shaped societies in the Möll valley on a long-term perspective.
Modern hydropower plant construction has influenced the Möll River and the valley since the late 1930s. Today, the Möll provides water for the biggest reservoirs in Austria and has became a crucial river for hydropower supply. The headwaters are abstracted to provide the Glockner-Kaprun power plant with water, the middle and lower sections are influenced by the reservoir and power plant "Malta-Brein". Four further power plants transport water out of the valley or receive water from other catchments. National and even transboundary electricity transfer networks connect hydropower production from the local/regional to a supra-regional scale.

264 **From Fuel Shortage to Sustainable Yield. Environmental Narratives, Social Conflict and the Evolution of Scientific Forestry in Germany 1750 to 1850**

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The paper will focus on the formation period of German scientific forestry from about 1750 to 1850. Learned societies, scientific academies, monasteries and universities provided the places for the creation of a scientific model for a 'modern forest' in the 18th century. This model included the rational and efficient use of timber and fire wood on the basis of 'sustainable yield' exploitation. It excluded agricultural uses of woodlands and discredited users that were not educated on a scientific basis. The five decades after 1800 were characterized by massive conflicts over the implementation of scientific forestry. In certain years several hundred thousand local forest user had to stand trial for violations of forests laws. Violent resistance errupted during the 1848/49 revolution. Scientific forestry had to accommodate the needs of the local population and the demands of liberal economists, who called for higher revenues or a conversion of woodland into farmland. It did so in its peculiar way by drawing up accounting schemes for agricultural practices and distributing fuel wood to the poor. And it adopted a new way of legitimizing centralised scientific forestry by emphazising the protective effects of forests on the environment. The paper will argue that explaining the environmental narratives of scientific forestry needs a thorough analysis of its socio-cultural backround, of the conflicts and the negotiations that occurred during its implementation. Accordingly, the making of environmental knowledge was first and foremost a socio-cultural process.

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268 **The Concept of the Environment and the Practice of Total War during World War I**

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Until recently environmental scholars have paid little attention to the history of warfare. In a similar vein, military historians have, for the most part, ignored the environment. However, the two are closely linked because natural resources always played a key role in the supply of armies, the everyday conduct of warfare and the outcome of battles. The environment has had a great effect on warfare; and military action, in turn, has greatly impacted the environment. This raises many questions with regard to how this interrelationship can be studied.

This paper pursues the question of how the conceptualization and perception of the environment was affected by the outbreak of belligerent military action. In other words, can we speak of distinct notions of an "environment of war" versus an "environment of peace"? From other subfields of military history we know that warfare altered established notions of nationhood, territoriality, and even gender. Can the same be said with regard to the environment? Related to that, to what extent does a more environmentally-centered perspective require us to reevaluate the conceptual boundary between war and peace? Does it make sense to think in exclusively political categories when thinking about the beginning and end of war or does an environmental focus suggest that the boundary between the two is less defined particularly given the long lasting consequences of environmental destruction? In order to add historical specificity to my arguments I will focus particularly on the environmental circumstances of World War I. In general, though, this paper will be less of an empirical account but rather a more theory-oriented exposé focusing on the concepts of war and the environment in order to demonstrate that an incorporation of the environment into the study of warfare requires us to rethink some of the basic premises of military conflict particularly in the age of total war.

269 **Producing the "River of National Unity": Nineteenth century visions of nature and culture in the São Francisco River Valley, Brazil"**

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This paper highlights how 20th century rhetorical and physical landscapes in Brazil emerged from the representations of those landscapes by late 19th Brazilian engineers, with great help from American and European experts. During the early 1930s, Brazilian engineers and elite entrepreneurs called on the Brazilian federal government to develop the São Francisco River's hydraulic potential for electricity and irrigation. Driven by ideas of progress and nationalism, those engineers referred to the São Francisco River as the "Brazilian Nile River" or the "Mississippi River of Brazil," then as the "River of National Unity," and "the reason for Brazil's own existence." This paper examines the role engineers played in the histories of "seeing nature" and "seeing Brazil's national identity" in this river landscape. This paper argues that those histories were saturated with elite understandings of climate, geology, race and nation. Imperial in character, those histories were central to

imperial power during the great scientific and engineering reconnaissance period of the 19th century. To unthink the neo-imperial assumptions found in the "River of National unity" discourses, this paper explores the writings, diaries and maps of two of the most important 19th century scientific and engineering expeditions to the São Francisco River, sponsored by Brazil's imperial government. Embedded in European Enlightenment ideas and Alexander von Humboldt's rational vision of unity in the world, these imperial maps and documents of the São Francisco River created new ways of seeing and representing physical and cultural landscapes. These visions of nature, culture and nation on the São Francisco River ultimately helped produce the 20th century symbol of the "River of National Unity.

270 **The Ecology of Colonial Famines and Wars in the French African Empire, 1864-1916**

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This paper considers recurrent famines which have taken place in the French colonial empire between 1864 and 1914 in North Africa and Sahelian colonial territories. There is limited scholarship on the Algerian famines of the 1860s, little if any on the famines of the 1890s in Algeria and hardly anything on the famine of the conquest and early colonial presence in the Niger region. These understudied cases beg a number of questions relating to the management of the colonial space in the process of imperial acquisition: how did the French armies manage the land they conquered and how did they relate to their African environment? How did the earlier forms of mediated colonial administration perceive issues of resilience and vulnerability? How did they appreciate demographic issues in relation to their dominant concern with tax revenue and sovereignty?

The main comparison will be between two cases, the great Algerian famine 1865-68 and its links to the repression of 1864 and the subsequent war of 1871 and the famines in the Niger region following the conquest in the years immediately prior to 1914 and during the world war. This comparison will enable a re-evaluation of the concept of "colonial war" by stressing the slow burning effects of the forms of demonstrative violence favoured by the colonnes of the French army which practiced extensive ecological damage as a form of warfare and contributed directly to its deep alteration through military implantations, population displacements and the introduction of spatial control.

The normal run of colonial administration of early "peace practices", routine collective punishments and repressive action shaped a perception of the colonial ecosystem which included the native people in often contradictory manners. The analysis of the different tribal systems either fixed practices of space or disrupted them profoundly (the struggle against pastoralists in the Sahelian region). While often anxious about the vulnerability of local societies, the French military produced contradictory discourses on what degree of rule and development one should or could impose by force.

273 **Forest, Frontier and Wilderness: The making of Naga Environmental History (1870-1990)**

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Nagaland, the North Eastern frontier state of Indian subcontinent remains one of the most disturbed frontier regions even after five decades of post colonial Indian governance. Prior to 1947, when India attained independence from the colonial government i.e., the (British Raj), the Nagas were independent in certain pockets where colonial administration lacked governance. This includes mostly territories along the vast Indo–Burma frontier that today lie in Myanmar (formerly Burma) across the Arakan watershed. These unadministered territories existed in the colonial period partly due to non revenue generation of the hill and also because the frontiers were not demarcated by boundary line (1). The paper attempts to reconstruct Naga environmental history through a cursory analysis of colonial records on frontier policy that inherited elements of coercive control and conciliation. Both these strategies of rule worked hand in hand as the Naga landscape had geo-political significance for the British Empire in South Asia following the growing influence of French imperialism over China and an unstable Burmese frontier.

By analysing Naga colonial ethnography and historical records, I will try to explain how colonial policy towards forestry and forest conservation was premiered over revenue or permanent settlement and how it ultimately marginalised the Nagas and restricted their entry into forest reserves. By maintaining the status quo of Naga customary laws over civil and criminal jurisdiction that was uniformly applicable all over British India, the structural changes within Naga society, the privatization of community owned land have grown unhindered. While customary and usufruct rights on community land have been maintained the amendments to forest conservation laws and Jhumland (swidden farming) regulation and acts (1896, 1946, 1970, 1979) have impacted the livelihood of the local people (2).

The paper would explore these complexities by arguing that colonial and post colonial strategies of governmentality in the Naga Hills has been shaped by scientific practices on forest conservation (3) and the exigencies of post colonial borderland politics neglecting the changes in indigenous farming practices (swidden) and growing landlessness within the Naga community. It reflects contemporary human insecurity in Nagaland. The paper would contribute towards understanding communities at the margin of the nation state and how environment history is constructed by a complex set of state politics and policy measures that try to nationalize the frontier space and maintain the structural inequalities (economic and social) that emerge within frontier communities. (4)

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274 **Discourses of Deforestation in New Zealand 1920s to 1990s**

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New Zealand was heavily forested at the time of European colonisation in 1840 and had been even more completely forested before human arrivals. This presentation is prompted by intersecting incidents, triggered by a 'debate' over estimates of forest area of New Zealand in 1840 as part of my contribution to Environmental Histories of New Zealand (Pawson and Brooking, 2002) sharpened by Denevan's 'The Pristine Myth; The Landscape of the Americas in 1492' and Demerrit's (2001) 'Scientific forest conservation and the statistical picturing of nature's limits in the Progressive era USA'. Together these shed some new light on the manner in which estimates of forest cover had provided a rationale for the implementation of an exotic afforestation programme and more recently have implications for the Treaty settlement process.

279 **Rivers between Empires: Luigi Ferdinando Marsigli's 'Danubius Pannonico-Mysicus' as observation of a socio-natural site (the middle Danube river basin in the late 17th cent.)**

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L. F. Marsigli, a learned Italian count in Habsburg's emperor's service, was sent several times between 1679 and 1701 to regions in Hungary, Croatia, Serbia, Romania, Bulgaria and Turkey. In this vast tract of ground the two Empires of Habsburg and Ottomans fought and struggled for hegemony in Central Eastern Europe. Habsburg tried to gain ground in recently conquered territories and Marsigli was the one to gain the necessary socio-ecological information. He had to construct bridges and roads for his emperor's armies and to advice the Viennese court about possible boundaries between the two superpowers. Travelling unceasingly, he surveyed vast areas and learned to disentangle the confusion of names of places and mountains in the multi-lingual Danube river basin. But above all, count Marsigli was interested in rivers.
Rivers were important not only for strategic considerations, from a western European perspective they were the threads to be knotted in a web for one's orientation in this terra incognita of the Balkans. His service in warfare gave Marsigli the chance to master, as he wrote in a letter to the Royal Society in London in 1691, the "anatomy" of the Danube. Warfare laid the groundwork for scholarship and Marsigli's scholarship became manifest in his "opus danubiale" published in Amsterdam in 1726 – six richly illustrated volumes filled with geographical, astronomical, hydrographical, historical and economical observations.
This paper presents a re-reading of this source, which so far has been used for the history of science and cartography, from an environmental historians' perspective. Marsigli sketched the course of the river, measured the speed of its current and its depth, tried to understand the migration of fish, observed fishers and asked them to name their catch; he collected mushrooms and mapped their habitats in a map originally drawn to show the new frontier between the empires.
Marsigli observed riverine socio-natural sites in which material arrangements of cultural artefacts and natural objects were formed by human practices, which themselves were determined by (often far older) arrangements. What becomes particularly striking is the importance of historical thinking for the way natural environments are perceived. Marsigli was fully aware that not far from the place where he was building a pontoon bridge across the Danube, Trajan had built a bridge sixteen centuries earlier.
This paper discusses the potentials of a source like Marsigli for an environmental history interested in rivers as socio-ecological realms. What are the potentials and limitations of this source to reconstruct riverine landscapes before industrialization? With the case of Marsigli the paper also tries to shed some light on the role of warfare in the appropriation of nature in early modern Europe.

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286 **A Controversial Platform: The Politics of Fishermen and Environmentalists in the Rigs-to-Reefs Debate**

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This paper examines the roles of fishermen and environmentalist organizations in the shaping of offshore oil platform conversion policies. Since the 1980s, some offshore oil and gas platforms in the Gulf of Mexico (USA) have been converted into artificial reef material after the platform's decommissioning. Rigs-to-reefs policies, as this practice is called, have been suggested for the California coastal waters and the North Sea although proponents have been unable to institute the policies. Although one might think the debates would focus on scientific evidence about the merit of oil platform material as an artificial reef, they have often instead been heavily influenced by the positions of fishermen and environmentalist organizations. Neither of the two groups'

responses have been homogeneous – there are proponents and opponents of the rigs-to-reefs idea in both groups – and their voices have carried different weight in the debates in the US and European Union.

There has been little research into the historical development of the rigs-to-reefs program, which is a vital issue to the oil industry. Salcido (2007) has discussed some of these issues within a US legal context, but she advocates a clear position against the program rather than analyzing it for a historical understanding of the developments. The role of fishermen in the North Sea discourse has also been discussed (Baine and Side 2003; Baine 2002). There has been no comparative study of the roles of both fishermen and environmentalist organizations in both the US and North Sea contexts.

This paper will expose how various factions within the fishing industry and environmentalist movement have framed their support or opposition for the program and what influence that has had on policymaking activities. Several types of sources reveal these positions and their influences: media coverage (newspapers, trade journals, video broadcasts) of the rigs-to-reefs debate from the mid-1980s to 2008, correspondence from the organizations, and governmental papers. A historical comparative study of the fishing and environmental positions and how they influenced oil industry policy is critical to assessing how current policy came into being.

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289 **Calling the Wild**

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The symbolic resonance of large ferocious wild animals–the traditional representatives of what seems most threatening about the natural world–has proved much more durable than their physical presence. They have gained in glamor as their range and populations have diminished, although, as recent resistance to wolf reintroductions has demonstrated, traditional fears and antagonisms remain readily accessible. And if wildness in landscape has been effectively (albeit controversially) problematized, the same cannot be said for wildness in animals. In a world where human environmental influence extends to the highest latitudes and the deepest seas, few animal lives remain untouched by it. Domestication is similarly difficult to define; its impact has varied from kind to kind, as well as from creature to creature. So entangled have wildness and domesticity become that it is now necessary to warn visitors to zoos and parks that lions and bears may bite the hands that feed them, and, conversely, it is now possible for domesticated animals to represent nature. My paper will explore this set of paradoxes and ambiguities with specific reference to two opposed modern tendencies: the inclination to regard wild animals affectionately, as pets, and the inclination to imagine or emphasize the untamed qualities in livestock animals.

291 **Between a Rock and a Hard Place: Attitudes Towards 'Exotic' Species in Early Modern Europe**

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In recent years, headlines announcing the "invasion" of foreign species of plants and animals, while denouncing their ecological impact, have begun to appear with greater and greater frequency, competing with wars and financial crises for our attention. A plethora of scientific articles and books, furthermore, have earned "invasion biology" currency as a timely and urgent specialization within the earth and environmental sciences. Yet the news of the movements of species from one part of the globe to another is, in fact, scarcely new; even in antiquity, commentators like Pliny repeatedly made note of plants and animals that had settled in new places and rapidly, even seamlessly incorporated themselves into their new environments. These ancient natural newcomers were scarcely regarded, if Pliny is any judge, as "invaders" in the lands they colonized; rather, they were usually spoken of as relatively benign immigrants. Whence, then, this modern emphasis on "invasion"? This paper will argue that much of the modern militarized rhetoric of "invasion" can be seen as having deep roots in the ways in which Europeans responded, during the sixteenth and seventeenth centuries, to the perceived threats posed by the influx of "foreign" and "strange" substances in Europe during the era that followed what Alfred W. Crosby, Jr. has termed the Columbian Exchange. In a recently published book (see below), I explored the ways in which many physicians and naturalists, in particular, condemned Europeans' fascination with the exotic and chose instead to devote themselves to chronicling its "indigenous" natural worlds. In this paper, in contrast, what I propose to do is, drawing on some new research I have conducted, to examine the ways in which educated Europeans, *without* using the word "invasion" or anything close to it, nonetheless came to discuss "exotic" and "outlandish" lifeforms in geopolitical terms, positing animals and plants as "citizens" of the locales that gave them birth, and harboring grave doubts about their ability--as well as right--to survive elsewhere. By exploring some of the very *different* ways in which plant and animal migrations were viewed in early modern Europe, the paper hopes to shed new light on the origins of the modern preoccupation with bioinvasion.

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292 **Contested Places: Weeds and 'Warfare' in the South Pacific**

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The use of military metaphors and gendered language in descriptions of the contest between humans and those elements of the natural world that have come to be regarded as inimical to human interests can be traced from the Old Testament world into the 21st century. In 'War and Nature' Edmund Russell has outlined the increasing use of militaristic images in the contest between humans and their insect pests from the 1914-18 European War onwards.(1)

In the first section of this paper Neil Clayton explores the use of similar warfare images and metaphors in the contest between people and their weedy floral pests. His analysis is set within the context of the Pacific basin, with particular emphasis on responses to the introduction of 'alien' floral species into New Zealand's complex Gondwanan environments. In the second part of this paper Fiona Clayton compares, again largely within the New Zealand context, the gendered nature of this imagery with the role that women played in the introduction of floral species into Antipodean places, with many of those species later being labelled as 'pests' by male-dominated agricultural and scientific communities. The authors conclude that this imagery has obscured the complex realities underlying the relationships between people, their weeds and the places they contest.

1 Edmund Russell 'War and Nature, Fighting Humans and Insects with Chemicals from World War 1 to Silent Spring', Cambridge: Cambridge University Press, 2001.

293 **'The Second world War and the Environmental History of the Pacific Islands-Tarawa: from an isolated atoll to a bargaining tool"**

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Several historians have commented on the relationship of military history and environmental history as running in parallel but rarely intersecting. This is evident in the USA where perhaps environmental history as a sub-discipline has become more prominent. It was there that one of the first attempts to address the intersection of war and environment began with Natural Ally, Natural Enemy. The Pacific Islands and World War Two in the Pacific offer a challenging focus for the environmental historian simply because of the diversity of the Oceanic environment. What might be true of an atoll such as Tarawa may not hold for high islands such as New Guinea. It is Tarawa that I focus on, less as geographical exemplar, but as a text of memory and politics between those foreign to the region. In the nexus between war and environment human perceptions assume significance. Tarawa was the site of a major American amphibious landing against the entrenched Japanese. Its atoll environment became the site of death for hundreds of American, at least half of whom were never found and many bodies found were never identified. Thus Tarawa became both burial ground and memorial to the Americans. This loading of place with sacredness and memory rapidly became a bargaining chip among the allies, Britain, Australia and New Zealand as well as the United States in trying to protect their own interests in a post war world.

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298 **"The Consequences of this promiscuous ownership": Island biogeography of a Mohawk reserve**

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This paper highlights the relationship between land-ownership and ecology on a particular Amerindian territory, and how this relationship caused the territory to become a biogeographical island. A Geographical Information Systems (GIS) analysis forms the basis of this study. Taking data from an 1885 government land survey of the Mohawk community of Kahnawake, it reveals indigenous patterns of land-ownership and land-use, as well as the nation-state's project to eliminate them through a complete resurvey and redistribution of land. GIS maps also reveal that ecological communities inside the territory were substantially different than those of surrounding areas. This paper argues that indigenous land practices, particularly land-ownership practices, were the determining factor in the formation of this difference.

The focus of the study is today a community of 8000 people occupying over 5000 hectares and surrounded by Montreal's suburbs. In 1885, as today, Kahnawake was heavily forested and sparsely populated. Its unfenced

and often invisible property boundaries, irregularly shaped lots, and unploughed soil were markers of cultural and ecological difference in the region. Government agents tended to blame lack of farming and the overabundance of land conflicts on a "promiscuous ownership," by which they meant Kahnwake's distinctive land-tenure customs. In other words, distinct land practices had led to the emergence of distinct ecological communities. The Canadian government intervened by attempting to do away with indigenous land practices, hoping that regularized land-ownership would be one step toward the elimination of cultural and environmental difference. Interference such as this caused political factionalism among Mohawks (Gerald Reid 2004), but also contributed to a traditionalist resurgence and a powerful new communal determination to defend the territory against incursions of all kinds.

This paper builds on the work of Sarah Carter (1990) who showed that the Canadian government's supposed efforts to help Amerindians to become farmers tended to have the opposite effect. It also represents an important contribution to ongoing worldwide debates concerning indigenous people's relationship to the environment (Krech 1999, Cronon 1983) and to nation-states (Cole Harris 2002, James Scott 1998). In contrast to those who suggest that human beings act primarily in response to geographical opportunities and constraints, this paper argues for an approach that foregrounds cultural factors when considering questions of ecological difference.

301 **Bridges and Ports: Interfaces in city-river relations**

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Over the last two decades we could observe comprehensive processes of re-using and re-appropriating urban riverscapes, which had been devoted to commercial usage such as urban ports, to luxury housing and leisure purposes, from London Docklands or Hamburg HafenCity to Frankfurt Westhafen. These processes of 'recycling' direct our attention towards the period when this fundamental physical and environmental transformation or rivers courses within cities set in. Industrialisation, particularly the mechanization of goods transport on rail and water from the middle of the 19th century, posed new challenges and carried with it new requirements how rivers could accommodate these new modes of transport. Whereas traditional shipping by sail or haul usually could be contained within the city along a fortified quay offering space for loading and unloading and temporary storage, steam-driven or –drawn ships and barges needed special and protected basins with mechanized loading and unloading facilities and frequently also rails to ensure transshipment with least possible input of manual labour. And given the increasing width and draught of steam ships, traditional bridges with their relatively narrow and low stone arches increasingly came to be seen as traffic obstacles.

At the same time urban growth and increased urban traffic more and more exposed existing bridges as insufficient bottle-necks. Thus in the second half of 19th century in many European cities on a major river a period of extensive bridge building set in, first of all to span rivers for new rail transport, but soon also to increase the number of crossings in order to facilitate intra-urban transport within the expanding urban territory. This process of building ports and bridges should be interpreted in terms of general urban and environmental history as increasing functional specialization: The Old Bridge in Frankfurt, dating back to mid-fourteenth century, had not 'just' bridged the river Main, but had also served as a site for material metabolism such as milling, the discharge of waste and feces, as stage for public executions, as part of city fortifications and public memorial for social discipline. Many of these functions were taken over by special institutions and infrastructures in the 19th century.

The paper will analyse this process of transforming the river by building bridges and ports in the 19th and early 20th century with Frankfurt (Main), Mainz and Mannheim (Rhine) as case studies. It will be asked how bridges and ports were dealt with as interfaces in city-river-relations, which possibly diverging notions of the river and its role for the city can be identified in planning and implementation processes. It will also be reflected, how local and urban policies towards the river interacted with larger processes of regulating rivers as driven by state governments and shipping interests.

302 **Nature's Counter Attack. War and New Zealand Environmental History**

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New Zealand has had five major experiences of war, each producing significant impacts upon the environment, while the distant Korean and Vietnam wars produced 2-4-5-T which also left its mark.

The so called musket wars of the 1820s not only moved Maori iwi (tribes) around the country but led to the taking of many more slaves as some Iwi used their temporary military dominance to develop large scale crop farming.

The New Zealand Wars, which flared between 1844-45 and 1860-1872, undermined the progress of Maori crop and stock farming as successive European governments confiscated, or bought the best land for farming at very modest cost. After these wars white settlers moved into heavily forested areas, removed trees and drained swamps to make way for pasture.

The Boer War of 1899-1902 saw a small shift away from pastoral farming to raising grain, especially oats as horse breeding flourished briefly. The First World War between 1914 and 1918 produced much greater

environmental impacts than the earlier musket (1820s) wars between the tribes, or the New Zealand Wars from 1844-1872 between British troops and Maori allies against other tribes. because New Zealand won access to phosphate on the formerly German owned Nauru and Ocean islands. Without this fertiliser New Zealand's largely infertile and exhausted soils would not have been able to support spectacular increases in production. War also encouraged more careful planning and a much more sustained application of science to increase productivity and efficiency. The British Government helped establish the Department of Scientific and Industrial Research in an endeavour to improve its food supply in time of war while the New Zealand Government established Massey Agricultural College, upgraded Lincoln Agricultural College and established several other research institutes to take advantage of Britain's post war needs. New Zealand agriculture reached its environmental limits in the process and much reversion of farmland occurred as the Great Depression hit along with erosion and flooding problems in the 1930s. The Second World War though probably produced the greatest environmental impact because it provided the technology to fertilise the rugged hill country via aerial topdressing. So the flood gates of development opened as New Zealand farmers attacked regenerating bush with renewed energy and increased stock numbers spectacularly as they carried through the so called 'third grasslands revolution'. The new technologies and chemicals such as the insecticide DDT, which made farming less labour intensive and much more productive, apparently quelled nature's counter attacks that occurred during both the Depression and War. Without the War New Zealand's agricultural recovery would have been slower and the environment would have had longer to make its counter attack. Agricultural bureaucrats and scientists determined to win the 'battle' against nature in the form of increasing erosion, flooding, droughts, leached soils and returning native forest, gained impetus and influence as new opportunities opened up and the Korean war inflated commodity prices down to the 1960s.

303 **Red coats and wild birds: military culture and ornithology across the nineteenth century**

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The proposed doctoral research will interrogate the intersections between military culture and the practices and ideas of ornithology across (and beyond) the multiple sites of the nineteenth-century British Empire. As regiments secured colonies and trade routes overseas, the British military embodied national and imperial power following the successes of the Napoleonic Wars and colonial expansion in Asia, North America, Africa, and the South Pacific. With unique flora and fauna new to science, British military sites provided ample opportunities for naturalist activities in the colonies and informal spaces of empire. The privileged and well-trained officer not only mastered cartography, gunnery, and fortification, but also scientific practices of classification, documentation, and travel writing, which all helped to sustain the romance of warfare integral to British imperial culture. Considering that British officers often occupied several imperial sites throughout their military careers, to what extent and in what ways did British military officers engage in ornithological activities? How were these activities facilitated by their postings to different sites and did they help the advancement of their careers? How did imperial ornithologists encounter different local cultures (with different attitudes to hunting, birds, field science etc.) and different local natures (different sets of birds and environments)? How were officers' identities shaped by class, ethnicity, and gender, and were they negotiated by being simultaneously immersed in cultures of the military and ornithology?

Major objectives of the study:

- To determine the relationships between trans-imperial careers and ornithological practices, ideas and the discipline of ornithology itself across (and beyond) the multiple sites of the nineteenth-century British Empire;
- To analyze how imperial ornithologists encountered different local cultures (with different attitudes to hunting, birds, field science etc.) and different local natures (different sets of birds and environments);
- To determine British military networks, sites, and practices of ornithological knowledge production and consumption, and whether ornithological interests or expertise propeled imperial careers;
- To investigate the ways imperial careers/colonial lives may be written using not only textual sources but also traces and artefacts of material culture

308 **Biological and chemical research on water bodies in Berlin in the late 19th and early 20th century**

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In 1820, Berlin had about 200.000 inhabitants in an area of about 20 square kilometers. During the next decades, the number of inhabitants increased continually reaching more than 1.5 millions at the end of the century. This continuing increase was induced by the reforms of Stein-Hardenberg (1807-1812), industrialization and the fact that Berlin became capital of Germany in 1871. As in many other urban and industrialised areas, these developments led to severe river pollution. In Berlin, water pollution was a major problem during the 19th century because the city's river, the Spree, has a low flow rate (discharge) and was flooded with domestic and industrial waste water.

In the 1850's, biologists and agricultural chemists started doing research on dissolved matter and plankton. After 1870, medical scientists figured out that organic contaminated water causes epidemic diseases, and bacteriology became a subject in its own right. Robert Koch was the founder of bacteriology as a research direction. In 1870, the report of the British Royal Commission was published and river pollution was identified as a major problem, not only in Great Britain, but in other industrialized countries, such as France and

Germany. The concept of self-purification of rivers was discussed for many years: Pettenkofer, an especially insistent proponent of this idea, argued that diluting one part waste water by 15 parts water would do. After construction of the Berlin sewage system, fish die-offs took place nearly every time after a heavy rain. The economic damage to fishermen was enormous, so that the Prussian Ministeries and the Berlin Municipal Council (StVV) started to address the problem. Scientists were invited to investigate river pollution and the dynamics of chemical and biological processes in water bodies. In Berlin, the first field investigation on chemical components and bacteria in the Spree and Havel was done by Frank in 1886/87. In 1896, Dirksen, & Spitta examined chemical and bacteriological profiles on Berlins water ways. Three years later, Spitta studied river pollution and self-purification of rivers in the Berlin region. In 1901, a research institute for water supply and waste water disposal was founded. Hydrobiologists proved that sporadic chemical analyses of river sites were inadequate to estimate the longterm consequences of river pollution. Only in the early 20th century, after decades of chemical and biological research by many scientists, did Kolkwitz and Marsson develop the saprobe system to evaluate water quality. Saprobie is the intensity of biological reduction done by plankton (aerobic bacteria, animals, plants, etc.), which is consuming oxygen from watercourse. It is a biological determination of water quality and levels of organic pollution in rivers and streams resulting from waste water. This system is still in use throughout central and eastern Europe. The saprobe system is only valid for lowland watercourses and its application needs a lot of experience by the investigator.

309 **'A geopolitics of "nature": place, travel and the International Phytogeographical Excursion, 1911'**

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What we consider 'nature' is always historical and relational, shaped in contingent configurations of representational and social practices. In the early twentieth century, the English ecologist AG Tansley lamented the pervasive problem of international misunderstandings concerning the nature of 'nature'. In order to create some consensus on the concepts and language of ecological plant geography, Tansley founded The International Phytogeographical Excursion which brought together leading plant geographers and botanists from North America and Europe to explore the vegetation of a particular host country. The first IPE traveled through the British Isles in the month of August 1911: the initial leg of the journey into the Norfolk Broads was led by Tansley's former student at Cambridge, the ecologist Marietta Pallis. 18 further official IPEs were held intermittently throughout the 20th century. This paper, highlighting the work of Pallis, revisits the languages and politics of nature and the 'natural' traced by the first IPE. Particular emphasis is placed on relations between her work and that of Tansley and American ecologists HC Cowles and FC Clements. Understanding 'place' as a network of relations, our regional focus begins to consider how taking international dialogue, travel and interchange into account might alter and enrich an analysis of ecological practice.

310 **Erasing Industrial Pasts to Manufacture Natural Settings: The decontamination and embellishment of rivers in Quebec since 1945**

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In the aftermath of World War II, a series of governmental initiatives in Quebec targeted the decontamination of rivers and the purifications of industrial and municipal effluents to create a clean and safe environment. These initiatives, and local controversies over water pollution, steered a series of debate on the recreational vocations of water streams in Québec and on sanitary standards for drinking water. Aquatic environments were the products of a century of industrialization and urbanization that had seen waste from different industries and cities modifying the content of the water streams. That problem was exacerbated by the decomposition of logs driven down to sawmills and by agricultural waste purposely discharged in rivers. The resulting decrease in the availability of oxygen modified the fauna and flora of the rivers. Furthermore, the construction of dams profoundly changed the river environment by influencing its hydrology and the capacity of certain species to migrate along the watercourse. Finally, settlement, land clearing and housing development on the riverside increased soil erosion and augmented the sedimentation of the river bed. Governmental scientists in wildlife management, sanitary and civil engineering, forestry, and hydrology designed projects to recreate original ecosystems – through the re-introduction of fish species, the dredging of the river bed to eliminate sediments, and the reforestation of the riverside. The implementation of these projects which more or less aimed at erasing the industrial past of the contaminated rivers clashed not only with the users of the river, but also with a nature that was not flexible enough to reintegrate its initial cast. Thus, the rehabilitation efforts sought to produce a landscape on top of the «Second Nature» of industrialized rivers. How was the shape of this ideal environment negotiated with local circumstances and how did humans and non-humans intermingle to offset the ideal environment? To answer those questions, this paper will examine the controversy surrounding the decontamination and embellishment of rivers in different agricultural, industrial and urban settings in Quebec. These case studies will enable us to demonstrate how a «Third Nature» resulted from the ideal environment designed by local populations and government technocrats, and negotiated with past ecosystemic changes and current stakeholders.

312 **Aluminum, commodity chains and the environmental history of the Second World War**

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The Second World War drove an unprecedented search for resources at a global scale to supply military activity in Europe, Asia and beyond. This paper contributes to recent debates about the environmental consequences of

global warfare by examining how total war produced new commodity chains over distance to deliver scarce military goods to combat zones and how those commodity chains precipitated different social and environmental effects along chains. The approach thus seeks to broaden our understanding of the global environmental reach of site-specific military activity, and, from another perspective, to highlight the critical role of military demands in producing long distance commodity chains in the world economy. In conclusion, the paper also addresses the commodity chain concept, its uses and weaknesses in environmental history.

Focusing on aluminum, a critical mineral used in alloys for aircraft construction, the paper traces the mineral's enrollment into the war economy of Britain and therefore Canada, Jamaica and British Guyana: from the Battle of Britain, where the air war was in some sense inaugurated, to aircraft manufacturing facilities in Britain and Canada, to the aluminum smelters and power dams of Quebec, where the bulk of British and commonwealth supply originated, to the mines of British Guyana and Jamaica, where bauxite, the primary resource input for aluminum production, was extracted.

Although similar commodity chains existed in the inter-war period, the war shaped them in new ways. First, demand soared. As a result, firms like Alcan, the major Canadian aluminum firm, and the primary supplier of British and Commonwealth air forces, stepped up production. After the United States entered the war and faced its own aluminum shortages, Alcan increased production again to meet about one third of US wartime needs. Second, increased production created secondary effects on water and land use. In Quebec, where Alcan smelted alumina in a highly energy-intensive process, the aluminum program led the way for a rapid period of dam construction on the Saguenay River and the diversion of electrical current across a wide zone of central Canada almost all of which depended on hydro-electricity. In British Guyana and Jamaica, the search for more bauxite intensified the exploitation of existing sites and led to a sharp rise in land conversion as tropical forests gave way to clearing crews and open pit mines. Third, war demands produced path dependencies. Because aluminum production involved enormous fixed costs (primarily in the smelting stage), wartime expansion could not be easily curtailed in 1945 without producing massive unused capacity. As a result, Alcan and other firms moved swiftly to reach consumer markets in the postwar before the emerging Cold War once again drove up demand.

313 **Allies Burning for a Hinterland: Asbestos and the Second World War**

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Asbestos was an essential part of warfare in the 20th century. The usefulness of the fire-retardant mineral during times of great conflict was introduced during the First World War when uniforms were constructed out of asbestos fibre, but it was not until the Second World War that the "magic mineral" became fundamental to the Allied fight as major cities were fire-bombed and the conflict raged on.

Prior to the Second World War, industrialized countries were only beginning to understand the practical and imaginative applications of asbestos, a fibrous mineral that can be broken apart and woven into fireproof products, including clothing and insulation for buildings, airplanes, and warships. While Europe was one of the largest manufacturers of asbestos-based products before 1939, the closest deposits of the mineral were found in the Soviet Union, which, even after it joined Allied forces in 1941, was not a place nor a government western Europe wanted to depend on. Instead, it turned to Canada, where the world's largest asbestos deposits are found and where both France and Britain had historical hinterland claims on natural resources. The Second World War was a time in which this hinterland was re-established and redefined.

At this time, almost no asbestos was processed in Canada and the majority of the fibre was taken from the mines, bagged, and sent to factories around the world. This paper will examine how the western European demand for the mineral during the Second World War created a global "asbestos boom" at the time of the conflict and afterwards, and solidified Canada's role as an eternal hinterland, rather than as a burgeoning ally.

Furthermore, it will question traditional understandings of "hinterland" and "ally" by tracing how the United States appropriated this cross-Atlantic relationship as shipping to European factories became too difficult to navigate, and the nation joined the Allied Powers in 1941, declaring asbestos to be an "essential mineral" to its effort. With Britain on the brink of collapse, the United States seized the opportunity to turn its northern neighbour into its own natural resource hinterland, and Canada sold to the highest and most powerful bidder.

This paper will show how countries with a colonial drive dictate the rhythms and rates of resource extraction in less powerful nations during times of crisis, turning them into new manifestations of hinterlands. In addition to this, following the war, a new conflict arose between European reconstruction and American suburbanization, both of which required massive amounts of the flame-retardant mineral, which had become synonymous with safety and power. Western Europe and the United States battled each other for control of the Canadian asbestos market, with America emerging as victor by the time the Cold War began, placing Europe second in command and demand, and instilling in Canada a deep faith in the ability of its asbestos deposits to eventually set it free.

315 **Ecological engineering" at the Museum of Natural History: the administration of nature in the Aquitaine Region between 1966 and 1968**

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After World War Two, natural history in France tended to apply on the metropolitan territory, a gaze first devised in the colonies. If one wanted to understand a space considered "natural," independently of the locality under scrutiny, one needed to acknowledge man's influence on nature, especially from an agronomical or hydrological point of view. In the midst of decolonisation, researchers of the Museum National d'Histoire Naturelle (MNHN) came back to the metropolis by renaming themselves "ecologists" and changing their practice and understanding of nature to acknowledge the anthropic dimensions of natural space. Rural territories then became their favoured research site and formed the "inner frontier" of France, especially to accommodate the increasing number of tourists that deserted colonial resorts to explore the natural spaces founded in the countryside. In that regard, what was named land use planning (aménagement du territoire) in the fifties and sixties in France can be regarded as a precursor of "ecological engineering": a technocratic practice that seeks to mitigate the need to maintain the natural environment and the development of the social uses of natural spaces of the countryside. Created in the MNHN in 1959, the "Service de Conservation de la Nature" (SCN) was presented by its parent institution as "the only official body skilled in that matter" in France, whether it concerned faunistic and floristic inventories or regulations to protect natural spaces and species.
This paper deals with the collaboration between the SCN and the Interdepartmental mission for the Infrastructures of Aquitaine Coast, in France, between 1966 and 1968, to address the utopian projection of a perfect milieu and its articulation within specific ecological relationships. It focuses on administrative documents and inventories of biological landmarks to analyse survey practices that stressed notions of threshold, zoning, etc. for the management of natural spaces (forests, sand dune etc.) and landscape design incorporated in the Aquitaine Coast project. It argues that the creation of infrastructures, such as the natural regional park in the Leyre Valley and the centre for nature study in Marquèze, rested on the pragmatic implementation of idealized ecological relationships to space.

316 **Unearthing rule: nature, colonial rule and the production of an extractive economy on the Zambian Copperbelt**

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This paper seeks to explore the constitution of a world centre for copper mining on the Northern Rhodesian (Zambian) Copperbelt in the early years of colonial rule. It argues that the process of producing an extractive mining economy and realising colonial control rested on the reworking of existing socio-ecological relationships in Northern Rhodesia. Drawing initially on the work of Bunker and Ciccantell (2005), the paper extends their arguments regarding the expansive dynamics of capitalism and the materiality of nature to address the political, economic and cultural processes that produced the distinctive 'new' natures of the Copperbelt in the early twentieth century.

In seeking to elaborate and extend Bunker and Ciccantell's account of the extractive economy, the paper mobilizes the concept of 'colonial governmentality' (Scott 1995, Braun 2000). Governmentality is centrally concerned with the rationality of government, and the mechanisms of power through which alignments of governable subjects and governable objects are produced (Watts 2003, Rose 1999). The paper explores how the concept of governmentality might be used to understand the ways in which colonial power worked to territorialize and entrench extractive socio-ecological relations on the Copperbelt. In particular, it examines socio-environmental tactics and strategies deployed by colonial authorities seeking to create self-improving individuals who would act and participate in Northern Rhodesian society and economy in modern and 'useful' ways. The paper explores how colonial subjects were realigned through the introduction of environmental policies combined with new tax regimes, political structures and commercial organisations introduced onto the Copperbelt. Together these reshaped society-nature relationships in ways which enabled the extension of colonial rule and the establishment of an extractive economy. This was, however, far from a smooth process of extending the reach of colonial power. The latter section of the paper explores that ways in which these attempts to rework socio-ecological relations were thwarted and resisted by both the indigenous populations and the biophysical territorial 'qualities' of Northern Rhodesia itself.

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317 **The National Park of the Cévennes : from natural habitat to country, 1970-2004**

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When, in the early 1960s, the French government claimed that the national territory did not possess any space deprived of human occupation, it created natural parks with a peripheral area reserved for regional development. While this conception of the national park turned out to be a failure with regard to the growth of the peripheral zone, the central zone that formed the core of the park benefited from the formation of a specific landscape.

The evolution of scientific research in national parks captures this changes. This is especially the case when one

considers the changing status of the national park of the Cévennes. First being declared an «exceptional natural milieu» to be preserved, the park became «a landscape to be improved and valued» within the span of two decades. Thus, during its first fifteen years, the activities of the park were entirely focused on research related to the natural environment: survey of flora and fauna, reintroduction of species and follow-up, etc. However, from the 1980s on, in a context of decentralisation and valorisation of the «local», the scientific approach encompassed other domains such as vernacular heritage, oral tradition, or regional identity of protestants and miners. Architects, ethnologists and historians joined the scientific staff of the national park of the Cévennes, heretofore composed only of natural scientists. Our paper focuses on the evolution of a space classified as a national park for its natural endowment, until it became a «country», that is a local territory where nature and culture ceased to be dissociated. It is based on an analysis of the scientific research produced within the park since its foundation, as well as on the tools and infrastructures (interpretation trail, ecomuseum) developed and handed over to the users of the park and the local population to orient their reading and understanding of the landscape.

Landscape transformation influenced the spatial representations of both the local population and the tourists. For the former, the ideal and the ideology that the park diffused participated to their daily routine, leading new rural inhabitants to feel more local than the natives did. As for the tourists, they became less interested by the exploration of a virgin and inhabited space. What mattered was the discovery of an identity and a culture embedded in a natural habitat, therefore idealising a space that seemed to have resisted the demographic and urban mutations happening in the rest of France.

318 **From Timber Cutting To Precambrian Wonders : The Ecological Reinterpretation of La Mauricie National Park's Landscape History, 1969-1979**

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While the federal agency responsible for natural parks in Canada states that national parks are meant to « protect for all time representative natural areas of Canadian significance », the fulfilment of this mandate remains geographically and socio-historically contingent. Scientific knowledge and discourse are used to conceptualize a preserved wilderness that, nevertheless, is the result of social representations. The latter effectively imagined the biophysical dimensions of national parks into a « wild nature». Those symbolic and material dimensions are crystallized in the official « natural history » of national parks produced by Canada Parks, as well as in the restoration efforts undertaken by the federal agency. This paper explores the creation of this ideal wild nature by focusing on the specific case of La Mauricie National Park, established in 1970 in a territory where timber and game had been exploited for centuries. Specifically, I discuss how the fundamental romantic representations of national park's wild nature, born in the mountainous landscapes of north-American western « frontier », were actualized in the case of La Mauricie National Park through the medium of scientific ecology. By objectifying La Mauricie's humanized landscapes through scientific concepts - transforming, for example, timbered forests into « typical ecosystems of the Precambrian region » -, scientific ecology enabled the reinterpretation of the hybrid characteristics of that territory in accordance with the institutional ideal of wild nature, creating a recreational scientific park. By studying the master-plans that produce the official « natural history » of La Mauricie National Park, and by analyzing the archives documenting past industrial and recreational land-uses of the area, this paper discusses how deep-seated representations of nature influenced the materialization of institutionally-produced « natural » objects. It also addresses the role of scientific rationality in legitimating territorial transformations, such as those resulting from the implementation of a park in a given landscape.

319 **Seasonal climate variability and famines in Medieval Europe (1200 to 1499)**

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In his fundamental work on medieval climate Alexandre (1987) highlighted the significance of dealing with contemporary sources. Recently, long series of temperature indices for "summer" and "winter" were set up by Shabalova and van Engelen (2003) for the Low Countries, but the time resolution is not strictly seasonal. This paper worked out within the EU 6th Framework Project "Millennium" draws on critically reviewed documentary evidence from a spatially extensive area of Western and Central Europe (basically England, France, BENELUX, Western Germany, Switzerland, Austria, Poland, Hungary, todays Czech Republic. Northern Italy and Catalonia). The narrative evidence is complemented with dendro-climatic series mainly from the Alps (Büntgen et al. 2006). Each "climate observation" is georeferenced which allows producing spatial displays of the data for selected spaces and time-frames. The spatial distribution of the information charts can be used as a tool for the climatological verification of the underlying data. A sophisticated software was developed for this purpose. It would also handle data from outside Europe (transition to "World ClimHist").
Reconstructions for winter (DJF) and summer (JJA) are presented in the form of time series and charts. Cold winters were frequent from 1205 to 1235 i.e. in the "Medieval Warm Period" and in the Little Ice Age (1306-1330; 1390-1470). Dry and warm summers prevailed in Western and Central Europe in the first half of the 13th century. During the Little Ice Age cold-wet summers (triggered by volcanic explosions in the tropics) were more frequent, though summer climate remained highly variable.
Results are discussed with regard to the "Greenhouse Debate" and the relationship of specific climatic situations to glacier and famine history is explored.

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323 **Knowledge and Indigenous Health on a Canadian Reserve: A case study of the Mowachaht Muchalaht First Nation**

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The Mowachaht Muchalaht (Nootka) First Nation were relocated by the Canadian government from their ancestral home at Yuquot (Friendly Cove) in the early 1960s to a reserve adjacent to a Kraft pulp mill (partially owned by the Danish Royal Crown through the East Asiatic Company). Life next to the pulp mill brought a host of environmental and health problems to community members including compromised air quality, drinking water quality and sea water quality. Individual and community health were adversely affected to a shocking degree. Yet for nearly thirty years, government and health officials routinely assessed the reserve's air and water quality as acceptable. Such "expert" assessments were in sharp contrast to the lived experience and "street science" of community members (Corburn; Murphy). This gap in understanding and assessing the reserve environment points to a deep epistemological divide between community members and external "experts." This paper takes the case study of the Mowachaht Muchalaht First Nation as a window onto this divide by considering how the plurality of environmental knowledges at play prevented either side from effectively communicating its position to the other. Among the broader questions that this article will interrogate are the following: What does it mean to know that an environment is unsafe? How do we know when the air we breathe or the water we drink is safe? How were the complex interactions between multiple variables taken into consideration when conducting environmental assessments? What sorts of "scientific" measures and standards were brought to bear by various parties, at various times for assessing the environmental conditions on the reserve? Which of these measures and standards were naturalized as "science" and which were dismissed simply as "anecdote" or "uncertainty"? Who exercised the authority to make these all-important distinctions? How were standards of proof and evidence established and by whom? In considering these questions, I will evaluate the different kinds of evidence that scientists, bureaucrats, and community members had at their disposal and consider the differential attention given to various forms of evidence. Sources for this article will be drawn from my fieldwork with members of the Mowachaht Muchalaht First Nation and extensive documentary research into the records of Health Canada and interviews with former employees of Health Canada. The richness of this case study will illuminate patterns of historical context that are relevant for other communities who suffer environmental degradation and/or who struggle for environmental justice.

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326 **European climate of the past millennium: potential of historical climatology for its understanding and reconstruction**

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Historical climatology as a science lying between climatology and environmental history is oriented towards the reconstruction of past climate and hydrometeorological extremes and their impacts on human society, based on documentary data (Brázdil et al. 2005). Intensification and progress of historical-climatological research in Europe during the 1990s and early 2000s significantly extended the range of data sources available leading to improved spatial coverage and producing high-resolution climate data at the daily, monthly, seasonal and annual levels. Methodological progress with the application of traditional paleoclimatological approaches to climate reconstructions notably enhanced the position of historical climatology in respect of European climate reconstructions of the past millennium (Dobrovolný et al., 2008).
In this presentation, documentary sources for climate and related phenomena in Europe that are available for climate reconstructions are discussed, together with the expression of those data in the form of a 7-point weighted temperature (from -3 as extremely cold to +3 as extremely warm) and precipitation (from -3 as extremely dry to +3 as extremely wet) monthly indices. Seasonal and annual indices series are produced as sums of corresponding monthly indices. Traditional methods of quantification of index-based series with respect to paleoclimatological methods working with the overlapping period between indices and instrumental meteorological measurements are compared. The contribution of climate reconstructions based on documentary data for a better understanding of a paradigm of the past millennium (Medieval Warm Epoch, Little Ice Age, Recent Global Warming) is discussed.
The EU 6th Framework Project no. 017008 "European climate of the past millennium (MILLENNIUM)" for the period 2006-2009 is presented with respect to the role of historical climatologists from the nine European countries participating in the project, their activities being coordinated with those of other project groups based on dendroclimatology, lake and marine sediments, statistical methods and climate modelling. The anticipated outcomes of the project for a better understanding and knowledge of the climate within the wider context of the recent global warming are also presented. Finally, an overview is offered of the wider contributions of historical

climatology for reconstructions and better understanding of the European climate over the past millennium.

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328 **The 500-year reconstruction of European Climate derived from historical archives**

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Besides several proxies from natural archives (tree rings, ice cores or lake sediments) valuable contributions to climate reconstruction can be found in documentary archives. Various sources of documentary evidence (e.g. narrative written reports, visual daily weather records, personal correspondence, special prints, official economic records, newspapers, pictorial documentation, epigraphic data, early instrumental observations, early scientific papers and communications) are critically evaluated, interpreted and transformed to temperature (T) and precipitation (P) indices in ordinal scale.
Exhaustive archive research has opened the possibility of constructing index series for several European countries: Germany, Switzerland, Czech Republic, Low Countries, Poland and Hungary. Due to cultural and historical factors these series, most with monthly resolution, cover much of the past 500 years. However, the Low Countries series extend much further back far as the 8th century.
Seasonal (DJF, MAM, JJA, SON) and annual Central European series have been compiled from individual "national" series. Because several systematic instrumental measurements started in Europe during 18th century, an overlapping period for both documentary sources and long instrumental series can be identified. Such fortunate coincidences of coverage permit the application of standard proxy-based palaeoclimatological quantitative reconstruction methods with calibration/verification phases. Documentary evidence-based indices were calibrated against instrumental measurements. Using r2, RE and CE measures we tested the calibration results on data from verification periods. Moreover on swapping calibration/verification data sets we able to examine the robustness of our reconstructions.
500-years long chronologies of temperature and precipitation on seasonal and annual level are presented as a one of the main results of the Sub group 1 activities working under the EU 6th Framework Project no. 017008 "European climate of the past millennium (MILLENNIUM)." These chronologies are compared with existing reconstructions of European climate, especially with those based on other proxies. Limitations and benefits of historical documentary sources are discussed and importance of the multi-proxy approach is stressed. Reconstructions based on documentary evidence are comparable to other paleoclimatological climate reconstructions with regard to data quality and methods. They add complementary information and help us to interpret the other data. In this sense documentary evidence sources can substantially reduce uncertainty of climate reconstruction and better quantify climate variability. Thus historical climatology can be shown to add greater precision to the reconstruction of European Climate of the last 500 years.

330 **Using ships' logbooks to reconstruct past climates of oceanic regions: A case study for the north east atlantic (1685 to 1750)**

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Attention has recently been drawn through publications and conference presentations to the potential of ships' logbooks from as early as the seventeenth century as a source of valuable climatic data. Principal amongst these endeavors has been those of the CLIWOC project (Climatic Database for the World's Oceans: 1750 to 1850, see also www.ucm.es/info/cliwoc). This project produced a database of 300,000 observations, and developed methods of processing the non-instrumental estimates of wind force and direction that constitute the majority of data from before the mid-nineteenth century. This presentation draws on the CLIWOC experience but extends the record for a further 75 years to 1685 to the earliest years of known logbook availability. It confirms that logbooks are a rich source of marine climatological data, the non-instrumental character of which is no obstacle to its scientific value and can be subjected to rigorous analysis. Account is taken of the limited number and narrower geographic range covered by the logbooks for this period. Fortunately they are sufficient of them to provide a daily series for the English seas from 1685 to 1750; this period is important being the oldest for which such a continuous series can be constructed and for embracing some of the more important climatic changes of the most recent pre-anthropogenic period. The presentation will demonstrate the nature of such archaic climatic information and how it can be re-expressed in modern-day Beaufort and similar terms. Attention will be drawn to the advantages offered by this data source, in particular its abundance and its high degree of homogeneity and reliability. The daily database for the period of corrected and homogenized data will be presented in summary form and discussed. The presentation will then review the climatic evidence offered for a period that embraces the cold decades of the 1680s and 1690s and the warming phase of the1730s, the Great Storm of 1703 and the intensely cold year of 1740. Data will be presented in terms of derived indices for

storminess, westerliness and zonality and precipitation but broad synoptic patterns interpreted from these data will also be reviewed. The dataset will be compared with contemporary contributions such as the Central England temperature and the Paris air pressure series in order to test its coherence and to demonstrate how it can be used in conjunction with other such sets to provide a more comprehensive understanding of past climates, and one that includes the marine environment, something not hitherto possible with this degree of temporal resolution and such a high degree of confidence. Finally attention will be drawn to the future possibilities of this vast source and to the very large number of logbooks both in the UK and abroad that have yet to be examined and their contents digitized and exploited in our search for a better knowledge of past climates and environments.

340 **The Changing Mission of Urban Parks in the US**

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Cities are a result of processes, of socioecological change. They are the most explicit locations for understanding the "succession of stages – a series of "states of nature" – that constitute the "human history of nature" (Moscovici 1968: 50 in Whiteside 2002: 51), because they appear to be almost entirely human artifacts. Cities are places where human transformation of the conditions of life – human and nonhuman – is most evident, where nature has been turned into a question, something whose identity is now uncertain, and which calls our identity into question too.

In the nineteenth century parks were spaces to recover from the assaults of urban pollution and to renew the spirit. Frederick Law Olmstead also designed parks as infrastructure for bioremediation. In the early twentieth century park design aimed to serve multiple functions, with a growing emphasis on active recreation. Today many urban parks are characterized by playing fields and recreation buildings, and are the object of multiple, conflicting political agendas, including, increasingly, for ecosystem services..

Such a new mission for urban parks may also serve different interests. How these are reconciled in different times and places reflect a great deal about urban power and politics. This paper will explore the changing mission of U.S. parks and what that implies for who owns the city through several case examples.

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344 **The Neva River in the Identity, Economy and Culture of "the Northern Capital" of Russia**

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St. Petersburg was founded in 1703 on the banks of the Neva River close to its mouth. The short but very affluent river which connects the Ladoga Lake and the Baltic Sea was for many centuries an important trade root and a multicultural and contested region among Viking, Finnish and Slavic populations; for most of the 17th c. it was under Swedish control (Kepsu, 2000). The river became the crucial factor in choosing the location of the new capital (Lincoln, 2002). Poet Aleksandr Pushkin coined an influential image of this decision. He stressed that it was Nature itself that gave command to the tsar Peter the Great to found the city on the banks of the Neva River when the tsar stood there in a state of dreaminess, gazing at its waters flowing into the sea (Volkov, 1997). The river plays a major role in the identity and mythology of the city (Lapin, 2007). It was a dominant factor of cutting of "window to Europe" for Russia, on the one hand, but also a cause of terrible floods, on the other. Floods became a part of collective memory of the city dwellers which very much influenced the Soviet technological decision of building a flood protecting dam around the river mouth.
These two images of the river – a trade route to Europe and a dangerous "beast" causing floods – partly masked other elements of its fundamental significances. This paper aims to reveal the multifaceted role of the Neva River in the history of the city. One of its major focuses is the history of its fisheries, which is very poorly known. The role of fisheries changed from being a significant economic activity of the local inhabitants to just a leisure activity. The small but delicious fish smelt which comes to the Neva River every spring from the sea remains an iconic animal of the city.
The history of fisheries in the city is well-connected with other socio-economical and environmental changes: the growth of water pollution that accompanied the industrialization of the city, general changes in the ecosystem of the Baltic Sea, and large technological projects such as dam constructions. The paper is based on archival documents, historical maps, local newspapers, scientific publications and visual materials. The initial impetus of this research (Kraikovski et al., 2005) occurred in conjunction with financial support from the Baltic Sea sub-project of History of Marine Animal Populations project

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345 **An Environmental History of the 'Cape of Flames'**

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Once named the Cape of Storms, but renamed the Cape of Good Hope by Prince Henry the Navigator, in January 2000 South Africa's Cape Peninsula briefly became known as the Cape of Flames(1). Dramatic wildfires torched 8000ha of the Peninsula, damaging 70 houses and 200 shacks in an informal settlement in the Cape Metropolitan area, and costing in excess of US$3 million to suppress (2). In November 2000, fires destroyed nearly 1000 homes in the Joe Slovo informal settlement. The apparent short-term increase in fires in the region since 1998 has contributed to a sense of crisis, particularly as ecologists believe that the peninsula's unique Fynbos vegetation, while requiring fire to reproduce, should ideally only burn at intervals of 10—15 years. Volunteer fire fighting organizations were set up in the aftermath of the 2000 fires, which later developed into the government-funded Working for Water and Working on Fire programmes, initially concentrating on the eradication of flammable invasive alien plants (experts do not agree these are the main problem) (3). Much was made of the threat to the rare indigenous flora of the region, but the fire-adapted nature of the vegetation was not widely appreciated. No long-term studies of the region were available to enable decision-makers to assess whether the fires were in fact unusual, whether longer-term patterns might exist, and if changes had taken place, what historical environmental and anthropogenic factors might have influenced them.
A challenge facing those aiming to manage South Africa's environments in a sustainable way has been the fractured history of the country in the 20th century. From the South African War, through Union in 1910, two World Wars, Afrikaner Nationalist victory in 1948, the onset of Apartheid, until liberation in the mid-1990s, numerous political changes have resulted in major shifts in priorities, in environmental research, management and policy. The influence of key institutions, individuals and international trends in ecology and conservation, must be examined alongside local ecological patterns and fire events. Fire management has often been led by trends rather than research (4). Municipal, forestry and agricultural records, newspapers and the journals of scientific and popular societies, provide information on fire events and reactions to them. Interviews with key players reveal disciplinary biases, and give access to a memory bank disrupted by institutional change.
In this paper I aim to establish whether the historical record bears out a unique exacerbation of the fire situation at the Cape in recent decades, and if it does, when and why this might have come about. If not, I will draw out the historical debates and discourses which have shaped this perception.

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349 **Water purity in France in the "Belle Epoque" : local solutions to a global-scale problem**

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At the end of the XIXth century, various discourses, from different categories of social actors, were expressed regarding the quality of the water distributed to French citizens. By examining them, it is obvious that local issues and global context of the water question were closely linked in their arguments.
We will study this connection in three different types of discourses:
- medical bodies and engineers insisted on the necessity to decrease the death rate from waterbone diseases, criticizing the fact that France was lagging behind other Western industrialized nations (Anglo-Saxon, German and Nordic countries). They also tried to enforce a real control and an effective protection of the public water's quality at different stages - and different places - of the supply system (pumping, canalisations, storage tanks...) ;
- the political and administrative discourse: in many places, local authorities decided to look for the experiences of other cities (French, but also foreign). Indeed, once like nowadays, cities have never lived alone, looking to experiments conducted by other local authorities. In each city, the global situation of water purification techniques was carefully assessed before making the decision to spend money on a project to improve the quality of local supplies;
- in rural areas, people were still using their own wells and water catchments ; on the one side, hygienists often complained that they were unaware of the risks of drinking water that could have easily been contaminated. But on the other side, fishing associations were lobbying against new forms of stream pollution caused by urbanisation and industrialisation.

The second part of the paper will focus on the solutions to the various pollution and water quality problems, still by looking to the link between the local and the global scales.
Firstly, the « Belle Epoque » (1890s-1910s) is a moment when the French State began taking care of the issue, for instance by enacting a public health law in 1902, but at the same time, local authorities were given autonomy in the decision-making process and in the choice among the various technologies developed to secure water supply and purify urban wastewater.
Secondly, cities were contacted by many inventors and sanitary engineering firms from outside, like British, Belgian and German compagnies. To get a contract with a French municipality, they edited many brochures with foreign and colonial references where municipal engineers and city councillors could take inspiration. We will underline the various types of cities deciding to adopt innovative water purification technologies: places struck by a typhoid fever epidemic; placies taking their water from rivers that were polluted upstream; and touristic

cities or seaside resorts.

At the turn of the XXth century, for French city councils and specialists of environmental issues, the answer to the local problem of water quality had to be found in a larger landscape, exactly like today, when the need to increase environmental protection make cities create international networks to share sustainable urbanisation policies.

351 **Private Uses of Public Spaces: Los Angeles Beaches in the 1920s**

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Today, almost all of Los Angeles's beaches are public. In fact, the State of California has some of the best protections for public access to the shoreline in the United States. Public parks, free or inexpensive parking lots, campgrounds, lifeguard stations, bathrooms and showers make beach recreation easy and accessible in Los Angeles. But this is not how the Los Angeles shoreline looked in the 1920s. Then, private cottages created exclusive enclaves along the shore, while private beach clubs erected ropes to fence off large sections of public beach for the exclusive use of their membership. Oil wells loomed over beaches, and oil companies fenced off great sections of public and private beachfront land. Suburban development in Los Angeles beach communities further restricted public access to the shore.

The collision between the private exploitation of the beaches and a growing popular image of the beaches as a uniquely public respite from urban living inspired a powerful political movement in the 1920s and 1930s to remove first oil and then private clubs, cabins and commercial development from the beaches. On the face of it, this assertion of the public character of the shoreline looked like a triumph for the whole community, a defeat of private exploitation and private profit in the name of public recreation. While this certainly was the case with the regulations imposed on oil wells, but the drive to remove private beach clubs was more complicated. Public beaches in Los Angeles were segregated, open only to whites. Angelenos of Mexican and Asian descent could visit some public beaches, but not all. African-Americans could only go to private beaches and private beach clubs. The drive to expand public ownership of the shoreline was, at least in part, a transparent effort to drive away black beach-goers, particularly from areas where their presence might reduce property values in near-by white-only residential enclaves.

The story of Los Angeles public beaches reveals a complex interplay of assertions of public rights to private lands, and private rights to public lands. It suggests that historians must look very closely at which public benefits from public lands, and consider the private advantages gained by eliminating private property rights on public lands.

352 **Slick and Clean: American Foresters and German Forests in the Great Depression**

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"Slick and Clean: American Foresters and German Forests in the Great Depression":
In 1935, Clarence Forsling, Aldo Leopold, W.N. Sparhawk, Leon Kneipp, and Edward Carter received grants from the Oberlanender Trust of the Carl Schurz Memorial Foundation to work and study with German foresters. Each was eager to learn from their counterparts about land-management strategies that ranged from traditional forms of wood production to the new concept of Dauerwald. Each was also intrigued by the links between sustained-yield forestry, economic opportunity, and community development, and the different environmental consequences of intense production and tree farming. Their responses, captured in their private correspondence and diaries, as well as in their published reports, reveal a decided ambivalence about German forestry that bespoke an uncertainty about then-contemporary U. S. forest-management practices. Going abroad forced them to reconsider domestic strategies, a disconcerting consequence of this trans-Atlantic exchange.

357 **Toxic legacies: the transnational mysteries of toxaphene contamination of Lake Superior.**

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Toxaphene, a persistant organic pollutant (POP) that was once the most heavily used insecticide in the United States, was marketed heavily as a safe alternative after DDT was restricted. Toxaphene was produced in the American south in the 1970s and used in agricultural fields throughout the world into the 1980s. After its use was banned in the US and Canada in the 1980s, existing stocks of the chemical were shipped overseas, where toxaphene became widely used in Russia, China, and throughout Africa. In the 21st century, Canadians noticed that toxaphene levels were rising in the fish of Lake Superior, even though the chemical had not been used near Lake Superior for two decades. Researchers now suspect that the chemical continues to be volatized from old cotton fields in the US south, and that global wind currents may also be transporting toxaphene still used in Africa into Lake Superior and thereby into people who eat fish. Among those most concerned are indigenous communities who live along the shores of Lake Superior, in both Canada and the United States. Fish is still a significant portion of their diets, and fishing is central to cultural traditions along the lake. Contaminants in food threaten more than physical health: they also transform cultural identities as well. Unravelling the toxic legacies of persistant organic pollutants in our food supply continues to be a challenge long after those chemicals are banned. Not only do toxic residues in food complicate national boundaries, they also confuse temporal distinctions, for their legacies persist long after they have been banned.

358 **Animals in the landscape in the seventeenth and eighteenth centuries**

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In the Mémoires pour servir à l'histoire naturelle des animaux of the 1670s, Claude Perrault and other members of the Paris Academy of Sciences presented descriptions of a number of exotic animals which came from Louis XIV's menageries at Versailles and Vincennes. These animals came to France as gifts from foreign rulers and as the spoils of trade and exploration. In the menageries, the animals existed torn from their natural habitats and, inevitably, they died, allowing for their dissection and their inclusion in the Mémoires. The elaborate and detailed illustrations in the book show the live animal in a natural setting, but this setting does not acknowledge habitat but ownership: the places depicted were domesticated landscapes. But in the text, Perrault situated the animals in their natural, exotic environments and acknowledged the importance of place as part of the animal's identity. The animal's original place and original name established it as a unique individual. Since only a few or a single specimen of each animal was available to him, Perrault did not believe that he could generalize beyond the individual. His acknowledgement of place, however, differentiates the Mémoires from earlier works of natural history. It was republished in 1733, and the first volume of Georges-Louis Leclerc, Comte de Buffon's Histoire naturelle, which appeared 16 years later in 1749, echoed many of its arguments, including its consideration of place and its emphasis on the individual rather than on species. But did Perrault's, and Buffon's, emphasis on singularity limit their understanding of the environment's relationship with the animals which inhabited it? Buffon's illustrations also depict the animal as an isolated individual. In this paper, I will looks at these texts and at their conventions of illustration to illuminate some early modern ideas about the relationship between animals and the places they inhabited.

359 **"The American Nile": Narrating Change on the Colorado River**

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Americans, struggling to understand or envision the future of the North American continent, often turned to Old World places for historical analogies and cultural meaning. Thus, spectacular mountain ranges became the "American Alps," or new towns on the frontier became a future "Rome" or "Athens." The Colorado River, however, was impossible to fit into Euro-American notions of rivers; its canyons and rapids, its arid surroundings, defied comparison, until early explorers hit upon Egypt's Nile as an analogue. The comparison implied that here in the American Southwest would emerge an agriculture-based empire that would endure for thousands of years.

This label, the American Nile, was adopted by Marc Reisner in his popular book Cadillac Desert (and it may have inspired Las Vegas casino builders to create the Luxor resort hotel thirty miles from the river's channel). But as historians often warn, drawing analogies from the past can be a tricky business. The Colorado is really nothing like the Nile. The rivers are not only geologically dissimilar; their history of human use could not be more different. Before Europeans arrived on the lower Colorado, there was little agriculture, wealth, or population. There was not even a complete map of the river until around 1870. There was no densely settled peasant class living along its banks, adapting to its floods and growing crops on its silt deposits, no huge metropolises like Cairo, and no ancient hydraulic power structure.
The conquest of the Colorado River, which took place in the middle years of the twentieth century, was the work of a modern state in league with modern capitalist enterprise. The logic animating those cooperating forces and the shape of the resulting political economy will be core themes of my paper. Although a history of river transformation began during the time of Franklin Roosevelt's New Deal, it was not a partisan project carried out by one party in opposition to another. Both Democrats and Republicans were in substantial agreement about the need for private and state capital to work together to transform this river into an engine of economic growth and development.

This river, therefore, did not represent a simple continuity with Old World predecessors. In its post 1930s phase its conquest marked an abrupt intrusion into the river's natural history but also a radical break with prior human use of rivers. The Colorado became the site of a revolutionary new way of dealing with water and its flow, which has profound consequences in the United States and throughout the developing world.

360 **Fishy Populations: Maximum Sustainable Yield and the Demographic Paradigm in World Fisheries**

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Beginning at the end of the nineteenth century, knowledge about European fisheries dramatically changed. Natural history and qualitative descriptions of fish morphology shifted toward a demographic paradigm focused on the quantitative analysis of large aggregates of fish represented as statistical populations. By the end of the 20th century harvesting fish populations to produce maximum sustainable yields had become an institutionalized goal within fisheries management. This paper traces how the demographic paradigm and the maximum sustainable yield construct transformed fish, fishermen and practices of fishing around the world.

361 **History's Live Show: Human Civilization at the End of the Cheap Energy Era**

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Like all living creatures, humans have always been dependent on exploiting energy for survival; the history of human civilization is actually a story of increasing concentration of available energy. But whereas for tens of millenia mankind prospered using annually renewable sun energy, modern civilization of the past 300 years became deeply dependant on non-renewable fossil fuels - gas, coal, and oil - for all human activities: industry, transportation, culture and - most important - the production of food.
Such a global-scale dependency on non-renewable energy resources is an unprecedented event in human history. The depletion of these resources, following the peak point of oil production, is expected to have a tremendous impact, altering all aspects of modern life: it is expected to be a global challenge, affecting the livelihoods of human beings almost everywhere.
Known for more than half a century, Peak Oil and its implications have untill now been researched by geologists, economists and environmentalists. Perceived as a future phenomenon, it seemed to bear little attraction for historians. But the Peak point is rapidly approaching, soon to become present and then history. We might be now on the very tipping point of a historical tidal turn.
In my presentation, I would like to do three things. First, to show how Peak Oil is a unique phenomenon in the history of mankind, since fossil fuels themselves are a one-time event. Secondly, and as a result thereof, I shall examine how Peak Oil might fit in different historiosophical models, such as linear, circular and spiral history. Last but not least, I shall try to assess how understanding this material process might help us in interpreting and explaining contemporary social, economic and political developments.

364 **Losing Resilience in the Fight Against Floods in New Orleans**

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Resilience provides a framework to study how human societies respond to hazard events. One element of resilience in human communities that distinguishes them from biotic communities is the ability to learn from previous events and to adjust how they will meet surprises and respond after an event. An analysis of changing strategies to content with river and hurricane-induced flooding in New Orleans illustrates a loss of resilience over time as responsibilities shifted from local to federal bodies and preservation of social memory diminished. A review of adjustments in the river flood protection reveals efforts to enhance resiliency following the flood of 1927. By contrast, following the landmark hurricane of 1965 (Betsy), flood protection took a decidedly rigid turn which allowed the erosion of resiliency. Post-Betsy hurricane preparation plans failed to acknowledge procedures that worked inn the past and this allowed vitally important social memory to disappear. This process illustrates the fundamental importance of constructing a viable historical record to accompany forward-thinking hazards planning in order to maintain an overall resilient society.

365 **Property Rights and the English Royal Forests, 1649-1660**

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The Commonwealth government aspired to a new vision for the English royal forests during the Interregnum. From medieval times the Crown managed the royal forests according to ancient forest laws, which dictated land use, management practices and access to rights and commons. These laws ensured adequate numbers of deer and other game animals for royal hunting; they also promoted the wise use and management of forest trees for fuel supply, building and repairs, and for the navy. Forest laws protected common property rights within the Crown's forest wastes and commons.
The period between 1649 and 1660 demonstrated a major shift in ideology affecting all aspects of English life. This included attitudes toward nature and the natural world (Thomas 1983) plus the role of Crown lands and the English royal forests. (Madge 1938; Gentles 1992) Although the Republican government never abolished forest law, the Commonwealth and Protectorate held very different views on the best use and management of royal lands. The new government regarded deer farming as idle and wasteful; instead these forests needed taming by enclosure, cultivation and improvement. The agricultural reformer Silvanus Taylor (1652) wrote at length on improvements to turn the forests into efficient farms, which would in turn feed more mouths and thereby allow England to build a larger army. His vision of forest management challenged traditional common property rights, land use and the forest landscape.
Using a wealth of unique Parliamentary survey material for individual forests, my paper examines some of the more radical 'changes in the land.' (Cronon 1983) The Republican vision threatened traditional life for forest inhabitants, both animal and human. The perceived threat in some areas was as potent as the stakes in the ground for other inhabitants. My paper examines the clash between Royal and Parliamentarian views of land use in the English forests. It also documents some responses, which were both literary and violent. In 1660 the restoration of Charles II revived royal control over Crown lands and the forest jurisdiction. Ultimately political events reversed Parliamentary schemes, land use decisions, sales and changes in ownership. Forest commoners reclaimed their common property rights to lands threatened by sale and enclosure. In several royal forests inhabitants promptly re-established their rights, registering their claims and titles to land and commons in the highest forest courts after the Restoration.

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366 **Geopolitical science? Field practices in the Canadian Arctic, 1955-1970**

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This paper will examine the relationship between the construction of environmental and geopolitical knowledges about the Circumpolar Region. Through an examination of the field practices undertaken by environmental scientists in the Canadian High Arctic during the late 1950s and 1960s, the paper considers the movement of knowledges between contrasting epistemic regimes. This is achieved through focus upon the Government of Canada's Polar Continental Shelf Project (PCSP), established in May 1958. Inspired by Prime Minister John Diefenbaker's 'Northern Vision' in the wake of the International Geophysical Year (1957-58), the PCSP's mission was to conduct a series of geophysical, geodetic and cartographic studies of the continental shelf to the north and west of the Queen Elizabeth Islands. The PCSP was founded within a politics of anxiety over continental defence and security in the North American Arctic. However, the PCSP was also conceived as an initiative to defend Canadian sovereignty in a region of the High Arctic that was perceived to hold extensive hydrocarbon reserves. In mapping geographical, geophysical and geological boundaries in the Arctic, PCSP field scientists became drawn into disputes that required their knowledges to be transferred into a distinct political economy. In concluding, the paper draws some parallels with contemporary discussions about expertise and the political stability of Arctic environments.

367 **An Environmental History of Progress: Damming Canada's Peace and Columbia Rivers**

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Most of the writing about large-scale river diversions, including those on the Columbia and Peace, centres on the environmental devastation and the social and economic dislocation that accompanied and followed dam construction.

This paper tells a different story about human interaction with the environment. Drawing on extensive interviews, this co-authored presentation examines how the people who built the massive dams on the Peace and Columbia Rivers in Canada in the 1960s, 70s, and 80s engaged with nature; what it was, how they experienced it, and how they envisaged environmental change.

We approach dam-building as a particular kind of connection to nature rather than its conquest. It took a lot of knowledge to disassemble and reassemble a river. By emphasizing how their labour connected engineers and trades people to nature, we reveal the environmental knowledges they possessed. In so doing, we challenge the dualisms that lie at the heart of many environmental history narratives; namely, that local people – insiders – are connected to nature while outsiders are alienated from it. Whether insiders or outsiders, all of them were connected to nature through work.

But it wasn't just their labour that connected them to nature: the engineers and trades people who came to the Peace and Columbia did so thanks to a variety of networks and technologies; networks that were international in their scope, like that of finance and knowledge; ones that were national, like labour recruitment; and ones that were regional, like provincial politics. The transportation and construction technologies that connected engineers and trades to nature also spanned the global to the local: planes, trains, trucks, and cars, brought men and machinery to these rivers to begin the job of reconfiguring them. Together, these networks and technologies moved people, money, and nature through local environments, enriching and improving some, while impoverishing and destroying others.

368 **On Mobility and Portability as Connectors of Times and Spaces**

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How does one connect subjects so diverse as precolonial African migration and state formation; 19th century European big game hunters, concessionaires, colonizing armies, and mining capital; 20th century poachers, human traffickers, nationalist guerrillas, and post-independence 'dissidents' (rebels); game and livestock, mosquitoes, and pathogens; and muskets, rifles, pesticides, and aircraft? How would this bringing together of multiple actors in the same narrative help us understand better connections between environmental spaces and times?

In this paper, I would like to focus on the play of mobility and portability in the production of environmental history. I will narrow my enquiry to a specific environment, Gonarezhou, which is now a national park in southern Africa. Within Gonarezhou, I will focus on two mobile entities, humans and game animals. At that stage I would like to introduce portable things that these two actors carry back and forth to the benefit and detriment of one another. I am interested in portable technologies in the case of humans, particularly killing instruments, the most recent being firearms. With respect to animals, I will single out the deadly insect, tsetse fly, which takes a ride on and feeds on the blood of game animals. The tsetse fly becomes mobile, and on its person carries the portable and deadly pathogen, the trypanosome, which it injects into the body of livestock through its bite when feeding and infects it. The farmers bay for the game animal vector's blood; they incur the wrath of conservationists, the arch-protectors of wildlife. The state acts; policy is produced.

Using these two portable elements, technology and pests, I will then discuss the ways in which mobility of their carriers, human or animal, has influenced the environmental history of Gonarezhou as a forest in the last 150 years. My proposition is that unless we fully understand the interplay of mobility and portability, we will miss an understanding of how actors that may appear far removed from a specific place may have influenced its emergence, both directly as passersby and indirectly through portables and mobiles.

370 **'Constructing Nature' – Urban recreation areas and the recreational use of nature in Malmö 1890-2008**

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During the last decades of the 19th Century industrialisation put its mark on Swedish cities. The working and living conditions roused a discourse about health and hygiene that concerned both physical and, what was considered as mental, illnesses. In this discourse nature and opportunities for recreation had a role with both medical and moral implications. Due to its position between the sea and the grain producing plains the fast-growing population in the city of Malmö had no access to natural recreation areas. This is still the case since the green areas is only 2 % of the city's total area compared to 45 % respectively 50 % in the two larger Swedish cities Stockholm and Gothenburg. In this respect, Malmö is part of a central European pattern of urban land use, where continuous human activities create a need for a sort of natural 'inland archipelago', or 'islands of nature and recreation'.
The solutions have been of two kinds. Firstly to organise recreational activities for workers, women and children in remote areas in surrounding parts of the countryside. Secondly by constructing semi natural recreation areas inside the city as lidos, woods, ponds and brooks. These areas have previously been used as industrial sites, for communication or as sand-pits, quarries or garbage dumps. This changing land-use has created conflicts concerning environmental justice as well as between nature conservation and conservation of cultural heritage. During the last decades Malmö has also been the home of many new immigrants with sometimes very different preferences for the use of nature as recreation.
This paper will deal with the regional and local examples of these changes during the period 1890-2008 in Malmö, the southernmost province in Sweden, and the neighbour to Copenhagen on the other side of the Sound.

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372 **Urban bay, urban politics: a history of the (failed) cleaning up of Guanabara Bay, Rio de Janeiro (1992-2005)**

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In 1992, on the eve of the UN Conference on Environment and Development in Rio de Janeiro, the Brazilian government signed an agreement with the Bank of Japan to clean up Guanabara Bay, a national symbol of natural beauty and one of the most polluted urban bays in the world. The agreement, which also included the government of Rio de Janeiro state and the Inter-American Bank of Development, generated an ambitious project of almost one billion dollars: the Programa para Despoluição da Baía de Guanabara, PDBG. Ten years later, however, the bay showed little improvement by most pollution indicators. In some areas pollution had in fact advanced spectacularly, despite the implementation of the PDBG—and despite the expenditure of most of the funds. In 2005, the State Chamber of Representatives created a Commission of Inquiry (CPI) to evaluate the progress of the project and possible misuse of funds. The investigation did not lead to dramatic indictments, as its authors initially hoped, but it did force some contractors and state agencies to fulfill their commitments. More often, however, the documents show a highly fragmented state, hungry for the unexpected funding available and with conflicting understandings of the Bay's environment and of the concept of restoration.
This paper explores the conceptual and political dispute among those involved in the cleaning up project, by analyzing the documentation produced by the CPI. For instance, because roughly 75% of the funding was allotted for the implementation of sanitary systems, environmental activists often complained that the State dismissed the degraded state of ecosystem of the Bay, and used the funding for pre-existing and old-fashioned sanitary projects. The paper also describe how the CPI interacted with other areas of the state in the regulation, enforcement and evaluation of environmental practices, as it became, instead of a mediator among conflicting parties in the fragmented state, another arena where these conflicts took place. In fact, although the CPI was ostensively multi-partisan, the legislators sought to preserve their own party members while pointed to culprits in the other parties.
The research shows a Brazilian bureaucracy that was at once rigid and clumsy, and yet flexible and adaptable. On the one hand, public officers frequently complained of the lack of coordination among the state agencies, on which they blame the lack of success of the Program. On the other hand, the same officers revealed remarkable creativity both to interpret the strings attached to the PDBG funding to their interest, and to use said funds to answer urgent demands from the Bay's resident population.

Finally, the research studies the connection between an international environmental agenda, represented in the internationally-funded PDBG, and the local demands and conflicts of one of the world's largest urban centers.

373 **"Her Majesty's Property": Environment, Regulation and Popular Use of Hamilton Harbour, 1846-1960**

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On a wintry Sunday in 1865, John Smoke huddled in his fishing hut, spearing black bass through the ice on Hamilton Harbour. Within a week, Smoke appeared in police court, charged by the newly-appointed fishery inspector with two infractions -- spearing fish, and fishing on a Sunday. The fishery inspector hoped to make an example of Smoke, as part of a larger campaign to preserve the fish stocks of the harbour. In passing sentence, the local magistrate remarked that men like Smoke seemed to think "that they were at liberty to do as they pleased with Her Majesty's property".(Hamilton Spectator, 4 March 1865). As "Her Majesty's property", the bay was community property. Through their behaviour, Smoke, the fishery inspector and the magistrate offered differing visions of what that meant -- as a community resource accessible to everyone, as a crown reserve to be regulated in the "public" interest, and as a public place where moral conduct must be guaranteed. Just what "Her Majesty's property" meant would be increasingly contested, as the city grew, and a bay which at first seemed large and abundant enough to accommodate many uses and many peoples appeared less so.

Differing visions of the harbour were expressed during its history through patterns of use. Hamiltonians envisioned the natural environment of 'the Bay' as a commercial and an industrial port facility, as a playground for anglers, swimmers, sailors and others, as the source of fish, game, ice and water for subsistence and business purposes, as an attractive site for cottages, amusement parks, beaches, philanthropic enterprises and housing developments, and as a convenient dump for residential and industrial wastes. These visions and the behaviour they produced transformed the environment of the bay, and therefore transformed the ways in which subsequent Hamilton residents thought about and could use the Bay. By focusing on particular environmental changes, different groups of Hamilton residents frequently sought to champion their particular conception of the harbour over competing visions.

In this paper, we present an overview of our findings on the interaction of the social and environmental history of an urban, industrial waterfront. In doing so, we suggest themes and time periods that assisted us, and might assist others, in making sense of the complex processes of urban environmental change.

377 **Consuming Belize: Rural Belizean Environments, Modern Identities and Global Consumption**

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In this paper I trace historical trends in consumption patterns and their environmental impacts in rural Belize through both an examination of archival records and secondary sources for the past century, and ethnographic field research beginning in 1990 through to the present. Shifts in consumption patterns in rural Creole (Afro-Caribbean) Belize over the past 50 years are tied to senses of what it means to be rural Belizean Creole, and have in turn affected the environment of rural Belize. I address two major issues--the use and meaning of game meat (deer, gibnut, armadillo, peccary, turtle) and the capacity to consume material goods and generate trash—especially plastics—in rural villages.
These issues are inextricably intertwined with rural Creole Belizeans' sense of identity both as global citizens and as people linked together by a shared sense of belong to place. Over the years, the meaning of eating game meats (deer, gibnut, peccary, armadillo and turtle) in Belize has changed. For the relatively small population of rural Creole Belizeans in the early 20th C game was the guaranteed source of meat in the diet, and was denigrated as poor people's food. Both mid-century nationalism and the 21st C celebration of local cultures—fueled by the transnational movement of people through both migration and tourism-- has turned game meat into a coveted marker of Belizean identity generally, despite the ready availability of chicken and beef. This change has in turn made these species increasingly scarce.
While game scarcity is one consequence of changing consumption patterns, another is a marked increase in the amount of disposable plastics in rural villages over the past 20 years. Belizeans agree that there is a growing problem of plastic trash blowing about rural villages, and the Belizean government has pointed to garbage as one of its most pressing environmental problems. Yet, at the same time, the plastic bags, Styrofoam food containers and disposable diapers that make up much of the trash in rural Belize also signify the increasing capacity of rural Belizeans to be active participants in the global consumer culture of modernity—through disposable plastics rural Belizeans can claim a global cosmopolitanism.
These changes occurring in rural Belize illuminate the central contradictions that inhere today in the relationship between over-consumption and environmental degradation. Through claiming a local place-based identity by eating game meat or parity as global citizens by consuming plastics, rural Belizeans create identity but simultaneously degrade the environment in which they immediately live. How Belizeans address the decreasing prevalence of game and the increasing presence of plastic trash while still forging identities they desire in the global arena provides insight into the questions of consumption and environment more broadly.

378 **Nature and the Management of Space: Local and Global Connections to the Cuyahoga River Valley, Ohio, USA**

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This paper examines the industrial ecology of Akron and Cleveland in northeast Ohio in local, national and trans-national terms to understand how human and non-human are managed in the process of urbanization and in the wake of deindustrialization. It explores the local, national and global patterns of resource use stemming from industrial expansion across the 19th and 20th centuries, including the steel, refining, and rubber industries. The paper also traces the deindustrialization of both cities and the environmental and social aspects of this development. Finally, the story of the growth and transformation of these industrial systems is also linked to the formation of the Cuyahoga Valley National Park, which lies in between both cities.

Cleveland, famous as the site of the 1969 Cuyahoga River fire that galvanized the environmental movement in the United States, emerged in the 20th century as a leading industrial center for key sectors such as shipping, steel, chemicals, and refining. These industries and the industrial ecology in which they operated had connections beyond the Cuyahoga; for example, the city's shipping, refineries and steel mills placed it within the larger context of fossil fuels, oil and coal especially.

Meanwhile, Akron had earned its reputation as the rubber capital of the world, famous for having the headquarters and tire production facilities for B.F. Goodrich, Goodyear, Firestone and General Tire. Akron's links connected the city to Africa, where Firestone owned rubber plantations, as well as Malaysia and other parts of the world where natural rubber grew. The city continuously smelled of burnt rubber, but beginning in the 1970s, Akron faced deindustrialization as tire facilities left the city.

In between Akron and Cleveland lies the Cuyahoga Valley National Park, which also reflects how space can be managed within the history of industrial ecology. In the 19th century, the area now defined as the CVNP became the site of management by urban elites looking for an escape from the industrial environment of the city. They crafted city park systems and recreation sites that formed the basis of today's Cuyahoga Valley National Park. The park continues to be seen as an antidote to the urban, industrial landscape; and while park personnel are trying to change this, as in the past, the CVNP serves mainly the needs of the wealthy or professional classes, not the working classes or poor.

This paper explores several issues related to urban and environmental history. By linking urban, economic and environmental history we can see how competing visions of nature influence the construction of place, both urban and "wild." Coal mines, plantations, factories, cities and parks are connected; all reflect how the creation of landscapes is a social act, an act of power over both human and non-human observable through particular social, political, economic, spatial, and environmental relationships.

380 **Making yourself at home in nature: The conflict between public access to land and leisure cabin ownership in Norway, 1850-2000**

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In the beginning of the 1800s, Norwegians were rediscovering their national identity after gaining independence from Denmark. They turned to nature as a source of this national identity (Berntsen 1994). The Norwegian Trekking Association, founded 1868, encouraged Norwegians to trek on the association's trail networks and to stay in its cabins. The experience of nature was thus a collective experience. The traditional public access to uncultivated land in Norway reflects this. Even though uncultivated land can be privately owned, anyone had the right to use the land for leisure purposes – for trekking, skiing, and tenting – as long as you respected the land and other users.

Beginning in the 1930s, Norwegians increasingly built new, privately owned cabins or converted old work cabins for leisure use. The experience of nature then became a more individualized phenomenon compatible with the emerging consumer society. This was not unlike the use of automobiles in the experience of American national parks (Louter 2006). The private cabin owners found new ways to "get back to nature" through their individually-owned pieces of wilderness. In the post-WWII period, cabin construction increased so much that it was getting harder to find good locations in certain areas. Furthermore, many land owners subdivided larger empty holdings and sold off the parcels for cabins. Land that was previously legally and practically accessible to all was divided and built on so that it in many cases it became inaccessible.

In 1957, the Norwegian parliament passed the Friluftsliv (outdoor life) law to guarantee the traditional land access that was under pressure at the time. This paper will investigate the relationship between private cabin ownership and this law and subsequent amendments. How did these two concepts of experiencing nature (private cabins versus public land access) conflict? How did actors understand the relationship between public and private land? How did these understandings change throughout the twentieth century?

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382 **Mapping precolonial African agricultural systems**

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Recent attempts to map global land cover change seems to underestimate the development of sub Saharan African agriculture prior to colonialism (Klein Goldewijk 2001). Furhtermore in most categorisations of pre-colonial agricultural systems the assumption has been that shifting cultivation was the norm and that African agriculture changed little over the centuries. There exists today several strands of research that questions this image of extensive farming. Already from the evidence on farming systems in 20th century it can be shown that behind the term shifting cultivation a number of different farming systems existed that were dynamic and changed over time (Miracle 1967). Furthermore, recent research has shown that a number of areas in sub-Saharan Africa where characterised by intensive cultivation (terracing, manuring and/or irrigation), that predates European colonisation, but their start dates are obscure (Soper 2002, Widgren and Sutton 2004). For earlier periods the information is less precise, but the existence of centralised societies indicates that agricultural production and intensity must have reached high levels. There exists however no continent-wide overviews of the development of farming landscapes during the last millennium. In this presentation, which is a contribution to a global project aimed at mapping agricultural history, a series of maps of African agriculture during the last millennium will be discussed.

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383 **Water quality assessment in France, mid 18th-mid 19 th century**

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The theories that social and political activities could effect the environment, and more specifically water sources and its quality, were further reinforced towards the end of the XVIIIth century. The works of Geneviève Massard-Guilbaud have shown how the concept of salubrity had become a State matter in France as early as the beginning of the XIXth century. It was more widespread here than in the rest of Europe, because central power's intervention into economic affairs was already increasing. Individuals whose expertise were found at the intersection of science and politics (like Chaptal) contributed to this evolution. Hygienism was also a popular school of thought that existed in specific forms early on in France (Bourdelais, 2001). Among these themes of environmental awareness, water held as a priority among social concerns. This lead to a timely assessment of the roles of water and humid zones in the debates regarding public health. The introduction of hydraulic equipment and sanitation works that marked the first half of the XIXth century was based on these traditions both complementary and contradictory, which should be studied without any prejudice.

I propose to analyse the relationships between the different discourses regarding water quality. My aim is to weigh the evolution of the roles of medical and chemical expertise, during a broader time period that encompasses more than the period when the French Royal Society of Medicine existed (from 1776 to 1791). I will consider firstly the relationships between doctors and the rest of the social body, and secondly, the other forms of expertise (technical, juridical...) that took importance in this century. This study will provide an opportunity to examine new models that could have been proposed, about the nature of polluting activities and their setting of near the streams (Guillerme, 1990) ; models that assume knowledge at least intuitive of the effects of pollution in close proximity to water sources.

There will be two central questions in this study: what kind of rationality was at work in the management of streams and stagnant water in a period of essential scientific and technical mutation change? How efficient was medical discourse in this application before the revolution that affected it in the course of the 1880s?

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385 **Roots of the Green City: Reconsidering the 19th-Century Landscape Tradition in the United States**

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Most histories have long held to a fairly simple narrative line with regard to the 19th-century American city: it was dominated by the imposition of The Grid and by rampant development designed almost exclusively to benefit commercial interests. In the past 30 years, scholars like Thomas Bender (Toward an Urban Vision) and David Schuyler (The New Urban Landscape) have revised this picture by noting the ways in which urban growth was actually inflected by the concerns of a new class of city planners, exemplified by Frederick Law Olmsted. But what's been missing from this revisionism is the perspective of environmental history. A commonly assigned textbook in U.S. environmental history courses, Ted Steinberg's Down to Earth, does not even mention New York's Central Park. Very little effort has been made so far to connect the urban landscape movement with the rural landscape movement or with the concept of wilderness, which to date has been the obsession of U.S. environmental history.
This paper, by first linking environmental and cultural history and then considering the perspective of historical geography, will reach for new perspectives on both the 19th-century American city and the history of environmental thought. My contention is that there are crucial continuities between Olmsted's work and that of nature-oriented poets like William Cullen Bryant and landscape painters like Thomas Cole, not to mention writers like Henry David Thoreau and Susan Fenimore Cooper. Moreover, the urban landscape tradition was actually much broader than Olmsted, encompassing the often radical ideas of people like Andrew Jackson Downing, H.W.S. Cleveland, R. Morris Copeland, and John H. Rauch. The rise of horticulture and landscape architecture as truly innovative practices went a long way toward developing a "landscape synthesis" in the antebellum period and in pushing a democratic engagement with urban and suburban nature through the 1870s, 80s, and 90s. Someone like Copeland, for instance, focused consistently on making landscape features accessible to the working classes and ultimately envisioned a kind of wild, interstitial city, a broad urban borderland: "in passing from one part of the city to another, a stranger would never be out of sight of the beauties of nature."

Landscape features were not all these new professionals were interested in, though. Because they advocated not just an aesthetic appreciation of green spaces but also an awareness of environmental problems like sanitation and air pollution, they can be seen as constituting an intellectual tradition that ultimately led to urban ecology. Certainly, their ideas were often ignored in the 19th century, but their well-considered alternative models remain relevant in the 21st century.

386 **A comparative survey of intensive cultivation systems in non-state social contexts**

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For the past three decades, an accumulation of historical, ethnographic and archaeological research on non-industrial agriculture has cast doubt on the explanatory power of the principal theories of agricultural change, which use population pressure, political centralization, or both, as the independent variables. The results from my earlier research in East Africa demonstrate that intensive cultivation developed and was maintained for centuries in conditions lacking both centralized political systems and population pressure. Neither of these conditions are therefore necessary causes of agricultural intensification. In order to identify the driving forces, which are causally linked to agricultural intensification in different parts of the world and during different time periods I have commenced on a global comparative study entitled: Intensive cultivation without state and population pressure: a comparative study of non-capitalist agrarian systems in a political ecological perspective. In this paper I present a preliminary mapping and compilation of documented cases of intensive cultivation without direct state influence. The cases will be sorted into approximate political-economic and environmental categories in order to develop new hypotheses about the relationships between intensive cultivation, political-economy, environment, and culture.

390 **French hygienic discourse and orientalism: the making of a safe industrial society in a barbarous and miasmatic world (1800-1850).**

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French hygienists between 1800 and 1850 had the political task of justifying environmental degradation caused by industrialisation in a theoretical framework inspired from Hippocrates in which the "things that surround us" (the circumfusa) were determining factors of health and illness. Many discursive strategies were used to resolve this tension. I will explore two strongly interrelated strategies.
One was to shift the causality of diseases from environmental to socio-environmental factors. The interpretation of statistics about professional diseases by French hygienists such as Villermé objectified "death as a social disease" (W. Coleman) and reduced the role of workplace environment. But if poverty was the cause of illness, on the long run, industry was the solution to the medical evils it seemed to have created. As the prospectus of the major review Annales d'hygiène publique put it in 1829 industry was like "Achilles' lance which cured the wounds it inflicted".
Part and parcel of this justifying strategy was a potent orientalist discourse (E. Saïd) about the extra European world. At the time when hygienists constructed the future of an industrial and salubrious European society, they elaborated the mirror image of a barbarous and dangerous world through statistical, epidemiological and medical discourses. Industrialisation and colonisation worked hand in hand, justifying one another. For example, writing about the recently conquered Algeria, a collaborator of the Annales d'hygiène publique explained that the bad medical climate of this country could be changed thanks to the industry of the European colonist: "the miasmatic influence cannot resist to man's industry… colonising is sanitizing". I propose to study this discursive strategy of an industrialised and salubrious Europe in a dangerous and barbarous world by examining hygienist literature, medical statistics, climatology, epidemiology, and anthropology of the first half of the 19 C.

398 **Legal Landscapes: The Cultural Production of Nature in Canadian Law**

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Environmental historians have in recent years explored the ways in which nature is culturally constituted, conceptualizing landscapes as nature/culture hybrids rather than as unproblematic natural entities (White 2004). William Cronon (1996), for instance, shows how the American wilderness, far from existing outside of culture, is in fact a product of a specific human culture (white, upper-class, masculine) that emerged within and helped to formulate nineteenth-century romanticism and frontier nationalism. This paper takes its cue from "the cultural turn" in environmental history to examine how the Temagami region of Ontario, Canada, was created—and contested—in the 1980s as a site of nature rather than culture. Specifically, the paper analyses a court case that took place between the Ontario government and the Teme-Augama Anishnabai, the Aboriginal inhabitants of Temagami, over who had legal claim to the region. I argue that the court case was not merely a contest over a given territory, but rather that the territory itself was constructed, along with particular ideas about race, gender and nation, in and through the legal system. I further show that, while it appeared that Ontario and the Teme-Augama Anishnabai struggled for control over the same place, the two parties in fact fought to have their very different relationships with the Temagami landscape recognized in law. Both parties' ideas about the region were shaped by earlier discourses: Ontario understood Temagami as a site of wild nature for tourists to visit and for logging and mining companies to exploit, while the Teme-Augama Anishnabai considered the region n'Daki Menan (our land), their homeland to live on and use. But, I contend, Ontario was successful in the court case largely because the province's understanding of the region had over time come to appear "natural," whereas the Teme-Augama Anishnabai's conception of the territory had been obscured through the discursive production of the region as a site of Canadian nature rather than Teme-Augama Anishnabai culture. This paper demonstrates how historical discourses and colonial relationships of power continue to inform the present, and indicates that movement toward a more sustainable future must include attention to the historical processes through which some human relationships with the non-human world can work to displace others.

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400 **Insuring Hail in Times of Global Change: Transformations of Hail Risk in 20th-Century Europe**

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This paper looks at the "unpredictability of hail" and the insurance market in Europe from a Swiss perspective. The author will elaborate upon several environmental, economic, and financial aspects of hail storms, including causal connections between climate change and the increasing number of damaging hail storms over Europe. However, the focus will be on risk calculation models and the development of preventive strategies as furthered by building insurance, crop insurance and reinsurance companies in 20th-century Switzerland. Resisting to considerable pressure from outside the European Union, Switzerland has not liberalised or deregulated its insurance markets in a manner the EU has been doing since 1994. Therefore, in a great majority of Swiss cantons building insurance is as compulsory as ever, and the market for the insurance of "natural" risks is still largely supplied by state companies. This is a welcome opportunity to discuss how market structures affect the risk of hail.

401 **Scientific Debates on the Landscape Concept in the Stalinist USSR with some Comparisons to the UK**

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The paper considers the development of the scientific concept of landscape in geography and cognate sciences in Russia in the immediately pre-revolutionary period and the problems which faced its acceptance from the time of Stalin's cultural revolutions in the late 1920s (Shaw and Oldfield, 2007). It is suggested that, although the landscape concept was felt by some ideologues to infringe Marxist-Leninist principles and was therefore denounced on ideological grounds, there were also some genuine scientific differences between opponents and supporters of the idea (Shaw and Oldfield, 2008). To some degree such differences were paralleled by contemporary debates in other countries. Comparison with the UK, where regional geography held sway and where the idea of 'natural region' bore some comparison with the Russian notion of landscape, suggests some of the similarities and differences which emerged concerning landscape and related concepts during this period.

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405 **Spatial and temporal reconstruction of fires and impact on Białowieża Primeval Forest – preliminary results**

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We studied the spatial and temporal patterns and ecological importance of fires in the European lowland deciduous forest based on historical and dendroecological reconstruction of fires in the last 400 years in Bialowieza Primeval Forest (BPF).

The past disturbance history of BPF is little known. For most of the boreal and hemiboreal zones fire is usually stated as being the main disturbance factor (Johnson 1992; Granström 2001). Apart from the commonly stated fire in 1811 (Faliński 1986, Mitchell and Cole 1998, Samojlik and Jędrzejewska 2004) and local fires of little general influence, there is no clear picture for the whole BPF. Recent archeological studies conducted in the BPF show that forest fires were probably more frequent in the past than today and connected to past multiple utilization of the forest, mainly as bee-keeping, domestic stock pasturing and charcoal production (Samojlik and Jędrzejewska 2004).

The evidences from the historical sources were confirmed by a palinological study by Mitchell and Cole (1998) who showed that the occurrence of fires in years 1400 – 1750 was more frequent than in other periods based on high micro-charcoal to plant pollen ratio.

In our study, we combined historical sources on the past forest use in last 600 years with the dendroecological methods. An inventory of the fire scarred trees, stumps and snags was conducted in the BPF. Subsequently, sample plots were established in the places with visible fire evidences and samples were collected both from dead wood and living trees with a chainsaw or increment borer (Pressler type). The collected samples were dried, polished and fire scars were age estimated. The result is spatially and temporally explicit reconstruction of fires in the last 400 years in BPF. So far our findings show that:

1) Until the half of the 18th century, fires were more frequent than in the subsequent period. This correlates with the historical data on traditional forest use - traditional bee-keeping, cattle pasturing, wood tar, charcoal and potash production all of which were connected to bringing the fire to the forest.
2) Since the second half of the 18th century until now, fires have been seldom observed. Historical sources provide information only on a single, yet vast fire at that time.
3) Modern times are characterized by the total fire suppression.

The results from this study will be supplemented by the fine scale palinological analysis of the BPF.

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407 **V.V. Dokuchaev and the emergence of landscape science in Russia**

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The first part of this paper provides a critical examination of the work of the Russian soil scientist V.V. Dokuchaev (1846-1903) and with a specific focus on his later work which advanced a complex regional approach to the study of natural phenomena based on the insights he had gained from his work on soils. More specifically, this work provided evidence of the complex interplay between a variety of factors (i.e. relief of the surface, parent rock, vegetation type and the geological age of the land) which ensured soil was conceptualised as an independent natural body governed by natural laws rather than a loose collection of material and characterised by a distinctive geography.

These insights were influential for the development of other branches of Russian natural scientific endeavour

and in particular that of landscape science. The second part of the paper develops this theme and considers the way in which his ideas assisted the emergence of landscape science and associated disciplines in Russia during the early part of the twentieth century. This includes an analysis of the work of scientists such as Georgii Morozov (1867-1920) and the geographer Lev Semenovich Berg (1876-1850).

411 **"Energy and Environmental Crossroads: Oil-led Activities and the Impact on South Louisiana's Wetlands"**

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Since the 1930s, south Louisiana's wetlands have provided America (and global markets) with abundant oil and gas resources.The expansion of this vital energy production and transportation corridor, however, has come with an environmental price tag, one that will perhaps persist for generations to come long after the hydrocarbons are depleted.Louisiana has the world's seventh largest wetlands and produces 71 percent of America's domestic oil production.Yet these wetlands are disappearing and have been for sometime, along with the habitat, wildlife, and traditional socio-economic activities that they support.Most of this loss has occurred between the 1950s and late 1970s, the era of intense petroleum production.The reasons for this high loss rate are complex and unique, involving a mixture of both natural and human-induced changes over time.One of the major causes of this wetland loss has been the long-term direct and indirect impacts of oil-led development, namely the construction of pipeline, access, and navigation canals and subsurface sediment compaction (subsidence) due to extensive oil and gas extraction in the coastal region.The wave of scientific studies published during the 1980s first analyzed the potential causes and consequences of Louisiana's disappearing marsh.These reports are important for a host of reasons, not the least of which is the influences that they have had on: planning and managing wetland resources; environmental policy; and restoration.These studies have become the cornerstone for political, legal, and environmental arguments about the costs involved in restoration, what types of projects are preferred, and who should pick up the tab.Local actors invoked Congress for more action and more recognition of the urgent need to protect Louisiana's wetlands and coastal resources, especially oil and gas infrastructure, from impending natural disasters.These warnings went largely ignored until August 2005 when Hurricane Katrina finally made Louisiana's wetland problem a national problem.Since then, these actors have attempted to "reframe" environmental politics by holding the oil industry partially accountable for the environmental damage done by building canals and extracting petroleum in south Louisiana's wetlands.Combining newly untapped primary sources and a survey of related literature, this paper will identify both the human element and the complex geological processes involved in the transformation of Louisiana's wetlands overtime and will seek to answer to what extent is this case study unique in history.The energy and environmental tradeoffs in south Louisiana have been particularly challenging given the enormous oil resources produced in the region over the decades and because of the Mississippi Delta's complex geologic structure.Understanding how the two have interacted overtime can raise important questions about environmental policy and about the long-term impacts of energy production in wetlands around the world.

412 **Transformation of an industrial harbour area to a sustainable housing district – the example of Western Harbur, Malmo, Sweden.**

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The Kockums shipyard built its first steamship 1873, and from that on, the Western Harbour was more or less synonymous with Kockums for more than 100 years. In the early 1960-ies the number of employees peaked at 6.000, simultaneous with an increased competition from Japanese shipbuilding industry. During the 1970-ies, a combination of very large investments and the oil crisis meant the beginning of the end, and 1986 the last civil ship was built by Kockums. The largest of its buildings was converted to a car factory, and Saab-Scania produced cars there for a short time at the border between the 1980-ies and the 1990-ies before it was closed. The building has since then been used as Malmö convent centre.

Physically, the development of the Western Harbour land area has followed the industrial development. The whole area is artificial, a landfill into Öresound. Before 1775, Malmö harbour consisted of a number of jetties in Öresound. During the 1840-ies and 1850-ies the land expansion into Öresound began, and continued during the end of the 19:th century. After a number of years with constant area, the area expansion continued after WW II, and occurred during the 1940-ies, 1960-ies and 1970-ies. The final area, 160 hectares, was reached in 1987, when the last landfill was done in relation to the establishment of Saab-Scania.

In the mid 1990-ies, Malmö decided to arrange a European housing expo which included the building of a new housing district. The Bo01 expo opened in the Western Harbour in 2001, with the theme "the sustainable city of tomorrow". The soil had been thoroughly examined, due to previous industrial activities and the status of the masses used for land fill. Contaminated soil was removed and replaced with clean soil, and the whole area was covered by a layer of clean soil. The energy that supplies the area is 100% locally produced, a wind power plant in the Northern Harbour producing most of the electricity and a photovoltaic panels producing the rest. Heating is produced and stored in a system of solar panels, sea water and geothermal storing. The buildings should also be energy efficient. Material recycling is well developed, i.e. the organic waste is collected in a vacuum system and transported in electric vehicles to the local water cleaning plant where it is a source of biogas production. Green roofs, habitats in parks and yards and an open storm water system enhance the biodiversity and gives inhabitants a green surrounding. Development of the Western Harbour has continued after Bo01, with a continued commitment to sustainability, and Malmö is today an internationally known forerunner in the field of sustainable urban development.

413 **Nineteenth Century Urban Live Food Markets: The Victorian Environment and Urban Development**

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In 1852, Parliament passed the Smithfield Market Removal Act to close the Smithfield Live Cattle Market, London's historic meat market. The Act removed the cattle market out of the city to Copenhagen Fields in the suburb of Islington in 1855. A modern Smithfield Metropolitan Market opened on the old site in 1869 offering dead meat and dry provisions. Smithfield's nuisance value had been apparent to all Londoners, not the least of whom was Charles Dickens who recorded a now classic description of the market in Oliver Twist. Smithfield, he wrote in 1837, was "… covered nearly ankle deep with filth and mire; and a thick steam perpetually rising from the reeking bodies of the cattle." Responding to Dickens and others engaged in an impassioned debate, the Act removed the cattle market out of the city.
But there is more to these events than just the closure of a meat market. The interests of urban developers and environmental reform activists prepared London's meat consumers for the disappearance of live meat from the urban landscape. The history of Smithfield's placement outside the City walls and its eventual displacement to the outer suburbs offers the opportunity to see Smithfield in the context of London's urban history and development. A consideration of land use and the architectural and functional design of London may illustrate how cities viewed the sighting and location of live animal food markets. The appeal of Smithfield as a market space hinged upon several environmental characteristics. Not only was the Market situated outside the boundaries of the City, but it was also located near the Fleet River. The river provided water for the animals that drovers brought from farmers in the countryside, including farms located in the Scottish highlands. It was also an aqueous conveyor of animal refuse towards the Thames River. During the Middle Ages, slaughterhouses appeared on the banks of the Thames so that animal waste could escape the London landscape on the currents of the rising tide. Daily visible and audible to London inhabitants, Smithfield became a lightening rod for the city's reform movement. The Victorian sanitation reformer Edwin Chadwick noticed the correlation between the growing poverty in the City and the presence of the detritus of the slaughterhouses around Smithfield. As early as the fourteenth century, laws appeared for the removal of entrails from the sidewalks and public spaces. Although somewhat misguided, public opinion soon associated a toxic miasma with the Smithfield Market. Hygiene and sanitation technologies addressed the need to ameliorate public health and addressed public anxieties about the manure and blood so visible in the cattle market. These technologies changed the relationships between agriculture and urban livestock markets.
My paper is a chapter about urban development and the environment in my dissertation on the removal of the Smithfield Live Cattle Market. This chapter will also review the interests of urban developers, including the Corporation of London, the owner of the Smithfield site. The discourse among multiple interests included those of market salesmen, the consumers, butchers, government, drovers, graziers, landowners, and reform activists. Comparisons between the London cattle market and those in Paris, New York, and Boston may also reveal cultural interpretations of both concerns about the environment and the interests of business owners.
Current debates concerning farmers' markets within our urban landscape may benefit from this assessment of Smithfield. While far from Dickens's portrait of "the reeking bodies of the cattle," this paper promises an intriguing look at the historical, developmental and environmental antecedents for urban provisioning.

414 **'Struggling to understand and protect New Zealand forests, 1868-1900'**

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This paper examines various late 19th century initiatives to develop better scientific understanding of New Zealand forests as well as attempts to prevent their plunder. It interprets these faltering steps to know and administer New Zealand forests comparatively, with special attention to parallel endeavours in Australia and British North America/Canada.

417 **Green Rhetoric in Blackshirts: Italian Fascism and the environment**

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National identity may be seen as the central feature of Italian Fascism's ideology. An ideology that was otherwise rather confuse or flexible in respect to most issues of the political agenda. In fact, from its very beginning the Fascist movement did not have a well defined and organic political program, and boasted repeatedly of its programmatic relativism, claiming that its only dogma was the Nation.
In this context the conservation of natural beauty, mainly because of its aesthetic and historical value, was seen as a means to consolidate national unity and identity. It is thus interesting to see how far Italian Fascism had the ability to set up links between history and landscape that could be just used to foster national identity. Indeed during the Fascist regime there was a political re-invention and exploitation of landscape. The memory of the Great War, the celebration of a new era, the creation of national parks, and the rhetoric of rural folks as the "pure Italic race" were some of the tools used by the Fascist regime to reshape and politicize the landscape. Although Fascists described rural people as the true, pure race of Italians, at the same time they jeopardized their conditions of life by supporting the hydroelectric corporate expropriation of water and land, by tightening regulations on forest and pasture uses, and by forbidding emigration.
In our paper we will analyze how Fascists appropriated Italian landscapes through both rhetorical discourses and concrete policies, transforming them into the image of the "New Italy" they aimed at creating. We will follow this appropriation/expropriation process through three main paths: the creation of the first Italian

national parks, the Fascist 'war against goats', and the huge reclamation projects. Modernization and nature interacted in all these processes articulating with the preexisting uses/meanings of local environments. Using Karl Jacoby's framework, we will scrutinize the outputs of the fascist conservation policies in terms of repression and control on the local communities.
We will show how both narratives and politics affected the relationships between people and nature, changing their social as well as ecological meanings.

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424 **Fire and forests of the northern Sierra Madre Occidental in Chihuahua, México: a history of 100 years of natural resource extraction, land use changes and management policies**

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The Sierra Tarahumara is a mountainous area that covers approximately 60,000 km2 of the Sierra Madre Occidental (SMO), in the state of Chihuahua, México. Its landscape is dissected by deep canyons and complex drainages. The higher elevations are dominated by large extensions of pine and pine-oak forests, while the lower slopes and canyon bottoms are covered by dry forests and riparian vegetation. 19 municipalities are encompassed by the region known as the sierra, with a population currently estimated at 290,000 people. Of those, approximately 55,000 belong to indigenous groups such as the Rarámuri, Ódami and Guarijíos and Pimas. The most important income generating activities in the region are timber extraction, mining and tourism; while corn-based agriculture and animal husbandry comprise the subsistence component of the local economies. Most of the population in the region is concentrated in towns of less than 2,500 people, which results in an extensive use of the landscape. Human settlement and its associated activities take place in the valleys, but the slopes surrounding these are covered by forests, providing a large interface for human interaction with these natural systems.

Fire chronologies developed for different sites in the SMO indicate that forests burned frequently until the 20th century (Fulé et al. 2005, Fulé & Covington 1999). These changes in fire regimes have led to forest structures and fuel accumulation rates that begin to resemble those of the ponderosa pine forests of the Southwestern U.S. The decrease in fire frequency in the last century can be associated to anthropogenic factors related to land management and land tenure, as Heyerdahl & Alvarado (2003) found in their study sites in Durango. Drastic land management changes that took place in their sites since the late 1800s, such as increase of forest access by road or train, mining activities, grazing and commercial logging, set the stage for further alteration of fire regimes resulting from land distribution following the regional implementation of the Agrarian Reform Law from the 1950s up to the 1970s.

This fire history of temperate forests in the SMO links ecological and historical data to understand the present state of the forests and to provide guidelines to improve their management and conservation. Emphasis will be placed on the links between local land-use and management strategies in the 1900-2000 period, and state and federal-level policies guiding forestry and natural resource management in the region, focusing on those related to fire.

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432 **Tales of Topographic Displacement**

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The history of the Nordic North contains many examples of local land-related knowledge being replaced by geographical scholarship imported from the South. The modern framing and naming of the places and landmarks of the indigenous Saami has also followed the needs of state regimes rather than the needs and wishes of the Saami (Tanner 1929, Jones and Schanche 2004). During the post-World War II decades, the

northernmost provinces of Scandinavia and Finland turned into battlegrounds for industrial developers and conservationists (Massa 1994, Jensen 2002). By drawing from two case studies, this paper argues that the contemporary challenges of the Nordic North cannot be identified satisfactorily without paying attention to the historical transformations of the geographical nomenclature created for classifying the socioenvironmental resources of the North.

The two cases focus on different sides of topographic re-framing and together they serve as windows into the historical, and ongoing, socio-environmental transformation of the Nordic North. The first case study assesses the importing of the anglophone wilderness into the vocabulary of environmental governance in Upper Lapland (in Finland). Finnish wilderness planning (developed since 1991) has aimed at protecting selected areas in Northern Finland, a practice that is indelibly linked to the Western conservation tradition that assumes parts of pristine nature must be protected as crown parks (Barton 2001). However, the Finnish and Saami counterparts of wilderness (respectively: erämaa, meachhi/bivdo-eatnamat) refer to traditional hunting and herding grounds under local control. The wilderness status confuses those that have regarded these areas as part of the everyday.

Second, the paper examines the consequences of viewing the Nordic North as aseries of landscapes. The concept of landscape has no direct equivalent in the Saami languages, and a closer study of related concepts (such as eatnam, siida, guovlu and báigi) reveals links to a cosmology that deviates significantly from the Western (and also, Indo-European) world-viewing. The case study shows how scientific and administrative landscaping, while overlooking local cosmologies and lingual traditions, serves as a tool of continuing external domination.

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433 **An environmentally-friendly industry? Environmental thinking in the utopians communities (1830-1848)**

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Faced with upheavals resulting from industrialization, the "utopians" of the first half of the nineteenth century tried to redefine the relationship between city and country, environment and industry. In their numerous writings, French and English socialists condemn pollutions and dangers arisen from industry. In their opinion, the urban pollution and insalubrity constitutes an aberration with regard to the natural order, and a proof of the nonsense of civilization. Inspired by contemporary hygienists, whom they read and criticized, they saw social and moral reform as the answer to environmental problems. They designed a model of industrial development in which an improved social organisation would avert environmental dangers. As Etienne Cabet, the founder of Icarian communism in France, explained in his book Credo Communiste (1841): "Nature is infinitely intelligent, infinitely wise, infinitely just, infinitely good and kindly". As a consequence, the socialist project consists in domesticating this nature in the service of human progress. While liberal industrial capitalism produced disturbances and pollutions, socialist industrialism would be hygienic and firmly rooted in rural life. Owenite and Icarian communities, the Phalanstère as well as the Familistère at Guise thus contributed to justify industrialization by removing the environmental disturbances which it risked to create. This papers intends to examine the role of environmental concerns in the progressive development of socialist thought on both sides of the Channel, as well as the differences which exists in this respect between prematurely industrialized Great Britain and France which remains more rural.

434 **Beyond Colonialism: Towards a new environmental history in India**

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In India, most studies on environmental history focus on diverse themes in the colonial period. The first wave of Indian environmental history may be termed as 'nationalist' since its concern was what colonialism did for national/natural resources (Gadgil and Guha 1993). The second wave of writings may be called as 'revisionist' as it revises many of the shortcomings of the nationalist school (K. Sivaramakrishnan 1999; Arnold 2005). The revisionist has succeeded in restoring the environmental subjects as significant and heterogeneous players in such history. Their subjectivities and identities are no longer represented as the direct result of colonialism. However, the colonial past is remembered in a positive shade even though the colonial authority destroyed the forests and uprooted their habitation by a forest community, Kanikkaran, who lives in Agasthiyar hills, Western Ghats of south India. So this paper argues that a more nuanced understanding of Indian environmental history is possible only by a specific way of placing center-stage the environmental subjects, i.e. communities, which work the environment for a living, their practices and world-views.

To recover the environmental subjects as varied and diverse, Gunnel Cederlof and K. Sivaramakrishnan (2005) of the revisionist school have argued that enframing environmental history within larger binaries such as metropolitan vs. nationalist (an analytical frame which is common in the nationalist school) will be inadequate for the task. They note that only local histories of particular communities can recover the environmental subjects. Thus, one needs 'to persuade historians and natural scientists to embark not just on grand themes in environmental history and discourse analysis, but on very local, small scale histories of single communities and their experiences of ecological pressures and change overtime, as part a broader social agenda aimed at local empowerment and environmental awareness' (Grove et al 1998). To move away from these two schools, two questions have been drawn from the memory of Kanikkaran community; why does the community glorify the colonial past? If they interpret in the positive shade what is their conception about nature? If these questions are addressed, the static understanding about the forest subjects and the unidimensional understanding of nature could be avoided in the historiography.

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435 **Relations between land use change and food consumption in the Philippines over the 20th century**

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The Philippines are an example of a country experiencing drastic deforestation and rapid population growth in its recent past. Over the 20th century, the nation's forest cover declined from 70% to 20%. At the same time population grew 10-fold from about 7 millions to over 70 millions, leading to continuous increases in food demand. The decline in forest area is well documented and discussed in literature. Less information exists on what happened to the land after it was deforested and how these changes in land use were related to increases in food demand due to the ever-growing population.

This paper presents a reconstruction of land use in the Philippines from 1910-2003. Data were compiled from different sources, such as agricultural statistics, surveys, satellite data, secondary sources and expert interviews. We also obtained data on food consumption and linked this to land requirements, trying to pinpoint the origin of the food products.

Our findings show that decline in forest area over the first half of the century was closely linked to the expansion of permanently cultivated area. Large shares of the cleared land were planted to rice and cash crops. In the second half of the century a different picture emerged. Deforestation continued, mainly on sloped land not suitable for permanent cultivation. This was facilitated by large scale logging operations, which provided infrastructure and opportunities for migration into those lands. Large areas of grass- and brushland and minor quality re-growth forests emerged, being of low economical and ecological value. At the same time, the Green Revolution brought about dramatic yield increases on land already under cultivation. Necessary increases in food production were achieved without further aerial expansion of agriculture. Linked to the exhaustion of forest resources and increased domestic demand, the nation, which was a major exporter of tropical cash crops and hardwoods in its past, became a net importer of biomass over the last decades.

We conclude, that natural forest was replaced by fundamentally different land uses over the past century: in the first case, the land kept a permanent economic value, as it is producing food. In the second case, there was only one harvest (the wood) and degraded landscapes of low economic and ecological value emerged.

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437 **Colonized Environments, Rural Resistance, and Moral Ecology in post-Conquest England and Late Medieval Orkney and Shetland**

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Karl Jacoby posts an early American eco-terrorism, what he calls "environmental banditry," in the period from 1870-1918, when rural peoples protested the establishment of America's national parks and the alienation of local populations from traditional natural resources. Poaching, arson, theft, and destruction of property were acts of principled resistance and demonstrations of a moral ecology, not simple crimes driven by economic motives. Jacoby has written a new environmental history, in which complex class concerns and perceptions of nature are manifested in illegal acts against higher powers who alienated local populations from traditional ecological resources.

This paper asks whether medieval Europe offers any examples of such sophisticated peasant protest to ecological infractions by colonial powers. The eleventh-century Norman Conquest and the Stewart absorption of Scotland's Northern Isles in the sixteenth century provide two case studies for the alienation of local peoples from customary resources. Both case studies are predicated on the imposition of foreign law over subjected populations, namely the enforcement of Norman over English law, and Scots over Udal law. Focusing on coastal and marine resources, this paper uses court cases, legislation and charters to consider two different medieval peasant responses to royal and colonial claims over traditional resources. Whale poaching as seen in early twelfth century southern England and the theft of numerous marine resources in the Northern Isles document peasant crimes, but potentially more complex and strategic protests that are not communicated in court records.

Medieval cases of theft, poaching and destructive acts are portrayed by many historians as simple political or economic resistance against foreign rule. These crimes, though, suggest a deeper resentment and more complex motivations, perhaps an early moral ecology against misuse or abuse of natural resources and fears over fragile regimes of sustainability. English and Scandinavian lords and earls had always exploited rural populations politically and economically, but the new Normans and Scottish earls did so without regard for or knowledge of native ecologies. My paper examines how locals resorted to principled resistance, not simple crime, to protest the profound environmental changes that resulted when foreign groups invaded and then disposed of local tradition. Borrowing from Jacoby, this paper posits a medieval peasant moral ecology.

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439 **Archaeological perspectives on indigenous conservation in precolonial Pare, Tanzania**

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The landscape within the North Pare mountains of north-eastern Tanzania includes large areas of terraced agricultural fields, hundreds of water storage reservoirs, an extensive network of irrigation furrows, and pockets of woodlands protected locally by their status as sacred groves. Together these features contain a rich archive of information concerning the history of local resource exploitation, and have been cited as examples of 'indigenous conservation' on the grounds that the sacred groves represent preserved remnants of extensive precolonial woodlands and that the irrigation furrows and agricultural terraces attest to the existence of effective soil and water conservation measures that predate European contact in the mid-19th century. Thus, Pare reservoirs and furrows have been the focus of a series of rehabilitation programmes from the 1990s onwards, first as a joint project by the Dutch and German development agencies SNV and GTZ and now as part of an ongoing initiative by a local agency the Traditional Irrigation and Environmental Development Organisation (TIP). A recent initiative by TIP is also promoting the virtues of agricultural terraces, whilst the area's inclusion within the eastern Afromontane bioversity hotspot gives added impetus to the maintenance of local traditions which act to limit further incursions into the remaining forested areas. There are, however, potential alternatives to these historical narratives which question the antiquity of the sacred groves by reference to records of colonial tree-planting schemes and to early European observations of a largely treeless landscape. Moreover, the area's reputation as a centre for iron production in the late precolonial period suggests at least the possibility that deforestation resulted from local extraction of fuel wood and invites questions regarding the clearance of forests for agriculture, particularly since several markets and settlements are recorded as having developed as a direct result of the area's role as a supply station for ivory caravans during the 19th century.

Drawing on recent and ongoing archaeological fieldwork this paper will examine the veracity of these various historical narratives and in doing so aims to highlight the degree to which conservationist initiatives rely on perceptions of environmental history.

442 **Guardians of the Atlantic: Ocean Pollution and NATO Environmentalism in the Cold War**

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A spate of environmental policy-making emerged from the United States in the late 1960s and early 1970s. In the realm of ocean pollution, events such as the Torrey Canyon and Santa Barbara oil spills awakened the consciousness of influential activists and politicians, while controversies about nerve gas disposal and radioactive waste dumping sparked intense debates and a major anti-dumping agreement in 1972. Amidst these well-known events in the history of environmental activism and law, it was perhaps surprising that one of the most active bodies for pollution studies and control was the Committee on the Challenges of Modern Society (CCMS), formed not under the United Nations, but under the auspices of a military alliance, the North Atlantic Treaty Organization. The idea was President Richard Nixon's, in the wake of the Santa Barbara oil spill; and his counterparts in NATO awkwardly accepted it. President Nixon's sincerity in his commitment to environment issues remains a controversial point among historians, but he did encourage the Atlantic alliance to take ocean pollution seriously. In his quest to identify points of "linkage" in negotiations with the Soviet Union, scientific cooperation and environmental issues ranked high on his list of items that might become fodder for real negotiations amidst the geopolitical stalemate of the arms race, and he encouraged NATO to find common ground on such issues. Following Nixon's rhetoric, the CCMS stated in 1969 that its goal was to protect individuals from the unintended consequences of technological change. NATO identified Atlantic pollution as a serious problem, yet its European members were unapologetic ocean polluters, particularly (in the case of radioactive waste) Britain. How seriously did the CCMS pursue its goals, and in what ways did Atlantic protection evolve under this limited, American-dominated alliance system? Drawn from the archives of NATO and other collections, this paper explores the global ramifications of environmental pollution in an unlikely context, through the eyes of a military alliance designed explicitly to act as guardian of the Atlantic.

443 **Coffee in the blue mountains. Landscapes, public policies and Green revolution in the coffee plantations of Costa Rica**

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Since 1960 Costa Rica's coffee plantations experienced an intense process of technological change. In the context of the Green revolution, farmers implemented the cultivation of genetically modified varieties, increased the use of chemical fertilizers and introduced new farming practices. This resulted in a technological collapse of the farming systems prevailing before 1960, which were distinguished by an organic fertility management and the development of agroforestry farming systems. Such transformations were favored in the policies issued by the national social-democratic governments, providing loans and agricultural extension services, and promoting the establishment of coffee producers' cooperatives.

Results were evident in the short term: there was a substantial increase in the yields per hectare between 1960 and 1980. But in the long term the effectiveness of this process has been questioned in several ways. The changes in the international coffee market have contributed to expand the organic coffee production, and the rapid development of farming systems has caused damaging effects on soils, facilitating degradation processes. This has brought up the need for examining the real extent of the technological intensification and, paradoxically, of restating the organic farming systems that were abandoned in the search for technical modernization.

The analysis of such process is the purpose of this paper, in terms of the changes experienced in the landscape of Tarrazú, a traditionally coffee-growing region located in the southeast of Costa Rica, in the middle of rugged mountains, surrounded by extensive cloudy and rainy forests. This document is specifically focused on studying this impact through the following aspects: (1) the role of ecosystems in the agroforestry farming systems before 1960, (2) the impact of Green Revolution technology on soils and the relations between ecosystems and agroecosystems in the region, and (3) the evolution of the social representations on the landscape among the people of Tarrazú, before and after the technical modernization.

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446 **Imag(en)ing Time Traveling Trees: Aerial Photography, GIS, Digitalization, and Re-Reading African Landscapes**

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Historians and non-historians pre-dominantly rely on words to study and represent environmental change but critics have argued that words in both written and oral form misread past landscapes. As a result, environmental historians are increasingly privileging the history of the production of environmental ideas over the history of physical environments.
The integration of historical series of high resolution (sub-1meter resolution) aerial photos, satellite images and digital and Geographical Information Systems, however, has the potential to add dramatically to our capacity to more fully understand and explain the dynamics of physical environmental change. Trees are key in re-imagining and re-imaging environmental change because old trees are identifiable throughout historical time series of aerial photographic and more contemporary SPOT satellite images and their GPS coordinates can be obtained and verified through fieldwork.
I will first discuss how words form the main basis for the analyzing and representing environmental change, next outline how serial images (aerial photography and satellite images and digitalization and GIS tools can offer when they can be linked with more conventional historical data (through time traveling trees). I conclude by highlighting how this methodology can enhance our understanding and representation of environmental change beyond the tree and farm level.

449 **The Lives and Gardens of Three American Women: Constructing Race and Gender Identity in the Natural World**

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Planting a garden, trading vegetables with a neighbor or culling for herbs on a hillside all seem like simple acts of being outdoors and providing good nutrition to loved ones. But they are also powerful ways of perpetuating cultural traditions and promoting a sense of ethnic and racial identity. In my paper, I will look at how three very different women linked the natural world to their sense of heritage and identity. The study maps the intersection of Raymond Williams' and Bill Cronon's studies on the construction of nature, David Hollinger's post-ethnicity studies, Roland Barthes' and Mary Douglas's theories on food and symbol, Joan Scott's calls for gender analysis, and Yi Fu Tuan's work on identity and place.

The first of the three women is a Crow Indian, living on the Crow reservation in southeast Montana, who learned about the local fauna and its uses and meanings from her famous grandmother Pretty Shields. In her ability to find and identify local plants, she envisions herself as much a tribal historian as an herbalist. She feels a strong imperative to transmit her knowledge via publications and lectures to Indians and non-Indians alike as a means of keeping Crow culture alive. The second woman is an African-American woman in St. Louis, Missouri who has been active in a local community garden movement. She learned to garden and to cook from her family while growing up in the rural South. The downtown neighborhoods she works in suffer from limited access to fresh produce and from some of the most severe health and nutrition problems in the nation. Yet to her, her gardening lessons and cooking classes are not simply about solving a health crisis but about reigniting a sense of cultural vitality in the community. The third woman is an Italian-American woman from the Hill--a St. Louis Italian-American neighborhood--who, with others like her, maintains a strong yet informal network of food sharing from her backyard garden. The fresh produce they grow and the gardens they plant are practical because they provide a plentitude of good, fresh herbs and vegetables, but the gardens also help the women maintain their sense of Italian heritage.

This paper will address how these women have created their gender roles and ethnic or racial identities through these activities. It will examine how have they constructed their local landscapes, both figuratively and literally, as a way to articulate and transmit their cultural heritage and to put that sense of heritage to work to revitalize their communities. It will also examine how have these three different women engaged that process both differently and similarly. The main theme of the paper is how women create and maintain cultural identity in their communities through the mutual construction of race, gender, and nature.

450 **South Phoenix: White Privilege and Path Dependence in the Making of a Contaminated Community**

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This paper examines the historical development of environmental inequalities in the Phoenix, Arizona metropolitan area. Its focus is on the historic production of a zone of environmental contamination and locally unwanted land uses in central city minority neighborhoods. The study begins with a review of contemporary environmental justice research on Phoenix in order to identify the metro area's most contaminated census tracts (e.g. Bolin et al., 2002). It then develops an analysis which identifies key political, economic, and geographical factors contributory to the emergence and persistence of a region of poverty and contamination. Two strategies are followed in the analysis: The first provides a historical overview of the development of this zone of environmental and social inequalities, identifying a diversity of factors operating at different scales that have contributed to its production; The second examines post-WWII changes in select neighborhoods using indicators of land use change, demographic composition of neighborhoods and the siting/abandonment of hazardous industrial facilities to provide a finer grained analysis of recent changes. Conceptually, the paper utilizes notions of path dependence (e.g. Melosi, 2000) and white privilege (Pulido, 2000) to analyze the persistent effects of early racial segregation, industrial concentration, and the location of transportation corridors in producing and maintaining environmental injustices. These are also discussed in relation to more recent development patterns engendered by rapid suburbanization, urban redevelopment, and industrial decentralization across the metropolitan region. The paper concludes with a discussion of processes of uneven geographic development in the production of environmental injustices.

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453 **'The wildness is taken from the forest by the metalworks': The Political Ecology of Extraction in the Making of the Modern World-System, 1450-1800**

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"The wildness is taken from the forest by the metalworks." Christian Lehmann used these words to describe mining's devastating toll on the forests of the Saxon Erzgebirge (Ore Mountains), sometime in the second half of the 17th century. The Erzgebirge had been at the epicenter of modernity's first great metallurgical revolution in the century after 1450, its silver and iron nourishing the arteries of accumulation and production in the great expansion of Braudel's "first" 16th century (1450-1557). By the 1570s, however, Central Europe (and the Erzgebirge in particular) had become a second-tier producer in the world-economy, as the center of the world-economy's iron production shifted towards Sweden, and as silver production shifted to Potosi. In the 18th century, iron and silver would again find new greenfields, this time in the direction of Russia and New Spain. Metallurgy of every kind, but these two sectors especially, devoured the wealth of nature at a ferocious pace; it was sustainable only through the radical and recurrent extension of the modern world-economy's geographical arena. This paper examines the movements of these two key extractive sectors (iron and silver) from the standpoint of environmental history. While the story of the geographical expansion of silver mining and iron production in this era is often told in terms of geological fortune and the world market, these explanations are unduly partial. The geographical movement of key metallurgical sectors can be most effectively explained by intertwining the concerns of environmental history with those of historical sociology and economic history. From this standpoint, the exploitation of the forest, prosecuted so effectively by early modern metallurgy, constituted at once a key source of economic growth, and a key crisis tendency, in early modern capitalism – a contradiction that was attenuated (but never resolved) through renewed expansion on the frontiers of the world-economy.

454 **Nature's Casino? Flooding, Risk, and Insurance in European and American History**

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The industrial revolution tremendously increased the commercial as well as the destructive potential of rivers. With the concentration of material wealth in the floodplains and the transformation of rivers into highways, the seemingly incoherent and unpredictable character of natural "behavior" led to an explosion of uncertainty. The affected societies reacted by various means to this new challenge, most prominent of which were the erection of ever more levees and flood walls, the construction of reservoirs, the straightening of rivers, and increased relief activities by private and state institutions. Only at the end of the nineteenth century, however, were flood insurance schemes seriously contemplated to deal with this contingency.

In 1846 the first European flood insurance policy was offered by the Austrian company Azienda Assicuratrice in Triest. The Austrian enterprise was short-lived but others soon followed. In Germany, serious attempts at establishing flood insurance began only at the end of the nineteenth century. In 1898, after a devastating thunderstorm had hit the Cologne area, local industrialists founded the so-called "Thunderstorm-Committee" ("Unwetter-Ausschuss") to promote the establishment of an insurance against all kinds of natural hazards, including floods. This attempt failed as did later undertakings during the Weimar period and the Federal Republic.

Despite, or rather because of the failure of the private sector to provide adequate protection against flood damage at reasonable premium rates, there has always been considerable public concern about a lack of insurance after severe floods and a large demand for some kind of state intervention. Today, in most countries where flood insurance is available, it is supported in one way or another by the government – by the way of subsidized premium rates, tax deductions or by a genuine federal program. Two more or less successful examples of this kind of insurance that my paper will analyze on the basis of a wide variety of archival and published sources, are the Swiss system of all-hazard insurance and the National Flood Insurance Program in the United States.

In general, natural hazard insurances are an innovative tool to spread the cost of natural disasters in time and space while at the same time enabling individuals, companies and societies to reap the benefits from private and commercial activities in earthquake-prone areas, in regions affected by severe storms, or near waterways, lakes, and oceans. In practice, however, natural processes often turned out to be not only less predictable than expected, they were literally unaccountable.

457 **Woodland Exploitation in Central Europe 1400–1800: Changes vs. Stability**

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Traditional forest history maintains that in the Early Modern Period substantial changes happened in woodland management all over Central Europe because overexploitation left woods in such a ruined state that they were no longer able to cope with the increasing demands. Based on Czech and Hungarian examples, this paper will argue that while in some regions (at higher elevations with abundant woodland) changes indeed occur in the given period, in other areas (such as densely populated lowlands) stability was more characteristic. We will also argue that the relationships between various phenomena in woodland exploitation and energy regimes are far more complicated than simple causality. We will analyse archival documents as well as botanical and archaeological field evidence.

The main foci of the paper will be:
1) The exploitation of particular woodland sites, both in the lowlands and in more mountanious regions.
2) The rise of plantation forestry in the region within a European context, and how the justification for its existence is related to actual woodland properties as observed in point 1.
3) The proliferation of woodland-based industries (lime-burning, charcoal making, potash production for glass-making), mostly in the eighteenth century.
4) The reasons that lead to the overwhelming success of plantation forestry ca. 1800, which quickly and radically transformed many woodland landscapes.

458 **Ancient Deforestation Revisited**

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Recently, heated scholarly discussion has focused on the question as to whether loss of forests was one of the most notable and widespread effects of human activity on the natural environment in the area of the Mediterranean and Near East during the Greco-Roman period from about 800 B.C.E. to 600 C.E. While no one maintains that forests disappeared from the entire Mediterranean basin, the prevailing view from the time of George Perkins Marsh in Man and Nature, a book that begins with a declensionist narrative concerning the Roman Empire and its depletion of natural resources, has been that the area of forests was sharply reduced, and as a result there was increased erosion, local desiccation of climate, loss of habitat for some species, and decreased availability of forest resources such as timber for construction and wood for fuel.
Jared Diamond, following this view, says, "With the tree and grass cover removed, erosion proceeded and valleys silted up…. Fertile Crescent and eastern Mediterranean societies had the misfortune to arise in an ecologically fragile environment. They committed ecological suicide by destroying their own resource base." (Diamond 1997, p. 312).

Many, including Diamond, do not place blame primarily on the classical Greeks and Romans, but emphasize that deforestation is a long-lasting process that began at least as early as the Bronze Age. Others, such as J. R. McNeill in Mountains of the Mediterranean World (1992), while not denying earlier episodes of deforestation, blame the 19th and 20th centuries for the most serious damage.

More recently, contrary views have been expressed, by A. T. Grove and Oliver Rackham (The Nature of Mediterranean Europe, 2001), who see forest destruction in the Bronze Age and Bulldozer Age, but admit no serious denudation or erosion between the two. Peregrine Horden and Nicholas Purcell, in The Corrupting Sea (2000) speculated that if deforestation happened in the Classical Age, it was a "Good Thing" (p. 334). Now Diana K. Davis, in her award-winning Resurrecting the Granary of Rome (2007), sees the idea of a forested landscape in the Mediterranean south coast Maghreb during Roman times as a pernicious weapon of northern European colonialists against the Arab societies they sought to dominate.

It is time to reconsider the whole picture on the basis of old and new evidence. Ancient writings are not as silent on the subject as some have maintained, and cannot be rejected out of hand as some have tried to do. Proxy data including information from pollen analysis and dendrochronology has been greatly augmented and made accessible recently. More is known about the history of climate. Interesting experiments using computer modeling have offered possible new models for reconstruction of the past. Without denying the complexities in a varied region, and the possibilities of both restoration and degradation, it is here asserted that the impacts of human activities on the Mediterranean forests during the period under consideration were substantial and lasting.

459 **Searching for the Dying Forest. Forest Sciences and the Role of Experts in the German Waldsterben debate in the 1980s**

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This paper is centered on the German scientific experts´ efforts to come to grips with the phenomenon "Waldsterben" ("forest dieback") in the 1980s. The broad public concern about this environmental problem had been triggered by scientific warnings in the early 1980s. Suddenly, the forest scientists were in the focus of public attention and their advice was urgently sought for by politicians. Yet, in spite of long traditions of

research on plant diseases in general and on "smelter smoke damages", in this new situation the experts were confronted with their own inability to explain the "new-type damages" in the forests. The scientific debate was characterized by uncertainty and a multitude of contradictory hypotheses and explanations of the "Waldsterben". The paper will explore how the scientists dealt with this situation of public and political attention on the one hand and their own and the public´s awareness of scientific uncertainty on the other, and in how far they communicated their (non-)knowledge differently in public, political and scientific debates.

460 **From commercial integration to marginalisation: Rivers in the Upper Austrian Eisenwurzen region, 1850-2000**

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Before the introduction of motorised transport, rivers were the most important medium of transport in Central Europe. This function of rivers and the limitations of riverine transport shaped the relations between regional centres and their peripheries and impacted land use, resource extraction, processing and consumption in the surrounding regions of rivers. The introduction of steam railways and later street transport in the course of industrialisation fundamentally altered these interrelations. The paper discusses the changing role of rivers for agricultural, forest and industrial production and commerce along three case studies in the Upper Austrian Eisenwurzen region.
The Upper Austrian Eisenwurzen region turned from an industrial and commercial region into a marginalised periphery between the late 19th and the late 20th century. In the 19th century, the region was Europe's second largest producer of iron after the United Kingdom (Sandgruber, 1997). Iron ore was extracted from the Styrian "Erzberg" and decentrally processed in the surrounding mountainous Eisenwurzen region. Rivers played a crucial role in the integration of the region as the key mode of transport, linking the sites of resource extraction to the regions of demand. The limits of this mode of transportation led to a small scale mosaic of agricultural, forest and commercial production and induced specific patterns in land use, population and regional commercial exchange.
From the late 19th century, steam railways replaced rivers as the most important transport medium for bulk products. The Upper Austrian Eisenwurzen region proved little suitable for the expansion of railway and production infrastructure, which enforced a decline in iron production and a stagnation of population numbers (Mejzlik, 1935). During the 20th century, the region was marginalised in two ways: The previously flourishing iron industry declined, and at the same time regional disintegration processes took place like in many other parts of Austria (Krausmann et al., 2003). Hillier parts of the region were increasingly reforested, while agriculture was intensified in low-land areas. The remains of the iron industry have retreated to the iron processing works in the cities of Steyr and Linz while rural areas increasingly rely on agriculture, forestry and tourism.

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461 **Japanese environmental history: narratives of sustainability**

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This paper examines the history of Japanese thinking and policy-making in reference to search for ecologically sustainable social development. By doing this also show that social justice and environmental history - and movements and thought aiming to shape that history - have a close relationship in Japan. My cases are primarily from the period of modernizing Japan and contemporary Japan, but I also analyse these processes against the traditions going back to Edo period and beyond. In the Japanese case there is also the luxury of having good sources going back for centuries, which makes it easier to analyse the very essence of historical traditions of environmental history and reconsider some of the widespread assumptions about the links between modernity and environmental awareness.

In this research sustainable social development is understood in a broad sense under influence of deep ecology that attempts to overcome limits of anthropocentric approach to life security and well-being, whereas environmental risk is analysed primarily in the light of discourses on risk society and reflexive modernization. My research then questions what kind of alternatives there are available for greens in Japanese politics. However, I also provide a wealth of examples from Japan to show that Japan also has intellectual traditions and social thought that has questioned short-sighted approaches to environment. Moreover, there are social practices, such as those related to the management of water or forestry resources, that can be used to illustrate the diversity of historical and environmental circumstances and administrative cultures and popular attitudes toward environment, authority and social participation in Japan. There also emerges a picture that in Japanese environmental history local variations differ markedly and that few decades of national environmental policies have not changed this basic trait. While some of the traditions and social practices have remarkably "modern" elements in their sustainability, there are also elements that can be used to explain why environmentalism and Green Politics have had difficulties permeating Japanese political mainstream. In Japan, environmental thinking

and criticism has often failed to translate into policy-making while there are also success stories that defy easy explanations. Through the analysis and narrative of Japanese cases my paper will focus on the attempts to search for ecologically sustainable social development in Japan – demonstrating that these attempts are embedded in culture, tradition and history.

464 **Historical geography at stake**

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In this study, I shall focus on three major issues. The first, is the question of the relation between geographers of the Vidal de la Blache school of geography and the very birth of the Annales school. The new interest of French geographers for the archives, their ability to deal with many different themes and the very good results they elaborated in the regional studies led in the end of the nineteenth century could be a good departure. I shall focus on the main problem to know in which manner those two scientific groups did interact during the end of the 19th century and the beginning of the twentieth. The interest of the geographers for the material aspects of culture represents a very important point to be developed The second problem will be to understand in what extend the historical geography in itself tried to explain the environmental evolution of the earth and its impact on human societies, for example with Roger Dion's work on those topics. Of course, the interrelation between natural sciences and geography will have to be strongly and deeply examined, because the invention of "human geography" prevailed against a holistic point of view among the French geographers of the early twentieth century. Finally, I shall study the mutual feedback of French geographers on the Annales school through their work in the extra-European context, it is to say for example colonial geography, like with Pierre Gourou, but also Jean Dresch and all the other geographers involved to any extend to what could be called the French school of geography in the beginning of the twentieth century.

466 **Salt and landscape: towards the environmental history of the salt boiling industry of the Russian North.**

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The Russian North (Pomorje) is a traditional name for the vast territory of Russia to the North from the city of Vologda, between the lakes Ladoga and Onega on the West and the Urals on the East, including the White and Barents Sea. Two great rivers - Northern Dvina and Onega - flow through the region and connect it with inner Russia.
Salt was one of the main resources of the region since the early time. We know that as early as the 12th c. the salt boiling industry existed here, and taxes were imposed. Documents of 16th and 17th c. show us a well-developed salt business (Smith, Christian, 1984).
Nenoxa, Una, Totma, Sol Vychegodskaya were the most important centers of salt production, while Kargopol, Kholmogory and Vologda are known as the most important markets for that salt (Krikovski, 2002, Hellie, 1999).
Monasteries played a major role in the salt production and trade of the region. During this time salt boiling was the main occupation for a significant part of the population of the Russian North. Salt-works were jointly owned by peasants. Usually the shareholders were close relatives (brothers or the uncles and nephews), or neighbors. The salt boiling enterprise was named Varnitsa (from the verb varit' - to boil). Each varnitsa required two kinds of the natural resources, i.e. salt water and fuel. The salt producers of the Russian North used seawater in the coastal zones or the underground brines in the inland areas. The sources of the inland brines salt water were well-equipped with forests and this greatly changed the landscape because each Varnitsa needed a lot of timber for fuel.
The wills of the Russian North peasants of the 16-17 centuries contain numerous mentions of transfer salt-boiling enterprises (varnitsy), located on islands and at Coast of the White Sea. Together with these trades in some cases were transferred the special sites of a wood located near to the salt-works and intended for preparation of fire wood, necessary during manufacture of salt. The right to log and export this fire wood was transferred to the same persons who inherited shares in varnits'a. Thus, salt-boiling during several generations led to serious changes in the surrounding landscape (deforestation, chinks). At the same time the level of profitableness of salt-works on the coast of the White Sea appealed to the peasants because of the poor agronomical inland regions and influenced migration in the Russian North.
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467 **Hydraulic policies and landscape alterations in the inland watersheds of atlantic spain (1900-2000)**

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In this paper we intend to give an overview of the environmental impact caused by the implementation of the hydraulic policies of the Spanish state through the XXth century, more specifically the construction of reservoirs. To be precise, we will give account of three of their effects, taking as a reference the reality of North-West Spain and trying to contextualize it within the wider framework of Southern Europe:

1. Loss of diversity and/or destructuring of the affected riverside ecosystems and agroecosystems (landscape denaturalization, diminished resilience,...)
2. Imposition of an industrial management approach (Gadgil &Guha) on a rural space, what implies the breakdown of the existing social metabolism (González de Molina & Toledo) and the extraction of natural resources from the local communities. In fact, the dammed up water becomes a source of electric energy to be transfered to outside spaces and sectors. Given that we will examine a broad time span (the whole xxth century) a periodization of the process of imposition of the industrial management approach on the rural world in Atlantic Spain will be proposed. Our starting point will be an initial phase of complementarity between the peasant management techniques and certain artisan/industrial activies such as flour mills or forges. This phase came to an end when the pressures and demands from the industry became more aggressive and the extraction of resources collided with the needs of the rural communities. We will try to date that turning-point in the coevolutionary relationship (Nogaard) until then established between nature and local societies, as well as explaining its causes
3. The mutations affecting the social metabolism, often imposed from the top down without social consensus, paved the way to episodes of unrest still waiting to be studied (Lanero & Cabana).That was the case of the hydraulic policy of the Francoist dictatorship. We are dealing here with conflicts whose nature has been changing over the time (distribution conflicts, ecological conflicts…) and that must be put in relationship with the emergence of a new landscape (Cabana, 2008) and the imposition of new forms of resource management. Tradicional management forms and uses, such as certain fishing modalities, watering practices, the use of slime as fertilizer or housekeeping practices such as laundry in the river, are thus prevented or hindered.

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470 **European Environmental Problems and their perceptions**

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Since air pollution crosses borders, one of the first major European environmental debates was caused by this problem: the debate about dying forests (Waldsterben).

In this instance, almost all countries in central, northern, and eastern Europe were involved, suffered from it and were blamed to have caused it. The reactions in these countries, however, were very different. They were most intense, almost hysterical, in West Germany, so that in France for instance, the German term 'Waldsterben' was used to describe the phenomena of dying trees as well as an overreaction to an environmental problem. It is of great interest to look at explanations of 'Waldsterben' offered in the 1980's, to compare them with today's knowledge and to try to explain the reactions in different countries.

473 **Local knowledge in a global industry: the formation and movement of the science of salmon aquaculture**

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Since the 1970s salmon aquaculture – the raising of domesticated salmon – has become a significant activity in several coastal nations, including Norway, Chile, Scotland, Ireland, Canada, and the United States. Global production by this industry now exceeds the conventional salmon fishery, and has become an important aspect of humanity's changing relationship with the marine environment. It has also become significant in local and regional environmental histories: transforming local ecologies, reshaping economic and social relationships between communities and their environments, and provoking controversies. In these as in other environmental controversies, science is invoked by all parties. While some insist that scientific knowledge can provide the basis for a sustainable aquaculture industry, others deploy scientific evidence to support their view that this industry conflicts with other uses of coastal resources, or with aspirations for a protected environment.

This paper examines the history of scientific study of the environmental dimensions of aquaculture, with special reference to the relations between research practices, concerns regarding environmental impacts, and broader scientific perspectives on the marine environment. As this history will demonstrate, the science of aquaculture has been shaped by specific political, institutional and environmental contexts at each research site – a conclusion consistent with previous studies of science as a situated activity (Bocking 1997, Kohler 2006).

However, while this scientific activity and related controversies have been grounded in specific local environmental and social conditions, both scientists and other participants in controversies have also drawn on knowledge from elsewhere. In particular, knowledge obtained through research and experience in Norway and Scotland has been invoked in North American debates regarding aquaculture. This movement of knowledge has paralleled other relations between the sites of aquaculture, including flows of capital, market forces, and Atlantic

salmon itself – the material basis of the industry.

This movement of knowledge raises questions regarding the situated nature of environmental science, its capacity to be mobile beyond the context of its production, and the relation between scientific knowledge and other forms of knowledge more commonly defined as "local" in nature. As this paper will demonstrate, how and why certain forms of environmental knowledge are seen as mobile reflects both attributes of the knowledge itself, and wider views of the environment and its appropriate use.

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474 **"Encountering the Isthmian Tropics: Race and Space during the Gold Rush Migration through Panama"**

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When the United States entered the new nation of Panama in 1904 to begin building the Panama Canal, they brought with them a suite of ideas and preconceptions about the tropics. Almost universally, American officials and observers argued that constructing a canal across the Isthmus of Panama would involve nothing short of the conquest of tropical nature. Indeed, just as "wilderness" was the dominant environmental imaginary of westward expansion, so the "tropics" was for extra-continental expansion. Americans were by no means alone in thinking about the tropics as a geographical space and vexing imperial problem. European colonial powers framed their administration of "tropical" colonies in similar ways, and American officials borrowed heavily from these European examples. But American tropical thinking was not merely derivative of European thought; it was rooted in a series of encounters with the American tropics throughout the 19th century. Gold rush migrants and government explorers, travel writers and filibusterers, landscape painters and naturalists, capitalists and workers, diplomats and soldiers; all moved through the American tropics during the 19th century, writing about and representing the region to a larger audience. And from these encounters, Americans came to know and discuss the tropics as an environmental ideal – and particularly to make sense of the perceived relationship between race and tropical space.
This essay examines the experiences of Gold Rush migrants and other travelers who crossed the Isthmus of Panama between 1848 and 1869. My goal is to assess how these travelers understood and experienced the Panamanian tropics as an environmental and racial space. My analysis is built upon more than one hundred primary sources – journals, diaries, correspondence, government reports, and published accounts – that detail American impressions and preconceptions of tropical nature and the ways in which tropical environmental conditions shaped the bodies and habits of tropical natives. These accounts, I argue, in their sheer volume and resonance, were critical to shaping broader American discourse on the tropics as it developed over the next half century, and particularly in shaping their sense of which races were best suited to tropical labor.

475 **Mapping South American Agricultural History**

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South America has a rich and very early history of domestication of a host of productive crop and other economically useful plants. The environments of the continent are quite diverse in their agricultural potentialities and the challenges they present. Within these environments a variety of agricultural systems developed and these will be defined and placed in a typology. Maps will be presented depicting the diachronic distribution of these types in AD 1000-1100, 1500, and 1800. The implications of the resultant patterns will be discussed in relation to human populations, societal complexity, and cultural landscape development and associated land cover units. In many cases the results of this investigation run counter to long-held conceptions of human articulations with the land and suggest that extrapolations based on these conceptions, such as modeling land cover and its prior effects on global climate change, need to be seriously reconsidered.

476 **Managing environmental risks. Society and floods in the Upper Rhine Valley and Tuscany in the Renaissance (ca. 1270-1560)**

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In my presentation I will reconstruct the dynamic relationship among political institutions, environmental hazards, and the management of natural resources. I hope to illustrate the process of statebuilding in late medieval and early modern Europe, a process that varied significantly from one city to the next, through a comparative analysis of its constituent components. My analysis focuses on the cities of Strasbourg and Florence and their surrounding territories during the late medieval and early modern periods, where political systems and municipal administrations were then being shaped by the interactions of physical and cultural landscapes. These two communities responded to the threat of recurring floods in disparate ways, using distinct technologies, hydraulic engineering schemes, and financial tools. Each also assigned specific rights and responsibilities to its citizens in relation to natural hazards. And each sought to balance the risks and rewards of being located in a flood-prone area. Regional perspectives usually combined past experience with political and legal traditions, technical expertise, and local administrative structures. Even if geo-morphological or climatic factors did not ultimately determine the cultural development of these cities, the role played by environmental factors in that complex evolutionary process deserves to be examined. The extensive archival research on which this study is based includes analysis of not only textual but also visual and material artifacts.

478 **Condominium: The Rise of Property in the City**

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The small inlet known as False Creek in the City of Vancouver has been the site of extraordinary transformation in the past 125 years. Humans have repeatedly and so completely remade the inlet that its former identities as Coast Salish space and then as industrial space have all but disappeared as False Creek has emerged at the centre of one of the densest and most widely acclaimed urban neighbourhoods in North America, the site of a highly successful public market, and the future site of an Olympic village.

Although transformed, the inlet as it existed when Europeans first mapped it in the 1860s still defines a recognizable boundary in the subsequent development of the city. This is evident in the mapping of structures that divide ownership through the legal form of condominium.

Condominium is a relatively recent legal structure in North America. Introduced in the 1960s, it enables private ownership of identified units within a building, common ownership of other spaces among those who hold individual units, and a structure for collective decision-making about the common spaces. What condominium facilitates is the vertical division of land into private parcels; land can be subdivided in three dimensions (T. Steinberg, Slide Mountain or the Folly of Owning Nature, 1995). The effect of this legal mechanism on many urban landscapes has been dramatic; the "condo tower" has become a ubiquitous feature of North American cities, none more so than Vancouver.

When introduced, condominium was heralded as a legal form with great potential. The author of the first text on condominium law in Canada believed that condominium would facilitate efficient urban development and that it would contribute to the building of a just and democratic, capitalist society (Alvin B. Rosenberg, Condominium in Canada, 1969). Others were less sanguine, particularly when the owners of rental apartment buildings began evicting tenants as part of a conversion to condominium ownership. Condominium, according to its critics, was an instrument of gentrification and, in geographer David Ley's terms, part of the "embourgeoisement" of the city (D. Ley, The New Middle Class and the Remaking of the Central City, 1996).

Using scholarship from the disciplines of law, geography and history, this paper will explore the transformative power of condominium in the last third of the twentieth century. It will argue that condominium facilitated the intensification of private property and that this spurred the vertical development of land. Using Vancouver as a case study, and drawing from newspapers accounts, legislative debates, and records from the land titles office and city hall, this paper will map the spread of the use of condominium in the neighbourhoods around False Creek. In doing so, it will evaluate the capacity of a legal instrument to transform and to define urban spaces, and, more generally, the nature of human interaction with the environment.

480 **Foresters from India in the British Caribbean**

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Researchers have highlighted the role of Indian forestry in shaping environmental policies throughout the British Empire. The impacts of Indian forestry were particularly evident in colonies in which extensive Crown Lands were available and the potential for financial returns from commercial forestry existed. Less well documented are cases in which Indian forestry affected policy debates in colonies that had only limited Crown Lands and forests with minimal commercial potential, as was the situation in much of the British Caribbean. This paper explores the impacts of two foresters from the Indian Forest Service who were sent by the British Colonial Office to investigate forestry-related problems in the Caribbean in the 1880s and the 1930s. It considers the reasons that the Colonial Office sent the two foresters, the foresters' analyses of the problems there, the reactions from the Caribbean to their reports, and the longer-term impacts of their visits. It highlights the case of Jamaica.

In the late 1800s, the British Colonial Office and the Royal Botanic Gardens at Kew became increasing concerned about deforestation and the state of forests in the empire. In this context, the Colonial Office sent forestry expert E.D.M. Hooper of the Indian Forest Department in Madras to report on conditions in the region; he visited seven Caribbean colonies during 1884-1885. Hooper's report on Jamaica reflected his experiences in India; it included condemnation of peasant slash and burn agriculture, charcoal making, and the use of fire in forested areas. The reaction of Jamaican officials to his recommendations for demarcation of forest reserves in certain highland areas and the employment of a regional forestry officer was decidedly mixed. Hooper's report did result in forest legislation being passed in 1889, but the law was ineffective and subsequently repealed in 1893. This paper examines the reasons for the limited impact of his report on policy.

The second forestry expert from India had a more long-lasting impact. The Colonial Office in 1933 encouraged the Jamaican government to seek advice from a trained forestry officer to provide recommendations on policy after Jamaica was unable to provide statistics on its forests for a forthcoming empire forestry conference. For the mission, it secured the services of A. Wimbush, Chief Conservator of Forests in Madras, who visited nine islands in the region in 1935-1936, spending the most time on Jamaica. Wimbush's report on Jamaica also reflected his experiences in India. His findings resulted in the hiring of Jamaica's first fully qualified forest officer and supporting staff in 1937, the subsequent creation of an independent forest department, introduction of legislation based on the Madras Forest Act, establishment of forest reserves, and afforestation. This paper

explores the significance of markedly changed local and empire-wide contexts for understanding the more enduring impacts of his recommendations.

483 **Global agricultural systems in Eurasia 1000-1500**

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The large Eurasian landmass has for millennia been connected by long distance trade with an ongoing interchange of commodities and ideas, but never the less different global agricultural systems have emerged. The major systems around 1500 were:

0) Hunters and foragers;

I) Extensive pastoralism and intensive agriculture in oasis (and river valleys) in a symbiosis, as in Central Asia;

II) Slash and burn agriculture and uncomplicated sedentary agriculture;

III) Intensive agriculture, in the core areas with wet-rice, as in Eas Asia;

IV) Mediterranean system with a longstanding relation between humans and nature;

V) Mixed cattle breeding and crop growing, where the blend is made on every farm and a symbiotic relation is established with manure, as in much of Europe.

The first goal of this paper is to discuss problems in defining and demarcating different systems, and also focussing on the period 800 – 1200 as decisive for the establishment of the Eurasian setting of global systems. A second goal is to develop a source critical method for the secondary sources used in this investigation.

484 **Forests and Warfare: The State of Research**

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Warfare, or mass violence in its many forms, has drawn heavily on forest resources and had complex impacts on forest ecosystems throughout history. Military historians have been peripherally aware of forest settings and their uses, but have rarely addressed environmental change. Environmental historians have frequently discussed war and the peacetime mobilization of military resources. Only now are the two fields starting to merge. War and militarization are a characteristic dimension of history, but distinctly different from civilian life in their relation to the natural world. Moreover, different types of war, ranging from campaigns between disciplined militaries of nation states, to civil wars and intermittent partisan warfare, have had differentiated impacts on forests.
As technologies of war have evolved through history, and accelerated devastatingly in the industrial era, the destruction of natural ecosystems has concurrently increased. It is a commonplace notion that "Total War" in the modern world has spread far beyond the battlefield, consuming entire civilian populations. But war against civilians and their agricultural resources is nothing new in modern times, as Donald Hughes and others have shown for the classical Mediterranean, and others have suggested for pre-modern Europe, India and China. For example, refugee movements have been a usual and tragic aspect of wars, but their impacts on forests have not been studied with care. Wildlife species have also been participants in military campaigns, reduced by both warriors' and civilians' improvised search for food, as well as by degradation of their habitats. Yet where mass violence has reduced human pressure, even temporarily, many species of flora and fauna have thrived.
This paper will highlight recent research on the interaction between war and forests cross-culturally, and point to major topics that environmental historians have still not addressed effectively.

487 **The environment and the labour conditions in the salt mines of Sol Ileckaya in the 18th c.**

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In the middle of the 18th century Iletskaya salt from Orenburg province started to play a very important role in the salt market of Russia.
This deposit is industrially significant even now because it is a premium qualtity salt. It is used in more than 80 regions of Russia, the countries of the CIS, and distant foreign countries. In 1996 in Paris this salt was recognized by salt professionals from 112 countries as the best in the world, having received the tenth gold prize of Europe for the quality.
In the 18th century extraction of this salt was made without any safety regulations. Environmental conditions for workers were very bad.
The salt was extracted in several large holes, as open pit mining. When the salt layer was exhausted in one place, the work started again in another. Normally salt was available in one hole for up to ten years. The hole could be several tens meters deep. As a result of the saltworks a lot of the deserted holes appeared, which after flooding by water turned into salt lakes.
Since 1770 Iletskaya salt has been obtained from mines. Such method of extraction is very hard and harmful for workers and a lot of claims were fixed in the documents. The salt workers lost consciousness frequently because of closeness in the mine. The majority of people involved in salt extraction suffered skin ulcers and apostemes from constant contact with the solution. The level of death among the salt miners was very high.

Thesd bad and dangerous environmental conditions were one of the reasons for the almost full termination of the salt extraction at the end of the 18th century.
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488 **Risk and Institutions: How natural hazards influenced the establishment of German crop insurance**

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In the paper, the background and the development of crop insurance as a risk management tool in early modern agriculture will be analysed.

Firstly, the paper will show how a new understanding of both natural hazards and coping strategies came up due to a fundamental change of perception. Before the 18th century, hail was mostly perceived as a scourge of God. Moreover, insurance as a whole was not an established institution. Consequently, the peasants could only trust in religion and self-help. However, with Enlightenment gaining ground, hail was seen as a natural phenomenon and the first economically based concepts of crop insurance were published. Combined with essential developments in the agricultural sector, the change in attitude was responsible for the foundation of crop insurance companies around 1800.
Secondly, the paper examines the process of branch institutionalisation and the problems connected with it. In the beginning, calculation of premium rates was inaccurate because of both the lacking experience and statistical base. Risk diversification was difficult because the number of client was too low. Consequently, the economic growth of the branch was below expectations. Also, there was a market adjustment so that many enterprises vanished. However, most of the problems could be solved when process and product innovations were introduced into hail insurance. For example, new customers were acquired as a result of a refinement in underwriting techniques. Furthermore, innovative products like collective contracts were introduced in line with market requirements.

Methodically, the paper combines both a historical-anthropological and economic-historical approach in order to analyse the background and the course of business of German crop insurance. It shows the economic and social effects of natural hazards and considers the changing reactions and attitudes of contemporaries towards hailstorms and different coping strategies. Furthermore, problems of an early insurance market and their solutions are identified.

489 **Rural landscaping and urban wilderness: On the making of Swedish 'nature' in the era of landscape management**

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According to Bruno Latour (2004), the categories of 'nature' and 'culture' conceal rather than clarify the complex and multiple interactions between categories that have commonly been understood as mutually exclusive. 'Nature', in his view, is always highly political, and his actor-network theoretical approach presents an alternative analytical framework that reaches beyond the nature/culture divide. Inspired by Latour's approach, this paper discusses how 'nature' is produced and defined in two quite different Swedish contexts.
During the last decades of the 20th century, the concept of landscape management (in Swedish landskapsvård) was introduced into agricultural policy and rural land-use in Sweden. Referring to a set of practices for maintenance and restoration of biotopes and human-made features characteristic of pre-industrial farming, rural landscape management evolved as a new niche within agricultural production. With the help of economic subsidies, Swedish farmers were taught to regard the positive effects of their work on the currently-valued biodiversity and cultural landscapes as products in their own right. In this process, landscape elements such as pastures, cairns, stone walls and pollard trees were integrated into national and international (EU) administrative systems for a monitoring of landscape values. These systems encouraged the making and maintenance of certain varieties of 'nature'.
While rural landscapes have been going through a process of official acknowledgment for their specific 'nature values', the rather wild and unplanned 'nature' that is developing in many pockets and corners of the urban landscape has not attracted the same kind of attention. More or less neglected biotopes can be found for example in areas awaiting future urban developments, abandoned industrial sites and many varieties of temporarily unused areas, especially in the urban fringe. This kind of urban 'wilderness' challenges the conventionally associated nature-culture and rural-urban dichotomies, and is seldom understood in terms of 'nature values'. For urban residents – both human and non-human – such patches of 'wilderness' can, however, be very valuable, and by the human users, these sites are often understood in terms of 'nature'.
This paper presents an examination of the different connections and networks through which 'nature' is produced within rural landscape management in southern Sweden and urban fringe landscapes in the Swedish cities of Malmö and Gothenburg. In both cases it is obvious that the concept of 'nature' conceals rather than clarifies the connectivity and dynamics of landscapes constituted by complex human/non-human relations.

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490 **Changing paradigms – attitudes towards bio-invasion in Germany 1858 – 1945**

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Most Western countries have experienced an acclimatization movement during the nineteenth century, conducted through the foundation and activities of one or several acclimatization societies and botanical gardens. These institutions actively sought to introduce selected species into their regions citing scientific and economic reasons. After several decades the movement came to a close, and subsequently most countries have enacted regulations aimed at restricting the introduction of foreign species, efforts, in other words, to contain or reverse the development initiated earlier.
In Germany, this change of attitude towards non-native species underwent some unusual twists. The Akklimatisationverein Berlin was founded in 1858 and kept a newsletter until 1974. Some years later, when Germany acquired colonies in Africa, attention shifted to the possibilities of establishing European crops and livestock in Africa. Around the turn of the century, these considerations included people and mixed with the racial discourse about possibilities of moving humans to foreign environments and climates. These issues offered an avenue for further adaptation when the National-Socialists assumed power in the 1930s. Here, the issue carried ambiguous implications, drawing on contradictory traditions of conceptualizing nature. On the one hand, National Socialism cultivated a romanticized view of nature as a place of purity and national identity. In this context, "foreign" species represented a disturbance. However, at the same time National Socialist designs of Germanic domination over a racially transformed world included imperialist elements that adopted earlier concepts of imposing chosen species onto occupied lands. These considerations included discussions about the possible "acclimatization" of people of various "races" in Africa and elsewhere.

This paper traces the development of German attitudes towards the translocation of species between ca. 1858 and 1940 as reflected both in discourse and in policy.
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492 **Justifying industrial nuisances, Paris, 1770-1830.**

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Between 1770 and 1830, industry and its pollution became legitimate inside the city of Paris.
Before the Revolution, the police of Paris succeeded in curbing industrial nuisances by the implementation of stringent regulations. It relegated to the ends of the town and some localized areas the workshops that rejected a bad smell or much smoke. Then, from the years 1770, the authorities tried to solve this problem otherwise. Lenoir, head of the Parisian police, created the office of salubrity inspector of Paris, for the pharmacist Cadet de Vaux. The experiment was not conclusive, but the idea of solving the pollution by technical means appeared. In addition, exceptions to the traditional rules were granted for certain industries (especially the chemical industry). During the French Revolution, the context of political events and economic and technical arguments justified the authorisation of factories despite their harmful effects to public health or to the neighbourhood. At the beginning of the nineteenth century, Paris was really sick of its industrial pollution. Yet Chaptal and Guyton de Morveau, scientists consulted by the government, denied the possibility of industries to be unhealthy, especially the chemical industry. This view was also that of the Paris Health Council, established in 1802 by the prefect of police, who wanted to reconcile the city and the industry. In 1810, a decree laid down rules for stable industrial establishments unhealthy. But, during the Empire and the Restauration, support for the industry became the dominant motive of the authorities, relegating the control of pollution in the background or leaving it in the hands of hygienists close to industrial interests. The hygienists believed they could solve all the problems by technical means. Manufacturers benefited from the imperfections of the decree to settle wherever they want. Justice is powerless to resolve conflicts between neighbours and manufacturers. Above all, the administration chose to promote economic development rather than to safeguard public health. Thus, the industrialization of Paris and its suburbs was growing.
By 1830, industry had become an established feature of urban life, never mind its environmental impact. This has been made possible by the reassuring discourse of the hygienists and their belief in the safety of the industry.

493 **The co-evolution of technologies, institutions and mentalities, and the challenge of sustainable development**

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In this session the challenge of sustainable development in the area of water resource management is explored by examining the nexus or network of relationships between technology, governance and lifestyle. This network

or web is in constant flux, with each element continuously reproducing or reshaping the other two.

The focus will be on the transition from industrial to what sociologists like Ulrich Beck, Anthony Giddens and Scott Lash have called 'reflexive' modernity. Reflexive modernity does not indicate a break with modernity, but stands for a radicalization within modernity – a 'modernization of modernity'. Radicalized or reflexive modernization is a process whereby modernization has become directed at itself, at the destructive and continually expanding side-effects and risks that are systematically produced by industrial society. Beck cum suis argue for 'ecological enlightenment', that is a reorientation from a focus on economic growth to one of sustainable development.

It has been recognized that the course that second modernity has been taken within a European constellation will differ considerably from its course within non-European constellations, where the dynamic of reflexive modernization displays its effects not on first modern societies but rather on the distorted constellations of post-colonialism. Different non-European routes to second modernity await description and analysis. The following sessions on case studies from Iran, Nepal and Peru will indicate possible trajectories to reflexive water management and will highlight some constraints and stumble blocks by using the technology-governance-mentality nexus.

494 **Consuming the Environment in the Early Modern Caribbean**

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The beginnings of the "consumer revolution" in Western Europe can be traced to the late seventeenth century and eighteenth centuries. Incidentally, this was also a time when the "environmental question" became more prominent in the general debate and environmental problems began to attract attention, partly as a result of experiences in Europe's tropical island colonies. There are good arguments for combining the perspectives of environmental history and the history of consumption. Both fields of research emerged approximately at the same time, in the late 1970s and early 1980s. Moreover, environmental history and the history of consumption represent, in a sense, two sides of the same coin.

The relationship between consumerism and detrimental changes in the environment is a part a complex development the early stages of which can be observed already in early modern colonial societies. One of the early indications of consumerism was the growing market for tropical plantation products such as sugar in Europe in the second half of the seventeenth century and the eighteenth century. During the same period a significant increase in consumption, both in Europe and in the Caribbean, is concurrent with rapidly deteriorating environments in the Caribbean, particularly the sugar producing islands. Therefore, it should be of topical interest to examine the relationship between the emergence of consumerism and various forms of interactions with natural environments in the eighteenth century Caribbean.

The proposed paper focuses on questions concerning both the praxis and ideology of consumption and environment: One objective is to analyze eighteenth century texts describing the English, French and Danish Caribbean from the viewpoint of eighteenth century economic theory and environmental ideas. This includes an analysis of the cultural assumptions which shape the perceptions of environment and the debate concerning questions on economy and natural resources. Another objective is to look at consumption patterns on these islands. Did local inhabitants and European visitors to the early modern Caribbean "sugar islands" make a connection between the changing environment and the increasing consumption of goods? Did they take the ethical aspects of consumption into consideration? What can be said about consumption patterns of the various groups of people in the early modern Caribbean? How much were they influenced by European fashion in clothing, food and drink? Did the consumption patterns of the planter class spill over to the other groups? In what ways did the tropical climate shape consumption habits and the development of Caribbean material culture?

The source material consists of travel accounts, scientific treatises, missionary reports, pamphlets, diaries and newspapers.

495 **Towards reflexive and sustainable land and water management in Iran**

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In order to examine the possibilities for sustainable land and water management in Iran and other (semi)arid countries of the Middle East and North Africa (MENA), I will:

(1) give a brief overview of the co-evolution of agricultural technologies, social institutions, and ethical and religious mentalities throughout history;
(2) present the outcomes of large-scale empirical research on the attitudes, interests and values of Iranian soil and water experts on the one hand, and of farmers and other local people on the other; and finally,
(3) sketch the main contours of a more reflexive and sustainable land and water resource management in Iran and the MENA region.

Three periods will be distinguished: pre-modernity, industrial modernity and reflexive modernity. The pre-modern era can by characterized by its key technical system (the Qanat system of underground irrigation channels), its main governance institution (the Buneh cooperative organization of agricultural production) and

its ethico-religious belief system (Zoroastrianism and Islam). The epoch of industrial modernity can be identified by the partial replacement of Qanats by deep wells and large dams, the substitution of the Buneh by a system of smallholding, and the emergence of a mechanistic worldview. Currently, Iran and other MENA countries seem to be in stage of transition from industrial modernity to what has come to be known as reflexive or second modernity. Reflexive modernity can be characterized by the revitalization of traditional structures and their integration with the structures of industrial modernity, in such a way that the benefits and advantages of both will be preserved as much as possible. The outcomes of large-scale empirical research on the attitudes, interests and values of Iranian soil and water experts on the one hand, and of farmers and other local people on the other, will shed light on the challenges and constraints of a successful transition to a more reflexive and sustainable land and water resource management.

499 **Irrigation development trajectory in Nepal and evolution of technology and institutions**

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Nepal's irrigated agriculture sector has come a long way, striving for enhanced performance and thereby increased socioeconomic returns to its mostly agrarian populace. Along with the technologies of providing irrigation services, various institutional arrangements - both in terms of rules and tools for their implementation - and the mentality of the state-appointed agency personnel and that of farmers have undergone significant changes over time. More recently, increased involvements of the irrigators in the entire irrigation development and management process are particularly evident. This has not only influenced the technological choices and the domain of irrigation development, but also the associated institutional attributes, reflected in a shift from technocracy-led development approach to a people-centric participatory approach. It also has accompanied a marked shift, often uneasy, in the mentality of both the agency personnel and the farmers. By characterizing and analyzing such evolutions in irrigation technology, institutions and mentality, this paper inquires into the prospects and limitations in Nepal's context.

506 **Wood and Civilization**

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Without vast supplies of wood felled from forests, the great civilizations of Sumer, Assyria, Egypt, China, Knossos, Mycenae, Classical Greece and Rome, Western Europe, and North America would never have emerged. Throughout the ages, trees have provided the fuel to make fire, the heat of which has allowed our species to reshape the earth for its use. Fire made relatively cold climates habitable; grains eatable; allowed for clay to be converted into pottery and the extraction of metal from stone possible. Wood also shaped transportation. From Bronze Age coaster to "ships-of-the-line," the Royal Navy's principal battle ships were built with timber. Carts, chariots and wagons were also made almost entirely of wood. Little work could have been done without wooden tool handles; the soldier could not have thrown his spear or shot his arrows without their wooden shafts; or held his gun without its wooden stock. What would the archer have done lacking wood for his bow; the brewer and vintner, without wood for barrels and casks; or the woolen industry, without wood for its looms?

Those living in past civilizations recognized the primacy of wood. The Roman philosopher Lucretius conjectured that people first learned the art of metallurgy when they saw great forest fires liquefy metal from rock. It was then a simple step to imitate nature to equip themselves with tools. In this fashion, according to Lucretius, civilization emerged.

Ibn Khaldun, a famous commentator of the medieval Arab world, stated bluntly, "Wood gives humanity its fuel to make fires with which it needs to survive."

The Venetians, whose wealth was based on sea power, regarded forests as "the very sinews of the Republic."

Language also documents the importance wood played in the lives of our ancestors. The word wood for the Greeks and the Romans – hulae and material – was synonymous with "primary matter," suggesting that in Classical times people regarded wood as the foundation on which society pivoted. John Evelyn, a leading citizen of seventeenth- century England reiterated the Greek and Roman concept, stating, "All arts [technologies] must and fail and cease if there were no timber."

With wood being the principal fuel and building material from the Bronze Age through the nineteenth century, its abundance or scarcity significantly shaped the culture, demographics, economy, external and internal politics, and technology of societies during this time span.

511 **What can we learn from the historical co-evolution of human activities, rivers and fish communities in the last two centuries? Examples from French river basin**

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Due to the constant fluxes of water, sediment, and chemical compounds, rivers are one of the most open ecosystems of the earth. They often react on a short time scale to any change of human activities within the whole catchment (land use) or within the floodplain and/or the river bed itself. Nevertheless, the ways by which

such a co-evolving system of humans and nature can be restored from a highly altered state are complex and surprising responses are the rule. Interactions between biotic and abiotic factors that have developed during the period the system was modified by humans can make the system insensitive to any restoration of the historical environmental features and remaining in an alternative stable state.
Lessons from historical changes in rivers ecosystems can help nowadays to define realistic restoration plan for rivers and to better understand to which point re-establishing previous abiotic conditions (i.e. suppression of specific human pressure on the system) can really allow the expected recovery of biotic community.

The aim of the presentation is to highlight the way by which historical studies on rivers can be fruitful for the establishment of future Water Basin Management Plan with the two examples of: (1) the evolution of the fish community of the river Seine, facing several anthropogenic alterations of their biota, and (2) the development of statistical models to predict the past occurrence of fish species.

The evolution of fish communities since the middle of the 19th century to the end of the 20th century is analysed for several river stretches of the Seine Basin exhibiting different evolution trends of pressures (channelization for navigation purpose - modification of hydrologic and thermal condition from construction of reservoirs, transformation of land use without profound modifications of the river itself). Different evolution patterns, sometime opposite ones, are observed for fish communities, in relation to the dominant pressures involved.

For fish species from the Rhône catchment, our objective was to evaluate the efficiency of statistical models calibrated on the present day species occurrence to correctly predict the past distribution of the same species during the first half of the twentieth century. Historical maps were compiled and implemented in GIS and in association with the main environmental variables describing the habitat at the reach scale. Our ability to reconstruct the past distribution of 10 species is discussed, in relation with the alteration of the river system (past and present), the quality of historical data and the technical limit of such approach.

512 **19th-century narratives about carp in Illinois: transformation of a species**

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The 'German' carp (Cyprinus carpio) was among dozens of fish transplanted in new waters within the United States during 1870-1900, as part of a general enthusiasm for plant and animal acclimatization. Although known today as one of America's most infamous exotic species, the common carp was very welcome when first imported by the federal government in 1877, thanks to a great deal of hype about its potential for feeding the booming U.S. population. The carp initially lived up to that billing, particularly in the Midwest. In just two decades it became one of the region's most abundant commercial fishes, especially in the Illinois River, at the time America's most productive inland river fishery. By 1900, however, the Illinois Fish Commission was one of the few agencies still promoting carp, most other states having abandoned carp stocking and even implemented bounties for it. The now unwelcome immigrant was accused of eating other fish, destroying duck habitat, and ruining water quality, charges that persist to this day — as does the carp itself, now one of America's most common fishes.
Clearly, while today's carp are essentially unchanged biologically from their 19th-century progenitors, our ideas about the species have changed profoundly, and not just because we better understand its ecology. Those ideas had already undergone a gradual transformation in Europe that dated back to medieval times. This case study focuses on the 19th-century introduction of carp in Illinois. It examines the ever-evolving narratives about carp that were preached in private correspondence, annual reports, and the popular press by federal and state fish commissioners, anglers, politicians, scientists, commercial fishers, farmers, and writers. The simple swing in public opinion about carp belies a far more complex history, as advocates and critics alike continually refined and reinvented their narratives in accordance with broader issues in society, politics, science, and nature. In less than two decades, the carp in Illinois was transformed from a nutritious pond fish for the poor family farmer to savior of the commercial fishing industry. It mutated from esteemed delicacy to muddy-tasting trash fish, from foreigner to native, from welcome addition to unwanted pest. Thus the history of the carp's introduction in Illinois highlights the fluidity of our narrative constructions about nature, and how we project our agendas onto those narratives.
In Illinois, the ideology of carp underwent a more complex evolution than in most other parts of America, because of four factors — an abundance of popular native fishes, pioneering research by ecologist Stephen Forbes, the rapid and unexpected emergence of the nation's largest commercial carp fishery in the Illinois River, and a state fish commissioner who remained loyal to carp long after most other fishery managers in America had abandoned or rejected it.

513 **The Roots of Eminent Domain in Natural Resources: Under and Over the Ground in Medieval France**

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Scholars usually trace the medieval roots of modern states' assertions of eminent domain over natural resources to 1158, when Holy Roman Emperor Frederick Barbarossa invoked Roman law to support his claims to a variety of "regalian" rights. It is normally assumed that his declaration of imperial jurisdiction over all coasts, rivers, and the mining of precious metal ores influenced other continental rulers, who gradually adopted similar ideas. Yet historians rarely explain how these revamped Romanist ideas fit into a broader pattern of contemporary claims by emerging governments across Europe to jurisdiction over virtually all property within their territories, ambitions which were at first expressed in non-Romanist terms.

In this paper I use charters, fiscal sources, legislation, and legal treatises from twelfth- to fourteenth-century southern Champagne and northern Burgundy, France, to argue that authority over two key types of resources, iron ore and wood, developed in contrasting ways. In both cases the origin of oversight by lords emerged from local social practice, not learned theories. In the twelfth century lords granted out privileges to mine iron ore, usually found near the surface, just as they did pasturage, wood cutting, and other usage rights. As more exclusive property rights developed in the thirteenth century, mining was usually treated as an aspect of landownership, without eliciting any explicit claims of jurisdiction by the counts of Champagne or other local rulers. Perhaps because northern French mining focused on relatively plentiful iron ore, it was only in the later Middle Ages that the royal government, invoking the Roman-derived idea of regalian rights, began to proclaim its control over all mineral resources.

Overlords and rulers also exercised authority over woodlands, which by the twelfth century was called gruerie and usually focused on the control of clearances. By the early thirteenth century the rise of intensive coppicing for commercial wood-cutting encouraged the counts of Champagne to consolidate their rights to gruerie, thereby justifying their exaction of a hefty tax from virtually all wood-harvesting. Similar control by rulers across northern France led to a novel distinction between the ground itself (treffonds), representing the landowner's rights, and the trees growing on it, now called the land's "surface" or "tonsure," over which rulers claimed gruerie. Owing more to indigenous custom than to Roman law, this distinctive form of eminent domain allowed emerging regional and then national states to control intensively exploited woodlands, helping to ensure their sustainability across centuries.

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514 **Anekeitaxonomy: Botany, Place and Belonging**

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Being rooted, plants have always been associated with places. Even fragmentary Sumerian epics mention that particular kinds of trees are found in particular locations. Theophrastus, sometimes credited as the "first" botanist, often ascribed plants to places, as did many subsequent Greek, Roman, and Medieval writers. With the early modern advent of practical (and eventually regular) long distance travel and trade, the coupling of plants and places began unraveling. Commentators including Francis Bacon began to report occurrences of foreign plants around busy ports. Meanwhile, botanists were documenting plant species distributions with increasing accuracy and precision, puzzling over the reasons why distributions were irregular, and furthermore, over how to reconcile them with received notions. In the early nineteenth century, Swiss researcher Augustin Pyramus de Candolle distinguished twenty terrestrial "centers of creation" and associated botanical regions. His son Alphonse added more, and investigated the origins of cultivated plants for good measure. At the same time, a debate was emerging in England about how to account, in locally constrained "floras", for populations of plants suspected to have arrived recently, by human agency. A discussion between John Henslow and H.C. Watson began with a simple asterisk and led to the latter author proposing, and employing, a five-category system of belonging for plants found growing in Britain. Watson seems to have been the first, or the first remembered, to have specifically redefined 'native' and 'alien' for phytogeographic (his coinage) purposes. Alphonse de Candolle countered with another formulation, and competition ensued to find (or create) and justify a taxonomy of geographical belonging. Plant collecting was a scientific project, but also a competitive amateur pursuit. Botanists had to identify plants, but they also needed to know which plants to expect where, and when to call a collection complete. Discovering a population, and adding a species to any well-documented local, regional, national or even continental flora conferred prestige, but also raised suspicions. How did we miss that one? How did it get here? When did it arrive? Is it natural? The outcome included attempts to control both collection and conception by classifying plants, according to various idealizations of temporal, geographic, and (later) ecological "belonging." The most ramified of such systems was developed by Albert Thellung– another, almost forgotten Swiss botanist– in the first decades of the twentieth century. Thellung died young, just as his colleague Josias Braun-Blanquet was codifying the Zurich-Montpellier approach to "Plant Sociology". His contribution ended, and was thus eclipsed. Parts of his system persist in work by recent European phytogeographers. The title root ανήκει (belonging) honors and fondly parodies Thellung's penchant for coining compound pseudo-classical terms.

520 **Environmental justice and ecological modernization in Japan – contrasting urban and rural communities**

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This research aims to explore the issues on environmental justice and ecological modernization by contrasting urban and rural areas in Japan. Since the mid 19th century modernization has often been understood in the term of industrialization and urbanization in Japan, although at the same time not a few cases of environmental destruction and pollution have also been reported. At the first glance the interests and perspectives of environmental policy and social policy appear to maintain a distance from each other. However, "sustainability" connects the two worlds of ecology and care in post-industrial social settings. It is sustainability that social

policy ultimately concerns. Sustainability has much been discussed in the term of economic sustainability of local communities too. The economic development in local communities tends to be associated with economic benefits for some of the local residents in such concrete form as employment. However, the public attitude towards environmental protection largely varies in different places in Japan, taking an example of such environmental policy of municipalities as daily garbage sorting. Moreover, it is rural areas rather than urban in which facilities for handling factory waste and electric power stations have been built. These rural areas are also facing the demographic challenge with high rate of aged population, and in this connection the sustainability of rural communities needs be questioned not only in relation to humans but also to biodiversity.

Ecological modernization is referred to with various meanings and types, ranging from weak to strong ecological modernization (Christoff 2000: 222). Ecology has been discussed from different points of view: not only ethics, but also nature of science, re-interpretation on modernization, and so on. Ecology is also referred to in relation to the specific theme like the environmental health that is often manifested as ecocity-planning or housing policy in social policy (Cahill 2002: 82-83). However, it is not adequate to reduce ecology into the issues on living environment. Instead of narrowly focusing on peculiar spaces and conditions of living of humans, ecology urges us to have a holistic understanding on life by taking biodiversity and biocentrism as a point of start. This research studies the maturity and immaturity of ecological modernization in Japan by mainly focusing on the latter half of the 20th century. It will be questioned what kind of development has been sought at cost of sustainability of local communities and biodiversity.

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521 **Making Landscapes Consumable: Parkways in Germany and the United States, 1920-1970**

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For the 2009 World Conference on Environmental History, I propose to give a paper on "Consuming Landscapes: Parkways in Germany and the United States, 1920-1970." The proposed talk stems from a larger book project examining the ideological, technological, and environmental preconditions, decisions, and consequences of the manufactured landscapes of parkways in Germany and the United States. In particular, I am studying the 750 kilometer-long Blue Ridge Parkway in Virginia and North Carolina and its German counterpart, the Deutsche Alpenstrasse, the German Alpine Road extending 450 kilometers on the northern mountain crest of the Alps. Both roads were built as tourist parkways starting in the 1930s to stimulate traffic and open up neglected tourist regions in the proximity of major population centers; and both presented particular versions of nature.
It is my goal to bring together, on a methodological level, the study of environmental history and of the history of technology by analyzing the sculpted landscapes of the Blue Ridge Parkway and the Deutsche Alpenstrasse, and in the process I aim to shed light on a neglected aspect of the environmental history of the 20th century. These roads were created specifically for car drivers and passengers to enjoy scenic views from their cars without having to leave them. This scenery, however, was not a given, essentialist entity; it only became an experience through the selective efforts of civil engineers and landscape architects designing these roads. The paradoxical goal was to enable motorists to gain a new appreciation of nature, an escape from industrial society, while using cars, one of the main icons and means of consumerism in the 20th century. Rather than treating these roads as a brief interlude in environmental history, I ask why the first major environmental transformation of the car culture focused on sculpting roads in order to create pleasant vistas. The comparative angle of the project should enable me to overcome notions of "national styles" and instead help to trace the parkway ideal of touristy nature as an international phenomenon indicative of larger changes in 20th-century Western societies. While much previous research on such roads has focused on the perspective of the designers, I aim to analyze the experience of consumers, that is drivers and their passengers, as much as possible. While designers stressed the ostensible American or German qualities of these roads—especially during the contrasting political regimes in Germany and the United States in the 1930s—consumers often reiterated these sentiments, yet also chose to create a rhetorical unity of nature and technology through driving a car that downplayed national sentiments. By making landscapes consumable for car drivers, these parkways, paradoxically enough, contributed to the nationalizing of landscapes while also creating avenues for a car-driven, touristic escapism.

522 **"Fashioning a Freshwater Eden: Elite Anglers, Fish Culture and State Development of Quebec's 'Sport' Fishery"**

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Canada's province of Québec possesses such a vast assemblage of freshwater rivers, lakes, and streams that are filled with so many iconic game fish that many nineteenth-century British and American anglers came to view it as a pristine and even Edenic aquatic landscape. Contrary to anglers' perceptions, Québec's aquatic landscape was a collection of complex habitats filled with fish species that had evolved over millions of years and had already been integrated into the fishing traditions of Amerindians and French colonists who preceded them.

Although initially a small foreign cohort, the elite anglers who came to Québec represented a significant new group of agents who would shape both the cultural and ecological landscape. The angling elite shared an intellectual conception of nature that caused them to infuse the landscape with new values even as they sought to exercise control over it for their own narrow agenda. By the second half of the nineteenth century, government policies increasingly brought anglers' activities and interests under State regulation through laws, licenses and leases, the use of fish culture, and a sophisticated and well-targeted promotional scheme.

Ultimately, anglers' efforts to create an exclusive paradise for their activities merged with this auxiliary intervention of the State to produce a cultural and environmental legacy that included the subourdination of people, the diminution of the social importance of non-game species, and the creation of novel aquatic ecosystems through the introduction of foreign species. This paper integrates scholarship from Environmental History, Québec Studies and Aquatic Sciences to demonstrate the environmental and cultural changes that accompanied elite anglers' transformation of Québec's freshwater aquatic habitats from an idyllic, Victorian "Anglers' Eden," to a modern State-managed fishery for sport.

530 **The (Non)-Reception of the American Environmental History by French Historians and Social Scientists in the 1970's and the 1980's: hypothesis for an explanation**

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Environmental history and studies were officially born in the USA in the early 1970's. By the mid 1980's they had become in this country recognized and dynamic academic fields and started to attract international attention. Although some of them integrated then environment in their research agenda, American environmental history and, more generally American environmental studies, were almost totally ignored by French historians and social scientists. From a French point of view, especially from the Annals school representatives ot that period, the American claim of a filiation between the Annals school and the environmental history movement may seem rather strange. Building on a series of interviews of some of the French key historians and social scientists of that period as well as on an analysis of the work they then produced, this paper will aim at formulating a series of hypothesis to explain: 1) the general disinterest of French scholars of that period for environment, environmental history and environmental studies; and 2) why the few of them who tackled this issue seem to have ignored or bypassed the American movement. The main questions which will be tackled are:

- What were their knowledge of the American literature and research? What were their representations of these literature and research?
- What were their conceptions of materiality, environment as well as of the "nature" – "humankind" interactions?
- How did they then perceive the political and critical stance of the American environmental history and environmental studies of that period? Did this political and critical stance influence the (non)-reception of the American literature? How did it fit or not fit in the French way(s) of conceiving and practicing "critic" at that time?
- To what extend did the (non)-reception of the American environmental history and studies by French Annals School representatives of that period result from the way French historians were then conceiving and practicing their discipline? To what extend did it result from more general trends in the French social sciences? In other words to what may the (non)-reception of the American environmental history and studies be explained by French historical and social sciences epistemic cultures?
- In what way(s) the institutional structure and functioning of the French Academia did contribute to shape the (non)-reception of the American environmental history and studies?

531 **Agricultural Intensification and Landscape Change in the Pare-Mountains: Archaeological and Geoarchaeological approaches**

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Human activities, like iron smelting, long distance caravan trade, intensified agriculture and pastoralism played an important role in the shaping of today's East African landscapes. Both landscape change and human activities have also been driven by climate variability, drought and wet periods, which can be traced in the environmental as well as the archaeological record.

This research paper investigates the resource uses of historical economies and human-induced landscape change in the Pare-Mountains, NE-Tanzania. In a combined archaeological and geoarchaeological approach we are studying a) the emergence of settlements and market towns during the intensified 19th century long distance caravan trade and b) long-term landscape development in response to changing human economies and climate patterns.

Market towns mentioned on early East African maps sketched by 19th century travellers have been located by ground survey and are currently excavated and investigated to examine changing economic patterns during the "opening-up" of East Africa. Emphasis is given to crop and animal economies and dietary practices, reconstructed from archaeobotanical and zooarchaeological analysis. New insights into the kind and amount of resource exploitation during the peak of the caravan trade will be given.
A geoarchaeological approach was adopted to investigate the human impact on landscape development. Erosion

events reported in corresponding sediment deposits can be associated with both human land use practices, e.g. forest clearing or agricultural intensification, and extreme precipitation events and climatic variability. We examine and date (OSL-dating, 14C-dating) slope deposits, basins and alluvial sequences, in order to reconstruct a watershed erosion/sedimentation history. To characterize the erosion events and the eroded sediments, we are applying sedimentological analysis (particle size, Carbonates, organic matter) and mineral magnetic measurements. Additional, former vegetation cover is addressed by bulk 13C-isotope and charcoal analysis.
Phases of enhanced erosion are put in the context of known historical episodes of human land use - iron-smelting activities, caravan trade or agricultural intensification periods - as well as rainfall variability patterns, in order to quantify the importance of climatic and human-induced impact on environmental change. The results will contribute to the ongoing discussion about the long-term history of ecosystem dynamics and land degradation in East Africa.

532 **Further and further away from Mother Nature. Industry, water pollution, and the Hungarian people in state-socialism.**

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Hungarians used to have a long tradition of living in symbiosis with their rivers. The River Danube and her tributaries have been entering the country from west, north and east to continue their flow to the Black Sea. Seasonal floods, floodplains and swamps had been integral parts of both human life and natural landscape throughout the country until the nineteenth century, when extensive river regulation projects began. After World War II state socialist industrialization continued the modernization of the landscape and had enormous effect on rivers by large quantities of chemical, biological and heavy metal pollution. One of the pivotal sites for such a comprehensive state-socialist development plans was the Borsodi Basin, in the valley of the Sajó River, about 180 kilometers east of the capital, Budapest.
This paper analyses power plays of environmentalists, journalists, officers of the water board and large state-owned production plants in the River Sajó area. It describes the history of industrial and community river pollution, the evolution of environmental monitoring technologies, water regulations, environmental protection technologies and social perception of the river pollution issue. Based on quantitative and qualitative evidence this paper is suggesting new ways to analyze historical data in the limelight of discourse analysis and power networks.
Between the 1960 and 1990 new, cleaner technologies were introduced to reduce industrial water pollution in the River Sajó area. Paralel to that development local folks have gained a large physical and menthal gap between themselves and their natural heritage as a result of state-socialist industrialisation. That dual feature of environmental changes defined most of the space for local environmental discourse in CEE
Therefore this paper draws new notions on the environmental history and history of technology of Central and Eastern Europe (CEE), because much has been written about the biological degradation of the river basins in various industrial areas in CEE, but only little is known how various players in the game were distributed in the state-socialist period.

533 **How extreme where the Floods of River Rhine in the pre-instrumental Period? A novel interdisciplinary approach for reconstructing and quantifying pre-instrumental floods.**

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History of natural disasters has become a key topic during the last decade, not least because of the widespread impression that the world in our days is being hit by such events at more frequent intervals. The still very young scientific field of Historical Hydrology mainly concentrates on reconstructing flood events of the pre instrumental period, usually by specifying damages caused or occasionally by addressing the issue to inundation heights or meteorological reasons. This paper in contrast is going to shed light on discharge quantities of several pre instrumental floods in such a way that comparisons between instrumental measured and unmeasured pre instrumental floods can be drawn for the first time.

Why Rhine floods at Basel? The evidence for this town from the Middle Ages up to the present days is well preserved, because Basel was never destroyed since the disastrous earthquake in 1356 which nearly annihilated the town. Narrative reports of several trustworthy contemporary town chroniclers are still at hand more or less without gaps from the thirteenth to the late sixteenth century. Most major events are so well documented that the maximum height of the flood as well as the size and location of inundated areas could be assessed. More recent events are documented with flood marks or with reports referring to flood-marks which were later destroyed. In 1808 a gauge was established near the (only) bridge. Daily readings are preserved up to the present overlapping with streamflow measurements after 1867. The traditional scheme of flood reporting documented in nineteenth century newspapers was compared with flood-marks and gauge readings especially from the example of the extreme flood in 18th September 1852. The intercomparison of narrative with instrumental evidence allowed calibrating flood information from the Medieval Period. Based on this calibration

hydrologists attempted discharge calculations using the software Flux/Floris2000. Moreover Basel´s body of source material also implies the chance to reconstruct all floods of a certain height in as much the authorities – whenever a major flood took place – summoned up a bridge guard who had to protect the bridge from driftwood and similar risks. The expenses for this guard, as was demonstrated by Gerhard Fouquet, have left their footprint in the weekly led books of account of Basel.

A well fail-safe series of flood occurrences as well as an extension of extreme flood series into the pre instrumental period therefore could be obtained in this way. Both series will help to augment knowledge of coherencies between climatic variation, precipitation and flood events.

534 **Environmental statistics in Georgia: historical view**

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The condition of ecology is one of the most important global problems. In order to see the real picture of it, we must have statistical data which reflects ecological situation in country.

The history of environmental statistics in Georgia begins in 1979 and since than with the help of international organizations, this activity is being developed. Though there are many problems in this sphere, which require instant solution; particularly, the number of solved problems has reduced.

The ecological situation recently has deteriorated, in spite of great need of help, it happened so that nowadays governmental statistics pays less attention to it than its necessary.

We had studied existing documentations and publications about Environmental Statistics.

On the Basis of the results of study we divided history of Environmental Statistics into two period: soviet period (before 1990) and period of transition (from 1990).

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537 **Imperialism and agricultural intensification in the Andes: A long-term perspective**

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The irrigated coastal valleys and terraced mountain slopes of Peru provide an extremely rich and varied material for studying long-term landscape change. Drawing on an extensive corpus of largely published sources (e.g., Denevan 2001; Balée and Erickson 2006), this project investigates the extent to which different systems of agriculture have emerged, in different parts of the Andes, as responses to shifting imperial politics or opportunities for trade from the days of the Wari and Tiwanaku empires (AD 500-1000) through the Inca empire (AD 1400-1532) up to the present. In the context of this synthesis, it is of particular interest to address theoretical issues such as the political economy of landesque capital in the form of e.g. canals, terraces, and raised fields; the prehistoric occurrence of "plantations" of tropical crops such as coca; and core-periphery relations of unequal exchange gauged in terms of appropriated land and labor. Historical sources on Pre-Columbian institutions and economic flows are combined with archaeological and geographical data on the antiquity and extent of pre-colonial agriculture. Contemporary discussions of sustainability in the Andes often address the historical abandonment and possible revitalization of Pre-Columbian agricultural systems, as well as the ecological consequences of modern cash crop plantations, particularly in the tropical lowlands. In order to assess the sustainability aspects of traditional agricultural systems, these systems need to be understood in relation to politically or economically induced resource flows. The paper revisits classical topics such as Marx's concept of "metabolic rift" and Wittfogel's "hydraulic hypothesis". An important empirical question is whether political centralization was generally a prerequisite to agricultural intensification, or vice versa.

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542 **Heavenly Bodies: "Manned Space Flight" and the Women's Movement**

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The human body has become an increasingly important site of analysis for environmental historians. To further such efforts, this paper will explore the bodily history of Apollo astronauts during the 1960s and 1970s.

Throughout this period, scientists prodded, measured, exercised, and artificially stressed the physiques of those venturing into outer space. These same scientists also hooked up astronaut bodies to a host of machines, both down on the ground and up in space. The first part of this paper will examine how these physical experiences, publicized around the world for nearly two decades, altered cultural perceptions of the human body in an age before pacemakers, hip replacements, artificial hearts, and cyborgs.

The second portion of this paper will link this environmental history of astronaut bodies to the political history of the postwar era in two significant ways. First, it will analyze how as the 1960s wore on, and the Civil Rights movement and the Cold War intensified, politicians in Washington, D.C. began enlisting the strong, white, male bodies of Apollo astronauts to promote federal power both at home and abroad. Virile, white spacemen, they argued, suggested a powerful and homogenous United States while simultaneously helping to mask a host of racial problems such as those afflicting America's cities. Yet NASA's "manned" space flight was also highly gendered. While NASA repeatedly argued that female bodies were physically unfit for space travel, women nevertheless continually demanded membership in NASA's astronaut corps, and often used their bodies to do so. During the early 1960s thirteen women pilots passed an identical, civilian version of NASA's astronaut physical examination, and in the mid-1970s a vocal group of feminists began publicly arguing that women's bodies, in part because they were lighter than men's, were better suited for space travel. Partly as a result of such efforts by the women's movement, in 1983 Sally Ride became the first American woman in space. Thus while this paper begins by analyzing the environmental history of astronaut bodies, it will end by exploring how this bodily history in turn influenced the racial and gender politics of the 1960s and 1970s.

545 **Everglades Environmental History: Integrating ecological and historical approaches**

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Although the Everglades of southern Florida is a UNESCO World Heritage Site, its cultural significance has largely rested upon its image as a landscape that is alien, impenetrable, and at the same time fragile and in need of protection. Currently, the Everglades is the focus of one of the largest and most expensive environmental restoration programs ever attempted. Long-held visions of the Everglades certainly shape contemporary restoration discourse, policy, and practices, which treat the landscape as separate from and besieged by people. Certainly the Everglades has been dramatically altered through processes of land use change, suburbanization, and water management practices. Yet understanding the Everglades as a landscape of co-production, or an environment produced at the intersection of human and ecological processes, requires the synthesis of long-term ecological data with data that interrogates the human histories of place. This integrative approach allows us to produce an Everglades environmental history that reveals processes of co-production. In this paper, we highlight the ways in which archaeological data, oral history, and other archival materials provide a more nuanced understanding of the Everglades as a socioecological system has changed over its brief, 5000 year history as a wetland landscape. This work stems from interdisciplinary collaborations at the Florida Coastal Everglades, Long Term Ecological Research Program, supported by the National Science Foundation.

549 **Do's and Don'ts in Interdisciplinary Research on Causes of Fires in Tropical Moist Forests: Examples from Indonesia**

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Social and bio-physical research on causes of fires in tropical moist forests has been insufficiently integrated. A telling manifestation of this has been social science preoccupation with causes of ignition events regardless of whether those events occur in or near fire-susceptible forests or whether they have been shown to have led to actual fire propagation in forests. With examples of do's and don'ts from research and management programs related to the extensive Indonesian forest fires of 1997-98, arguments are put forward here for concentrating on: studies reconstructing the paths and ignition sources of particular forest fires as soon as possible after they occur; studies of fire use in or near forests during times of drought specifically; fine-grained research on fire behavior and fire susceptibility under varying conditions of fuel availability and moisture; and systematic research on the possibly numerous and complexly interacting human actions affecting those conditions.

550 **The Experience of Landscape through a Coach Window: Guidebooks and National Identity in Russia during the First Half of the 19th Century**

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Cultural changes in perception of space were crucial to national identity formation in many countries of the world as B. Anderson (1991) vividly showed. With respect to Russia, the work of Ch. Ely (2002) and G. Hausmann (2008) has been highly effective in advancing the notion of the Russian landscape as a cultural construction and focusing on the emergence of new aesthetic norms of perception.

This paper deals with the cultural practice of experiencing landscape by Russian passengers who traveled in coaches through the territory of the Russian Empire during the first half of the nineteenth century, and the ways this travel experience was linked to the process of nation building. In particular, the paper is focused on the narrative strategies of the first Russian guidebooks and the ensemble of images of territory and people utilized in them. Through a close reading of travelogues, the paper also explores the ways in which the guidebooks

influenced the visual perceptions of individual travelers. Close attention is paid to an analysis of the travel guides and travelogues related to the main thoroughfare of the Russian Empire between St. Petersburg and Moscow.

Following the Napoleonic wars, the Russian educated public began to discover the human and physical environments of their country. Thanks to the construction of broken-stone roads and the organization of regular public transportation, created by several joint-stock and state companies organized in the 1820s through the 1840s, travel in Russia became more popular and comfortable and the number of passengers noticeably increased. The available guidebooks provided passengers with descriptions of the various points to be visited in addition to recommending how to travel cheaply, advising what ought to be seen and how places of interest should be appreciated.

The guidebook narratives would often be characterized by descriptions of local resources and wealth. As such, they would include an impressive amount of information on local geography, with particular attention given to hydrographic systems, agriculture, labor, trade and commerce. The provinces of Central Russia were depicted as a densely populated territory, rich with natural resources; with picturesque landscapes and historical sites; with well-off, cheerful, healthy, and industrious inhabitants portrayed as the descendants of ancient Slavs.

Focusing on the guidebook narratives as an instrument for establishing common knowledge of the particular territory, its environment, and inhabitants and for sustaining a powerful sense of belonging to that territory as native land, the paper attempts to explore the link between the processes of knowledge production and nation building.

559 **Pollution of the Baltic Sea by Toxic Substances**

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One of the most fundamental global environmental changes during the twentieth century has been caused by pollution from toxic chemicals. Synthesized chemicals can be found from pole to pole and from the highest mountain peaks to the darkest depths of the oceans. Every single human being caries traces from a number of different man-made chemicals in their tissues. It was a long held assumption that humans could not have a negative impact on the sea waters. Within a single decade this misperception was ruined. In the late 1950s only a handful of dissenting scientists opposed the use of chlorinated hydrocarbons. A decade later these substances were detected in sea-life all over the world, which prompted a panel of the world's leading oceanographers, who were called together by the World Food Organization (FAO), to prophesy that the marine environment was doomed to ecological crisis if the use of toxins was to continue. The situation in the Baltic Sea was even worse: the amount of toxins in Baltic marine mammals and predatory birds was up to ten times greater than in other well studied sea areas.

In this paper I will examine how the Baltic Sea became to be considered as a poisoned ecosystem. The standard explanation for the awakening to the dangers of chemical substances emphasizes the role of influential individuals, such as Rachel Carson. To a lesser extent it has also emphasized catastrophes, such as the Minamata "incident". According to this model the Silent Spring by Rachel Carson and the Minamata "incident" raised social awareness concerning pesticides and other hazardous chemicals. Indeed, until the mid-1970s every western democracy prohibited the most dangerous of them. There is no doubt that Silent Spring also influenced environmental considerations in the Baltic Sea area. However, I argue that home-grown factors played much bigger role even in Sweden, where the impact of the Silent Spring was more pronounced than in any other Baltic Sea state. Moreover, Swedish environmental chemistry enjoyed a golden period in the 1960s, in which it advanced the knowledge of toxic substances and their fate in marine and terrestrial ecosystems. It is likely, for example, that Finnish scientists in the 1960s would not have begun to study the occurrence of toxic substances in Finnish territorial waters without Swedish influence. Yet it was not until Finnish scientists revealed the dire condition of the Finnish sea area that the national debate on the toxication of the sea began. In sum, I argue that the new consciousness of the toxic chemicals in the 1960s and 1970s in the Baltic Sea states was much more indigenous in its origin than has so far been recognized.

560 **Hydraulic engineering and landscape change : The example of the river "Schwarze Elster"**

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The river "Schwarze Elster" rises in the Lausitzer Highland and flows today from the German federal state Saxony through Brandenburg and Saxony-Anhalt. It discharges in the Elbe river near the city Elster. The river's hydraulic and landscape structure was changed in all areas of its flow stream. The first large-scale project of river straightening took place in 1852, when the "Association for the Regulation of the Schwarze Elster" was founded. Projects intended by this association included mainly the straightening of the river, the building of stream flow controls as well as the drainage of the Schraden forest. These operations took 12 years and were completed in 1864. During this time the river was shortend by about 30 km. The lower river stream was left in its original condition. In the following years the need for a regulation of the lower river stream became, however, more and more important. Main problems encountered concerned not only the tailback of elbe floodings, as emphasized in a report of the hydraulic engineer inspector ZIMMERMANN written in 1849 (LHASA, MER, C56, Merseburg, No. 950, p.13-14), but also the increasing influence of settling sediments and outflow in cause of the open pit of lignite of the Lusatian Area, the slowdown of the current and extension of the river course. After the great flooding of 1907 the lower river stream was streightened in parts by 1910. The second

main regulation took place in 1911 and was followed through until 1930.
Interest in the river straightening was not only fuelled by the need of stream flow controls and the constaining of diseases, it was also based on the Prussian reforms (GRUNDMANN 2001, RAKOW 2003) and their importance for the development of the cultural landscape in the Prussian territory.
The "Schwarze Elster" is a multi-faceted example of German hydraulic engineering, which progressed due to the increasing need of arable crop as well as flood protection. The straightening of the "Schwarze Elster", the building of stream flow controls, as well as the constraining of the disease malaria, turned a natural landscape of the floodplains in a culturally shaped landscape. Historical-geographic analyse methods and a combination of topographic and historical data, will enable to highlight the political, socio-economical factors as well as their results for human society and natural environment of the "Schwarze Elster" from the 19th to the mid 20th century.

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562 **Agroecosystems on the American Frontier: Material and Energy Systems and Sustainability**

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Between 1860 and 1940, American and immigrant farmers developed for agricultural purposes 150 million hectares of new land in the North American Great Plains. Across a vast area, land use ranged from intensively cultivated row crops to extensive fields of cereals to sparsely grazed pasture land for livestock (Cunfer 2005). In the process these farmers transformed the material and energy systems of a large part of the continent's surface. They redirected nutrient flows, tapped stockpiled soil fertility, and funnelled energy into new pathways.

This paper measures and analyzes those material and energy flows as they moved through soils, crops, livestock, and into the human economy. It traces changes in the socio-ecological metabolism of Great Plains farming, from its first emergence as America's last agricultural frontier through several generations of families who adapted to their environment even while transforming it.

The state of Kansas and the U.S. federal government conducted censuses of population and agriculture that allow a fine-grained reconstruction of family configurations and farm-level land use. The Grassland Settlement Project has assembled a database of demographic and agricultural information that allows us to track thousands of individual farms at 5-year intervals between 1860 and 1940. We can follow changes in crop choice, livestock numbers, labor supply, adoption of machinery, and many other aspects of the agro-ecosystem. This paper makes use of these rich data to follow several farms and communities spread across the state of Kansas. It uses the socio-ecological metabolism approach (Krausmann 2004) to measure and estimate such factors as nitrogen, carbon, energy, and food inputs and outputs of various farm practices. It links together strategies for soil fertility maintenance with strategies for family subsistence and economic profitability and discusses the sustainability of land use in the first 80 years of grassland settlement.

For comparison, the paper makes a similar evaluation of agro-ecosystems in Austria, as a way to understand the differences between long-established European agriculture and frontier farming in the New World. This comparison is especially apropos because a significant number of immigrants left the Austro-Hungarian Empire in the late nineteenth century to establish homestead farms in Kansas and throughout the Great Plains. How did their land use practices change as they moved into a distinctly different social, economic, and physical environment? Was frontier farming sustainable? What mechanisms were available to manage soil fertility and to conserve and channel energy? This paper addresses these questions, using a rigorous socio-ecological method and rich historical sources to reconstruct past farm systems.

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563 **"'We Know Too Much About Being Hungry and Not Very Much About This Mercury': Mercury, Fish, and Environmental Justice in Grassy Narrows (Canada), 1962-1974"**

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Between 1962 and 1970, a chloralkali plant managed by Dryden Chemicals Limited leaked roughly 1,400kg of mercury annually into the Wabigoon and English River systems in eastern Manitoba and northwestern Ontario (Canada). Mercury levels in northern pike, burbot, and walleye taken 80 to 100 kilomerters downstream

measured 27.8, 24.8, and 19.6 parts per million respectively, significantly higher than the 0.2 parts per million typically accepted as maximum background concentrations and well above any acceptable limits of mercury exposure to humans. Discovery of and response to the mercury contamination were slow; members of the Ojibwa Band, who subsisted on fish taken from the Wabigoon-English River system became the forgotten victims of this pollution "pandemic." The tremors exhibited by Ojibwa in Kenora, Ontario, were typically attributed to alcohol, and birth defects associated with inbreeding. Later blood and hair tests revealed that the Ojibwa suffered from exceptionally high levels of mercury poisoning that rivaled those found at Minamata in the 1950s.

In presenting an account of mercury poisoning within an aboriginal community, this paper aims to make connections between food, toxins, and social justice in a Canadian context. For their part, the Ojibwa were caught between poverty and limited warnings about the hazards of mercury poisoning in their primary mode of subsistence. Chief Assin of the Grassy Narrows band acknowledged than many of the people on his reserve still ate contaminated fish, noting that the Ojibwa "know too much about being hungry and not very much about this mercury." Central to this story, then, is the disconnect between toxic knowledge, which developed in scientific circles, and the failure to communicate environmental risks to the aboriginal community. The absence of attention to the Ojibwa resulted in what one Canadian health official called "genocide by neglect."

565 **Fire, Climate and the Fortunes of a Reinsurer, 1864-1906**

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This paper discusses the ambiguities of fire as a "natural" hazard in relation with reinsurance. Instead of merely taking the conventional approach and looking at a single city fire, this paper examines the impact of cumulative fire losses on the fortunes of a reinsurance company (Swiss Re) in the early years of its existence (1864-1906). This is achieved by analysing the connection between the occurrence of fires and reports of droughts both found in Swiss Re sources. Furthermore the paper juxtaposes those reports with objective climate data and presents a short case study for illustration.

567 **Japan's Kamioka Mine: Engineering Human Pain in the Hybrid Environments of the Jinzū River Basin**

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With the beginning of Japan's Meiji wars, miners started extracting silver and lead from the Kamioka shafts of the mountainous regions of Toyama Prefecture. This technological complex, and the engineered environments it birthed, seamlessly connected to the Jinzū River Basin, which also fed downstream paddies that, in their own way, were engineered environments as well. Smelting and ore flotation devices that allowed miners and processors to extract ever higher percentages of their desired metals caused pollution problems in nearby agricultural lands. But these pollution problems, particularly their consequences for human health, represented the product of hybrid causation. Naturally occurring oxidization processes in riparian ecosystems created the toxins that caused human pain; but "it hurts, it hurts" disease, or cadmium poisoning, was also the product of the physiological consequences of Meiji state pronouncements regarding being a "good wife and wise mother." Women who were both productive and reproductive tended to suffer disproportionately from cadmium poisoning: obeying meant sacrifice for the state. Similarly, women who sheltered themselves from the sun, in a culturally ingrained habit to preserve their white complexion, deprived themselves of nutrients that could have protected them from industrial disease. Mining technologies, engineered environments, natural alchemy, state pronouncements, and cultural habits enmeshed and intertwined to create disease and pain downstream from this important wartime mine.

568 **Denying and Disguising Depletion: Groundwater Overdraft and Urban Sustainability in the American Southwest**

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America's 5th largest city—Phoenix, Arizona—is experiencing an urban population explosion. Nestled in America's "Sunbelt" with year-round blue skies and only seven inches of annual precipitation, the Greater Phoenix metropolitan region is booming with immigrants, industry, and an insatiable thirst for water to feed that growth. Metropolitan Phoenix is comprised of 22 cities blended into one megalopolis of 3.9 million people. That population is expected to double by 2055. Located along several rivers that drain vast watersheds in the high country to the north, these central Arizona desert cities have enjoyed an oasis lifestyle during the 20th century, supported by government-funded reclamation projects delivering water to the Valley of the Sun. But surface water supplies are limited and rights to that water carefully guarded. A second source of water pumped from aquifers deep underground has been crucial to the growth of agriculture and cities in the central Arizona desert since World War Two. By 1980 groundwater provided about 40 percent of the area's water supply. Unlike surface water flowing in rivers, groundwater is essentially nonrenewable and subject to rapid depletion. Largely unregulated during the 20th century, groundwater was a common pool resource available to any landowner with a well and a pump. The State of Arizona did not seriously regulate groundwater pumping until a crisis in the 1970s led to passage of the Arizona Groundwater Management Act of 1980. The 1980 Groundwater Management Act, considered at the time innovative and progressive, sought to end groundwater overdraft by 2025. It was a law designed to put metropolitan Phoenix on the path to sustainability. But as soon as Phoenix got its water project built, the will to implement conservation and growth management regulations languished. The state legislature passed weakening amendments to the law, the state Department of Water Resources

declined to enforce municipal water conservation measures, and cities, homeowners, businesses, and growth boosters resisted meaningful reductions in water consumption and sidestepped regulations that required assured water supplies for new development. As a result, groundwater overdraft is increasing rather than decreasing. The water elite in the Valley deny unraveling this regulatory program and disguise the true scope of the region's water supply challenges behind bureaucratic obfuscation, regulatory complexity, and empty conservation gestures. A water supply crisis looms while responsible officials engage in group-denial and praise their ineffective water managing institutions. Such behavior is common among water managing institutions in the American West and undercuts efforts to design and promote sustainable desert cities.

569 **Interactive effect of fisheries and forestry on Atlantic salmon population abundance in the Russian North in the end of the 19th – beginning of the 20th cc.**

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Atlantic salmon fisheries in the White and Barents Sea basins were one of the main sources of life for peasants in the Russian North till the beginning of the 20th c., and therefore a principal resource for colonization of this vast region with severe climate conditions. Another important resource was a forest industry, which intensive development started in the end of the 19th c. Fishing, forestry, and the dam construction were the most important anthropogenic factors affected salmon in historical perspective (Netboy, 1968, Coates, 2006). These two main factors complexly interacted, because: 1) they were alternative occupations for local peasants who chose one of them depending on benefits which differed spatially and temporarily; 2) salmon fishing gear (weirs) crossed the rivers preventing timber rafting; 3) forest industry changed hydrological regime in rivers where juvenile salmon develop. Our previous studies on dynamics of salmon populations in the 17-18th cc., when fisheries were not intensive and forest industry was almost absent, showed that natural factors, in particularly climate, were the major factors affected dynamics of salmon populations (Lajus et al., 2005, 2007).

In this study we analyzed interactive effect of fishing and forestry on abundance of salmon populations based on historical sources. As an index of abundance we used catch per unit effort (CPEU), we analyzed also changes in a number of fishing places and dynamics of total catches. Our analysis showed clear differences between "industrial" regions with intensive developing of forest industry and "non-industrial" remote regions. The conclusion is that at the end of the 19th – beginning of the 20th cc. human activities became the main factor influenced population dynamics of salmon in the Russian North. Forestry reduced fishing and even caused increase in population abundance at the beginning of its development, because it prevented fishing and attracted labor from it, thus decreasing its intensity. Its further development, however, in particularly timber rafting, caused fast decline in salmon populations already by the 1930s. In "non-industrial" regions, where in this period most of peasants were involved in salmon fisheries, fishing pressure increased with growth of human population. This caused decrease in abundance of salmon, but it went much slower than in "industrial" regions. Thus in non-industrial regions in general salmon remained more abundant.

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570 **Regalian rights in woods as a resource for mining in medieval Serbia**

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This paper discusses access to woods in medieval Serbia as a resource for extensive mining production. The analysis focuses on royal charters and the Czar Dushan's Law Code (1346), setting these regulations within a broader historical and comparative context. Mining and woods-use here exemplify an approach to nature as a reservoir of resources, in which food, material for tools and construction, etc., are valued according to their economic utility and location.

Whereas earlier medieval Serbian mining had concentrated on surface iron ore deposits, the mid-thirteenth-century colonization of German-speaking Saxon miners brought advanced technology for the mining of gold, silver, lead and copper. Like contemporary Hungarian kings, the Serbian ruler allowed the Saxons to settle as separate, specially-privileged communities. Medieval Serbian mining terminology and legal codes, concerning both the mines and the mining towns, are all of Saxon origin, and they were later incorporated in Ottoman laws. In the process of assimilation, the name Sas (Saxon) lost its ethnic meaning, and became a synonym for 'miner.'
Drawing on Roman legal ideas, the Serbian ruler claimed "major regalian rights," or supreme authority, over mining, which included the exclusive rights of ownership, control, and use of ores, mine production, trade in metals, and coinage. He conceded his rights to exploit subsoil resources to Saxon miners in return for one tenth of mine production, which constituted a significant part of the royal revenues. Hence, the ruler was very interested in the protection and prosperity of mines.

Czar Dushan's Law Code (article 123) provides evidence of natural resource management by forbidding the Saxons to clear the forests for cultivation or settlement, and requiring that the woods be allowed to regenerate, but at the same time allowing them unrestricted rights to harvest wood. Thus the Saxons could use the woods for the needs of mining, but they did not acquire ownership of the land itself. This regulation served, therefore, to protect the forest. Similarly, royal donations in "banned" forests included special protections for on-going wood-cutting and iron production.
In some cases local communities took action against environmental pollution caused by mining, as at Srebrenica, where citizens asked the Serbian ruler to move smelting furnaces further away from the town. They claimed that the poisonous fumes had caused the death of many town inhabitants. These and other examples testify to an awareness of the need to carefully manage natural resources and to limit the damage their exploitation might cause.

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577 **Nutrient Balances and Magement of Soil Fertility in Andalusia, Spain (18th-20th**

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Repalce soil fertility is an important key for sustainable agriculture, especially in dry Mediterranean climates where organic matter is low. The analysis of the historical management of soil fertility is a fundamental tool for understanding ways of functioning of agrarian systems and for understanding the changes produced by the industrialized agriculture. It can be used, as well, to highlight the environmental damages that endanger the sustainability of agriculture today. From a "practical history" perspective, knowledge of soil fertility management in the past can be used to design sustainable agrarian systems today. Likewise, knowledge of present practices used by organic farming could be used to understand agrarian systems in preindustrial societies ("experimental" dimension of History).

We analyse the different ways of soil fertilization since the middle 18th century through three case-studies situated in Andalusia (South of Spain). One of them is in the West of Andalusia (Castilleja de la Cuesta, Seville), other one is situated in the middle (Baena, Cordoba), and the third one is in the East (Montefrío, Granada). There is different climate and soil conditions in each place, but have the same problem of rainfall scarcity. We analyse the soil fertilization practices when only organic fertilizers were used and now, when external nutrients from faraway places are used in the agrarian system. First, we have analysed soil fertilization techniques through different soil managements (nutrients loss by erosion, volatilization, lixiviation, etcetera), analysing the water addition by irrigation and use of fertilizers as manure and legumes. Second, we have reconstructed the evolution of land uses and nutrient balances at farm level since middle 18th century until today. Third, we have also reconstructed the N an P cycles at local level, the two limiting factors of the natural productivity in southern of Spain. Finally, we have focused our attention on the territorial consequences of each soil fertility managements.

The results show new hypothesis on historical evolution of mediterranean agrarian systems (19th and 20th centuries) and new points of view to understand the transition to inorganic fertilization from the organic one. This research confirms that N and P was a limit for productivity in agro-ecosystems studied by us. Thanks to the external nutrients received from outside, Andalusian agriculture has reached the present productivity level, what is origin of serious environmental problems. Preindustrial Agriculture had to pay a high territorial cost to replace soil fertility that could not be used for other purposes (to expand agriculture, for example), while today the cost is assumed by external nutrients (chemical fertilizers). Research shows that organic farming should overcome this problem to grow.

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578 **What drives the 'extractive frontier'? The City of London and the capitalisation of the mineral kingdom in the late 19th century**

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In the last quarter of the 19th century the City of London saw a spectacular boom in mining finance. Over 9000 exploration companies and mining syndicates were registered in London between 1880 and 1904 with a nominal

capitalisation of around £1billion, nine-tenths of which was raised for mining projects outside the UK. A mixture of both rank speculation and more sober investment, the geographical export of British capital drove the episodic conversion of landscapes to mineral extraction from the Rocky Mountain manias of the early 1880s, through the copper boom on the Iberian Peninsula later in the decade, to the extravagances of the 'Westralian' and South African gold rushes of the 1890s.

Economic historians have described the network of promoters, bankers, merchants, engineers, accountants, and lawyers that coalesced in the City (Harvey and Press 1990). The paper builds on this work in two ways: first, by examining how the network of mining-related expertise centred on the City worked to 'switch' surplus capital into mining, and direct it out of the industrial core and into underground spaces of the periphery (Arrighi 1994); and second, by linking the socio-ecological transformations associated with the extension of the extractive frontier to the circulation of capital and the 'insatiability of finance' in seeking out new spaces and forms of capitalization.

The paper advances its theoretical claims by reference to the northern Nigerian tin mining boom. At the turn of the last century the high plateau region in the northeast of present-day Nigeria was marked on British maps as a substantial blank. Yet by 1912 Nigerian tin stocks were among the most actively trade in London and by 1914 over 200 companies were mining or exploring for tin on the plateau (Freund 1981). The paper contributes to the 'new historical materialism' by illustrating how environmental histories of extractive economies can be understood by reference to the 'double character' of mining: as simultaneously a material process of applying and converting energy to transform matter, and an economic process of capturing, producing and transforming value (Bunker and Ciccantell 2006).

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579 **"A Mile Wide and an Inch Deep": Reflections on U.S.-Mexican Relations As Seen from the Rio Grande/Rio Bravo**

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Most of the world's major river basins cut across one or more sovereign countries, and the Rio Grande/Rio Bravo (around 3100 kilometers long, the world's 22nd longest) is no exception: it originates in the mountainous regions of the U.S. state of Colorado, flows south through New Mexico, then turns southeastward, where it serves as the international border line separating Texas and Mexico before mouthing in the Gulf of Mexico.

The domestic laws and traditions that govern natural resource use on river systems (riparian rights, prior appropriation, etc.) are complicated enough, but they become even more complicated when two or more countries are involved. Governments tend to manage these legal entanglements in one of two ways: through bilateral or multilateral treaties, or through the establishment of river commissions.

This paper will analyze U.S.-Mexican (and indirectly U.S.-Canadian) relations by examining the ecological and cultural impacts of human activity in the Rio Grande/Rio Bravo basin. Focus will be on the circumstances that turned the Rio Grande into an international bone of contention, and the myriad ways that the U.S. and Mexico attempted to deal with it. The river system is the third largest in the U.S., but it carries far less water than its larger rivals (the Colorado transports 20 times more, the Mississippi 100 times more), making it less reliable as a water source and all but useless for transport. Not for nothing did 19th century observers disparage it as "a mile wide and foot deep, too thin to plow and too thick to drink."

As the only major river system in the Sonoran desert, however, the Rio Grande/Rio Bravo emerged as a major arena of dispute between the U.S. and Mexico during the second half of the 19th century; and it remained contentious throughout most of the 20th century, despite a myriad of bilateral treaties and the eventual creation of the International Water and Boundary Commission (originally International Boundary Commission) in 1889. U.S.-Mexican relations—not least, U.S. arrogance toward Mexico and Mexico's own political instability—have often been more of a deciding factor in the river's governance than has been the activities of the Commission itself; and many of the river's ecological problems today originate as much from unresolved political problems along the border as from the work of the Commission and its engineers. These disputes involve agriculture, nature protection, shifting banks, and (above all) water appropriations.

583 **The countryside betrayed? Fiction and reality of the agrarian discourse in early Francoist Spain**

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During the Spanish Civil War, the rebels fighting against the democratic Government of the 2nd Republic will enact an agrarian discourse. They oppose the countryside to the city, identifying themselves with the former. In the Spanish rural world was the true and genuine Spanish spirit, in opposition to the Marxist, liberal, modern and decadence that the urban world represented. Dealing with environment meant dealing with Spaniards: the richness of the country and its supposedly unlimited resources assured the independence of the country and its

people. Spain and the Spaniards did not have to look abroad for reaching their astonishing future: they had to look inside the country, to its valleys, soils, mountains, rivers, villages and places where the 'gold years' of the country were buried. It was necessary to look to the country and the environment, where the real essences of the Spaniards were.

When the war was over, Francoist State will assume and continue with these rhetorical discourses. However, the policies developed in the 40s would not follow an 'environmental' path: the autarky policy would look forward to force the industrialisation of the country. Its application in the countryside is a good example: as we show in our work, the rural local authorities of Spain used the autarky policy in order to enhance productive goals, as a way of building and consolidating the Francoist State. As in other Mediterranean fascism, the consensus between the grassroots of the regime was necessary for granting a long live to the authoritarian regimes. The political goals of the regime were always above that rhetoric that linked the Spanish landscapes and the Nationhood spirit. The use of the natural resources in postwar Spain proved it.

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586 **A Right to Clean Air? Property, Coal Smoke, and Nuisance Law in early modern London**

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Air is a common resource, an element vulnerable to being dirtied or damaged by polluters because none own the air but all use it. In early modern England, however, air could be, in some sense, owned; house ownership also conferred the rights to such necessary "amenities" as light and air, and actions which deprived a householder of their air could constitute a legal nuisance. From about 1575, however, the common air of London was changed by the increasingly widespread practice of burning unpleasant coal both industrially and domestically. Beginning in the early-seventeenth century, courts faced the challenge of reconciling the rights of householders to clean air with the rights of tradesmen to pursue a lawful trade and in so doing to consume their necessary fuel.

In weighing these conflicting interests common law justices articulated a doctrine of spatial decorum, claiming that "offensive" trades were prohibited in certain places but were appropriate to others. While such prohibited areas of London might include rich areas in the City's mercantile center, and probably would have included the space near the home of rich and powerful elites, all justices were agreed that they most obviously did include the space around royal courts. Thus by the end of the seventeenth century the legal category of nuisance had contracted in the face of constantly expanding smoke production; coal consumption and its consequent smoke were deemed necessary, even beneficial and desirable, in most of London's growing metropolitan area. The few exceptions were the royal, aristocratic, and moneyed inhabitants of London's west end, whose airy neighborhoods were deemed unfit for industry. Thus, in early modern London, the strongest legal protection for clean and healthy air was reserved for the elite. A legal right to clean air, like the right to political citizenship, was only fully extended to those with wealth and property.

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587 **Paradigms and Paradoxes of Abundance: The St. Lawrence River and the Great Lakes Region**

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I will explore the St. Lawrence River and the Great Lakes as part of a panel situating regional environmental histories in a transnational framework. This region encompasses an international maritime transportation network stretching 2,500 miles from the Gulf of St. Lawrence along the border of the U.S. and Canada. My paper will examine the shared U.S.-Canadian management of the St. Lawrence Seaway, whose policy and engineering has involved federal agencies on both sides of the border, two quasi-private corporations, and the bi-national International Joint Commission. I will show how the interrelated changes of technology, commerce,

and ecology in the region gave rise to a dominant environmental concern worldwide—the threat of invasive species. Situating this regional history within a transnational framework will improve our understanding of North American environmental and borderlands history.

The context for this study is a two-century history marked by incredible abundance (rather than scarcity). At different times the Great Lakes region has acted as an international economic turnstile. Following decimation of beaver by the early nineteenth century, seemingly inexhaustible Great Lakes forests fueled westward expansion and later supplied the automobile and paper industries in North America; immense Great Lakes iron ore deposits from Minnesota, Michigan, and Ontario laid the foundation for the continent's steel industry. From the near extinction of the beaver, environmental consequences continue to unfold into the twenty-first century—toxic pollution, decimated rural landscapes and economies, habitat destruction. Aquatic ecosystems in the Great Lakes have collapsed under the invasion of exotic animals and plants via international shipping along the St. Lawrence Seaway—more than 140 species in the past century. The economic cost of invasive species is now so high that politicians in both countries have proposed closing the Seaway.

Neither U.S. nor Canadian environmental historians have incorporated these events into a transnational analysis of historical patterns and processes. In the scholarship, national or state boundaries have often limited research on the Great Lakes to local or country-based studies. But there are critical opportunities for transnational understanding. For example, one ongoing challenge for scientists, engineers, and policymakers has been to combat the influx of invasive species (or toxic pollution or rural decline) while continuing to engineer the free flow of natural resources and commerce. This paradoxical effort has required political and scientific collaboration across borders. Thus we can trace the construction of a region that transcends national boundaries even as its history has been partially shaped by those boundaries. The International Joint Commission, a bi-national governing body of the U.S. and Canada, is the embodiment of this transnational process. Today water is the limitless commodity in question—the black gold of the future in a water-poor world. Once more, the region represents the paradigm and the paradox of abundance.

589 **Environment and History beyond the looking-glass of the Annales**

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The inheritance of the Annales in shaping environmental history is paradoxical. On the West side of the Atlantic, Annales' historians and geographers are considered as potential sources for the development of environmental history. By contrast, on the other side of the Atlantic, they are often presented as false precursors, as they maintained a rigid separation between nature and societies. Beyond this (deceptive) debate, my paper wants to throw light on the complex inheritance of several generations of historians and geographers involved in the Annales enterprise, who have never been and are still not a single school (1). Avoiding a debate on early and late comers in the building of environmental studies is also a way to stress the diversity of models in writing environmental histories.
I propose to analyse the place of the milieu and the environment in the French historical studies. Some topics will be especially examined: starting from L. Febvre, who shaped the debate in the 1920', I will focus on the importance of territoriality in the original French contiguity between historians and geographers; the juridical and political dimensions of societies/environment relationships, stressed by M. Bloch in the 1930'; the more recent discussion on the plurality of "social temporalities" beyond F. Braudel's longue durée model designed in the 1960'. These three topics - territoriality, legal and political approach, diversity of temporal and spatial scales (2) – are still stimulating lenses to examine new productions of historians.
The main purpose of my paper is then to analyse the historicity of the notion of environment. My hypothesis is that this notion became a "sujet-objet nouveau" (3) since the early modern period. Rooted in the matrix of political economy, it presides to a change in political model in terms of sovereignty and of government. New procedures of knowledge – political, economic and naturalist knowledge – with new forms of describing nature (4) and governmental knowledge participate in this process. My presentation is conceived as a first historiographical step for highlighting the role of social sciences and history in the process of constitution of the notion of "environment". This might allow us to shape the writing of history beyond nature/culture paradigm in which our social and natural sciences are born.

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593 **Conserving 'Native' Lands: Transnational Dialogues over Official Environmentalism in British Colonial Africa and the Native American Southwest**

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In the 1930s and 1940s, as the United States government engaged in major environmental interventions on Native American reservations in the Southwest, colonial officials in several territories of British colonial Africa pursued remarkably similar agendas. Facing severe problems of ecological decline in "native" areas, officials in both arenas instituted extensive soil conservation and livestock management programs among local indigenous

peoples. By the 1930s, authorities in the British settler states of East and Southern Africa were seriously concerned about the negative effects of declining environments in African "reserve" areas on colonial interests in perpetuating segregation and controlling African migrant labor. Like their contemporaries in Africa, U.S. officials worried about the regional impact of ecological decline in Navajo and other reservation lands during this period, particularly as eroding soils were silting up rivers and affecting the supply of water available to the burgeoning populations of the Southwest.

This paper brings together these two traditionally segregated historical spheres to explore the transnational dialogues that developed among these growing networks of developmental "experts." Although a few historians have begun to examine connections between Africa and the United States in the "Dust Bowl" era, they have generally limited their gaze to the flow of conservation science and techniques. Yet left unexamined are the important questions of how and to what extent officials also transferred knowledge and "expertise" in managing indigenous "reserve" populations and their ecologies. As part of their broader tours of American methods of soil conservation and range management during this period, several British colonial authorities from various African territories (such as Kenya, Uganda, South Africa, and Lesotho) visited the Navajo and other southwestern reservations "showcased" by American Bureau of Indian Affairs and Department of Agriculture administrators. In their personal correspondence and formal reports, these officials often drew explicit parallels between the challenges of restructuring indigenous people's environmental practices in North America and the African continent. Exploring these transnational networks and conversations can thus contribute unique insights into both American and African historiographies while also enhancing our wider understanding of the transatlantic growth of Western "development"-thinking and intervention in the mid-20th century.

594 **Radioactive Reindeer in Sweden and Russia**

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The proposed paper examines the standards of food safety imposed by the Swedish-owned and operated reindeer meat processing co-op 'Tundra' in the Kola Peninsula of northern Russia. Standards of safety and hygiene at the Tundra slaughterhouse are informed not just by neoliberal capitalist regimes of international trade, but also by the Chernobyl disaster of 1986, which contaminated Sweden's tundra landscapes with radioactive isotopes and, consequently, negatively affected Sweden's reindeer economies. The Chernobyl disaster engendered a collapse in demand for reindeer meat during the late 1980s and early 1990s, but the Swedish market for reindeer meat has recently recovered. Because of lingering concerns about contamination as well as legally imposed agricultural subsidy schemes, it is now more profitable for Swedish reindeer producers to import their product from Russia in order to meet demand. As a result, formerly Soviet reindeer herders and factory managers at the Russian 'Tundra' co-op face an unusually strict series of procedures in order to get their product to pass Swedish inspection standards. This paper explores the social, economic and environmental impacts of the Swedish decision to outsource an economy that had been held in monopoly by Sweden's Saami ethnic minority.

599 **The Rise, Development, and Influence of the Environmental NGOs in China**

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For Chinese people, environmental NGOs have been a novel phenomenon, which did not emerge until the 1990s. There were two important events which directly promoted the rise of NGOs in China along with the increasing environmental challenges. One was the Rio' Summit in 1992; and experts thought that "China's environmental NGOs sprang up in 1992, following the inception of the United Nations Conference on Environment and Development and the enactment of China's Agenda 21." So two years later in 1994, the first formal Chinese environmental NGO, the Friends of Nature, was founded. Another event was the "World Conference on Women" held in Beijing, 1995, and during the Conference the "NGO Forum" made a big stirs. Just half a year later in 1996, two more grass-roots environmental NGOs, Global Village of Beijing, and Volunteer of Green Earth, also appeared.
In more than a decade since the founding of the Friends of Nature, environmental NGOs in China have evolved radically. On the one hand, the number of environmental NGOs and the staff working for them have grown rapidly. According to the Blue Book, The Development Situation Report on China's Civil Environmental Organisations, China's environmental NGOs are an "indispensable force" that is likely to grow by 10-15 percent annually. On the other hand, the variety and scale of activities of these organizations have also expanded dramatically. Initially focusing on issues considered to be politically safe, like environmental education, and biodiversity protection, the goals of their activities now involves not only the protection of environment, but also of the reform of the Chinese system of governance, according to the analysis of Elizabeth Economy.
Actually China's environmental NGOs have had a broad impact on enhancing the public environmental awareness and monitoring policy making. In early 2005, China State Environmental Protection Administration raised the "environmental assessment storm" by promptly ceasing 30 projects which violated environmental regulations, and announced the start of a long march to establish a harmonious society. Behind the storm there were Chinese environmental NGOs who had spent a decade shaping the fundamental change in Chinese social development. Nowadays these environmental NGOs attract diverse groups of people. They attempt to promote a new, greener vision of nature within the nation's political, economic, social and cultural life.

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600 **On the sustainability of the Mediterranean agro-ecosystems in Catalonia: land-use, fertilizing methods and nutrient balances from mid-19th century to the present**

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Organic agrarian systems of the past faced several sustainability problems when approaching relatively-high population densities and intensifying their market specialization. These problems were directly or indirectly related to the conservation of soil fertility, a renewable but exhaustible resource. One of the most difficult problems seems to have been how to compensate for the nutrients extracted by increasingly intensive cropping systems. Whether the available fertilizing methods balanced out this increased extraction, or an unsustainable process of soil mining developed until the arrival of chemical fertilizers, becomes a key question for environmental history.

Mediterranean pastures were poorer and more scarce than in Atlantic regions, and therefore supported fewer livestock and provided less manure. Some specific strategies were developed in order to find alternative fertilizing materials, such as the ashes obtained through a practice known as "hormigueros" in northeast Spain: burning piles of woody material, from forests, brushland, or agricultural crops, covered by a layer of humid soil. We have reproduced a field experimental "hormiguero" and analysed the changes in the materials burned in it, in order to be able to quantify the whole nutrient balance in a mid-19th century Catalan municipality. These materials mainly balanced the shortage of potassium produced as a result of the vineyard specialization developed in the province of Barcelona. Vines had helped, however, to reduce the agricultural demand for the scarce nitrogen offered by leguminous crops and livestock manure, together with other human, domestic and urban wastes or sewages.

These fertilizing methods were very labour-intensive, and required a critical amount of uncultivated land. They might have allowed to attain an almost sustainable nutrient balance up to the mid-19th century, but could not offer any more room for additional cultivated land or further intensification. Until the First World War the environmental pressures upon land were increased by population growth, integration of world agrarian markets, and the on-going industrialization in Catalonia. These pressures disrupted the precarious equilibrium between nutrient extraction and available fertilizers. Use of chemical fertilizers started to spread during the first third of the 20th century, but in small amounts and only as a complement to organic sources. It was not until the second half of the 20th century that they utterly substituted for the leguminous crops and manure, disrupting the integrated land-use management of the whole agro-ecosystem.

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601 **Colonial and Postcolonial Land Use Regimes and Landscape Change in the Pare Mountains, Northeastern Tanzania**

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Forest policy in Tanzania, like elsewhere, has undergone major shifts in recent years: from a broadly resource based approach to one focused on biodiversity conservation, and from centrally controlled state management to community participation. The overall aim of these shifts has been to prevent further forest degradation and deforestation, and to ensure greater equity in forest resource control. However, in order to design effective and fair conservation policies today, it is necessary to understand the historic legacy and dynamics of previous land use regimes, which have the landscape and land use practices of today.

Based on archival and ethnographic fieldwork to be conducted in summer 2008 in the Pare Mountains, this paper complements the other papers proposed for this panel (concerned with longer term landscape changes) by focusing on land use regimes of the colonial and postcolonial period. These include various agricultural and forestry initiatives – large and small scale cash crop production; forest reservation; tree planting; commercial timber extraction; changing land systems of land control – which made very different demands on local people, and were sometimes at odds with each other. Moreover, in the course of the German and British colonial period, the Ujamaa period after independence and, most recently, structural adjustment and liberalisation, changing regimes added different layers of policy directives, which have all left different legacies and have all contributed to shaping the landscape of today. The land use practices and environmental values of people living in the Pare Mountains, too, are not 'traditional', but the product of this complex history. At the same time, current forest

policies themselves are still very much shaped by previous approaches, and in many ways have changed only superficially. This paper seeks to unravel these different historical legacies, in order to properly understand current dynamics of landscape change, and to help design appropriate conservation policies.

602 **Preserving Nature's Gifts: Gender, Sugar and Modernity in Sweden 1900-1940**

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In Sweden as in many other northern European countries, the early 20th century was a period of intense urbanization. Hundreds of thousands migrated to the cities, joining the ranks of the fast-growing working class. But living conditions were in many cases poor, and public investigations showed that malnutrition was a problem in several urban areas. The rising influence of the labour movement also increased the importance of this issue.
One of the reactions was to call for education in domestic science and home economics. The argument was that urbanization meant that young people who moved to the cities lost the traditional knowledge of using the products of the land in a healthy and economical way. The consequence, it was argued, was that this ignorance by the working class housewives led to poverty and malnutrition. In the first decades of the 20th century, domestic science was established as a subject in Swedish schools.
This shaped the image of the modern Swedish housewife. In the 19th century, the focus was on serving the husband and organizing the household, but this changed gradually in the beginning of the 20th century. Now, other skills were emphasized. A competent, modern housewife made use of "nature's gifts", berries, fruits and vegetables through home preservation. Previously, this had been a luxury, but cheap sugar made it possible even for working class households. This became an important part of home economics.
The Swedish sugar industry did not hesitate to join this discourse. From the early 1930s SSA began to publish booklets with recipes that was distributed for free, as well as a inexpensive book called Home preservation (Hemkonservering), which between 1935 and 1937 sold 230 000 copies. But SSA also wanted to reach the housewives-to-be, and from 1934 a booklet called Sugar – our most inexpensive food was distributed in secondary schools.
In this presentation, I want to show how the image and the use of nature and natural products for consumption was gendered during the first decades of the 20th century by actors from the food industry as well as politicians. "The girls, the future housewives, should maybe first learn to understand the many advantages and uses of sugar...For the boys, there are also many good advice...on how to restore powers that have been exhausted during games or serious work."

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603 **A Cultural Crisis. Negotiating Waldsterben in the political arena of West Germany in the 1980s.**

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The paper addresses the political debate on forest dieback in West-Germany in the 1980s. This example shows how a complex scientific subject became a matter of public and political interest, being perceived as an urgent environmental problem. In the West-German society, there was a broad consensus that measures should be taken immediately to avoid an immeasurable environmental disaster. The forest expert's uncertainty about the reasons of the forest's malady became an essential political problem in this situation. The story of the "Waldsterben" indicates that scientific knowledge has achieved an important place in the West-German society and for politics. The paper asks how scientists, politicians, civil agents, and an interested public interacted in this situation to save the forest; which role the scientific knowledge played in this interaction, how it was transferred to a broader public; and especially, how different agents dealt with the problem of scientific uncertainty in a situation of perceived high risk.

604 **Representations and recriminations of a landscape: An environmental history of the Oak Ridges Moraine, Toronto, Ontario, Canada**

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Landscapes never are, they become, or they are constructed or produced by people as co-actors with geological and bio-physical processes. Gold and Revill (2000, 15) think of landscapes "as being compromised, partial, contested and only provisionally stable as modes of ordering the world and our engagement with it."
Landscapes change as people manipulate them and form different mental maps about them. Moreover, as Whatmore (1996, 26) suggests, non-human nature is a co-constituent in shaping landscapes, where nature's agency is a "relational achievement" or defeat, involving the creative presence of organic or inorganic beings, technologies and discursive codes. This paper explores the representations and recriminations of the Oak Ridges Moraine, an interlobate moraine formed approximately ten thousand years ago, that forms a 160 km long and on average 12 km wide greenbelt in the northern exurbs and suburbs of the Greater Toronto Area, Canada's largest metropolitan region.
The Oak Ridges Moraine has been represented as First Nations' home, archaelogical site, logging and farming frontier, geological formation, forest regeneration and watershed protection initiative, recreational haven,

development arena, aggregate source, class enclave, and ecological preserve. In the present, such representations compete and sometimes complement and support each other, showing that representations of the Moraine have not been determined only environmentally (that is, by its physical attributes) and locationally (for example, through its closeness to the Greater Toronto Area), but also socially and historically by various interest groups pursuing, protecting, and rationalizing specific functions or goals. These diverse representations continue to bathe the current fashionable images of the Moraine in their illumination. One working hypothesis suggests that the changing values of elite members of society are particularly important in colouring the images of the nature/culture hybridities of any landscape feature. In most western industrialized countries, the exurban countryside is becoming increasingly gentrified, aesthetic and environmental resources are prioritized, and these developments are putting pressure on older local residents connected to and involved with extractive landscapes. Environmental conservation is here part of a larger social dynamic where there is a competition, friction and contradiction between old and new activities and ideologies. It is concluded that the Moraine, though perceived as homogenous, is as fractured and diverse socially, politically, and perceptually, as it is geologically and ecologically.

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605 **Consuming the Wild: German Nature Tourism and Myth of the Pristine in East Africa**

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This paper explores the development of wildlife tourism and national parks in Tanganyika/Tanzania in the 1950s-70s as a case study in the neo-colonial tendencies of German nature tourism in East Africa. At the center my analysis and critique is Frankfurt zoo director Bernhard Grzimek, whose documentary films, books, and television program galvanized West German conservationist sentiment in the late 1950s and 1960s. Grzimek skillfully portrayed the rapid decline of zebra, lions, and wildebeest in the Serengeti as an issue for Western statesmen and actively promoted tourism as a way to save the animals from extinction. I argue that Grzimek's anxieties about the effect of decolonization on African wildlife and the need to develop a tourist infrastructure for West German and other European visitors showed strong discursive and institutional continuities with the revanchist "myth of the good German colonizer" of the interwar era. In this view, Germans' special affinity for wildlife and the good of nature made them ideal intermediaries in conservation affairs and uniquely situated to appreciate the spectacle of animal migrations on the Serengeti plain. Grzimek convinced Julius Nyerere that his newly independent country could earn far more money from recreational tourists than trophy hunters, and used his media image to develop the Serengeti national parks as a place to observe large mammals in a "pristine" environment.

Grzimek's national park ideal was infused with Euro-centric assumptions about leisure, nature, and "primitive" Africans that privileged sedentary agrarian life over pastoralism. Indeed, his vision of the Serengeti as a relic of a bygone natural-historical era, much like the Acropolis was a fragment of ancient civilization, appealed to a Western, male, bourgeois model of nature consumption that left little room for indigenous peoples, whose hunting and grazing practices were deemed antithetical to tourists' wilderness experience. The result was the alienation of Maasai peoples from the park's boundaries; a wilderness was imposed, rather than protected, for the pleasure of Europeans seeking a prelapsarian vision of nature. And despite its call to keep tourist money in local hands, present-day German ecotourism operators in East Africa have failed to "decolonize" their vision of nature by addressing the historical legacy of imperialist conservation and postcolonial struggles over land rights. This failure has left the nature park movement open to charges of ignoring human need in favor of a fetishized nature devoid of cultural presence.

606 **Landscape change, social change: Market-driven dynamics and glocalized landscapes in pre- to post-colonial Sri Lanka**

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Landscapes are not just palimpsests, they are also hybrids, transformed in a more profound sense than the notion of "cumulative change" might imply. Plantation landscapes in the tropics can be understood as "glocalized" (Khondker 2004) in the sense that the establishment of an alien production system always must take local conditions into consideration, and vice versa, in order to be operational. In this respect, landscape transformations resemble technology transfer (cf. Ravesteijn 2007). Individual agency is one of several crucial factors to be considered in this process, as both external and local agents have to adapt to unanticipated contingencies when pursuing their respective agendas. In a colonial context, the empire can be understood as a framework of constraints and opportunities. Whether the transforming agents are external or local is not given, but rather an empirical problem to investigate in each case (cf. Meyer 1992). Moreover, the agents themselves become transformed, or "glocalized". As individuals and as groups they can only be understood within a globalizing and glocalizing framework. The transformations of the colonial landscape are intimately linked to the social transformations in the colony. However, cash-crop production per se cannot be regarded as an entirely colonial innovation. The pre-colonial world market had already triggered societal and landscape transformations. This paper draws on an investigation of Sri Lanka's various plantation landscapes, attempting to elucidate these dynamics by utilizing historical, artefactual, and palaeo-ecological data, channelled through the nexus of an

historical archaeological perspective. A central concern of this project is the pre-colonial landscape that was eclipsed by the establishment of colonial plantations. The planters were especially prone to colonize chena lands, i.e. areas devoted to shifting or swidden cultivation (Gelbert 1988). The colonial transformations investigated in the project also comprise infrastructure and the built environment.

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609 **All the Empire's Whales: Scientists, Bureaucrats, and the Construction of an Antarctic Marine Environment, 1913-1939**

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Based on extensive research in British archives, this paper concerns activities between around 1913 and 1939 in the Falkland Islands Dependencies (later the British Antarctic Territory). It argues that in this period, patterns of British exploration in the marine and continental areas of the Dependencies reflected different state priorities. The former possessed a burgeoning whaling industry while the latter remained a frontier whose value to the state lay mostly in prestige, a commodity with limited value once the South Pole was attained in 1912. Consequently, the British government funded a series of research expeditions to Dependencies waters from 1913 while providing little money to ventures aimed at the Antarctic continent.
Most of this work was conducted by the Discovery Investigations, organized by an interdepartmental government committee and funded by whale oil excise. The Investigations, which have received scant historical attention, constructed the Dependencies' marine environment through studies of both the whales themselves and the ocean in which they lived. The result was a picture of a marine environment centered upon a specific economic resource and clearly labeled as goal-directed research. While providing reinforcement through the authority of science, the Investigations did not significantly alter government whaling regulations. Their greatest impact lay in symbolically affirming the value of science to enlightened commercial policy-making.
The Investigations continued up to (and beyond) 1939 for two reasons. Firstly, members successfully linked basic oceanographic research to rational resource management; secondly, the fact of organized activity in Antarctic areas possessed growing value as a demonstration of sovereignty. During this time the absence of a commercial driver like whaling meant little British activity on the continental part of the Dependencies. The waters constituted a legitimate site for scientific research aimed at rational control of a colonial environment; the continent remained a theatre for heroic deeds. This did not change until the 1940s when sovereignty became sufficiently important in its own right to justify permanent bases, charged with demonstrating possession while scientifically describing and commercially assessing Britain's territories.
The paper concludes by supporting recent moves to foreground the role of colonialism in environmental history and the history of environmental sciences (1), as well as advocating greater emphasis on resource management as a paradigm for understanding environments. Finally, it asks whether the Antarctic continent's commercial sterility was as important as its cultural barrenness to the history of human conceptions of its unique environment.(2)

1 e.g. P. Anker (2001), 'Imperial Ecology: Environmental Order in the British Empire, 1895-1945', Cambridge MA: Harvard University Press.
2 e.g. S. Pyne (1987), 'The Ice: A Journey to Antarctica', Iowa City: Iowa University Press.

613 **Antecedents of Amber Waves of Grain**

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North America is sometimes thought of as the "Bread Basket of the World." Although that label had merit in the 20th century, it was preceded by very different conditions. The prior agricultural landscape of North America is envisaged in this paper as a dynamic mosaic or a kaleidoscope. Variations in natural environments from place to place established conditions that confronted farmers with different technologies, needs, and cultures. Canal irrigation in the arid Southwest was paramount ca. AD 1000. By 1500 agriculture was widespread throughout the Eastern Woodlands. In 1800, agriculture was limited to east of the Appalachian Mountains, but beginning its inevitable spread westward. Unlike pre-European settlement times, it was also commercially-based.

614 **The US international forestry program and the scientific cultures of the British Overseas Forest Service, 1940-1970**

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The years immediately following the Second World War witnessed the rapid expansion in the recruitment of scientific personnel within the British Overseas Forest Service as scientific expertise assumed a more central role within imperial planning. This so-called 'technocratic turn' in British policy (Clarke 2007) was also accompanied by the proliferation in the use of technical assistance from outside the formal structures of the

Service. This paper examines the role of the postwar bilateral assistance provided by the US Government's international forestry program in shaping the work of late colonial foresters. Administered under a succession of government agencies, US forestry personnel - frequently on secondment from the US Forest Service - worked on a series of consultancies and research projects in the British crown colonies. In addition, this paper highlights the reconfiguration of professional forestry networks facilitated by this increasing involvement of US foresters in international forestry. Drawing on recent trends in imperial historiography that have emphasised the role of informal networks of personnel connection in the production and dissemination of scientific knowledge, it examines parallel professional efforts by foresters to foster the voluntary exchange of technical assistance through conferences and professional associations such as the International Society of Tropical Foresters. These findings are used to help explicate the role of the US international forestry program in mediating the process of British decolonization and the knowledge cultures of the British Overseas Forest Service.

615 **Unsustainable Property Rights on Aboriginal Reserves on the Canadian Prairies, 1870 to 1910**

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This paper analyses the complex property rights problems faced by aboriginals on the Canadian Prairies as they were forced onto reserves in the late nineteenth century. The principal issues were over land, though the aboriginals also faced problems with other inputs to their farming, and with the harsh Prairie climate.

With the demise of the bison hunt, the aboriginals were corralled by a series of treaties onto small reserves. Aboriginal society had always worked on a communal basis, particularly during the bison hunt. If they were to succeed at farming they had to compete efficiently, which involved working in small units, using modern equipment. Some form of subdivision of the land was therefore needed. However each reserve was held in trust by the Department of Indian Affairs, so there was no legal means by which it could be subdivided.

The Department of Indian Affairs realized that if the reserves could be divided into smaller units for individual farms, substantial areas of land would be left over, that could be claimed as excess, and sold off to 'real farmers.' With no legal foundation, then, the Department 'allocated' small parcels to individual families, and subsequently sold off large areas of 'surplus' land.

To the aboriginals, land was an integral part of their existence, and separating them from it destroyed a vital part of their heritage and broke up the integrity of the tribal unit. The structure of property rights in land on the reserves was complicated, informal, and under constant threat. In many cases the only successful aboriginals were those who moved off the reserves, even though that meant the loss of society and tradition. This achieved the goal of assimilation. Subdivision and the loss of their land was a major factor in the breakup of aboriginal culture that still plagues their society today.

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620 **Archaeogeography of planimetric dynamics in Western France (Vendée)**

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Since the end of the 1990s, and thanks to G. Chouquer's theoretical work , archeogeography has deeply changed planimetric studies (rural and urban). Archaeogeography deals with the notion of space and its dynamics in past societies. Its aim is to contribute to the reconstruction of the periodized history of geographical shapes and to a better knowledge of long-lasting dynamics which build the memory (or heritage). We try then to understand how geographic space is turned into an ecumene by societies (this latter concept was formalized by geographer A. Berque, meaning a land being inhabited, used, developed, farmed, etc.).
To exemplify this point, I would like to present my current thesis's work, on morphological heritage's transmission and formation within an original area covering 800 km² in Southern Vendée, France's west county. Research on landscape and palaeoenvironment in West France usually deals with the "bocage" (hedged farmland). This concept was created by geographers at the beginning of the 20th century, and refers to a plot of farmland enclosed by hedges and trees. A critical rereading shows that this concept is in contradiction with historians' and archaeologists' present results. They have indeed often proved how recent the enclosure was (at the end of the Middle Ages at the earliest). Therefore, agrarian history of Western France cannot be reduced to the sole "embocagement" (to hedge). Still, the "bocage" concept keeps prevailing and hides other ideas; its own

history goes like an overridden paradigm for this area. My diachronic study did not fit into this strict and oversized framework. Moreover, my research area is straddling two landscapes: enclosures on the one hand, open field plains on the other (alongside the old Bay of Pictons, today the Poitou's marsh), then I could not lock myself in this scientific pattern, leaving aside a great part of my work. So, I chose to emphasize the dynamics and the resilience of roads' and parcels' shapes, beyond landform and beyond one and only period. The issue here is to renew the question of landscapes studies in Western France in a different way: it has to transcend the hotchpotch concept of "bocage" and to highlight the fact that archaeogeography has to reveal the planimetric treasures of these areas, so often neglected compared to open field spaces.

622 **Environmental History and the History of Early Insurances Against Natural Hazards (17th/18th century)**

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Today insurance and re-insurance companies are important actors in calculating, analyzing and managing natural hazard damages. The environmental history and sociology of contemporary natural hazards and catastrophes would never exclude to study the way in which private and state insurances perceive 'nature' as a 'risk', how they interact with other institutions that try to minimize natural risks, that try to prevent damages or to cope with catastrophes that have happened.
It is thus surprising that until now the growing field of the study of premodern natural hazard perception and management within environmental history has largely neglected the development of insurance history. Insurance history has remained in the hands of economic historians or of historians of the welfare-state (e.g. François Ewald). One of the results of this neglection has been, for example, that the roots of the very notion of 'natural hazard', one of the key terms of environmental history, has been overlooked: it goes back to the language of 15th century insurance lawyers. My hypothesis is that the study of insurance history helps to refine periodizations within the framework of an environmental history, sometimes too quick in overarching local, regional and epoch-related differences in approaching a 'planetary' sum: while the difference between premodern and modern schemes of 'seeing nature like a state' (James C. Scott) in European and non-European regions is sometimes not easy to trace, the development of insurance institutions gives a more subtle difference between premodern and modern ways of regarding nature at hand.
The paper will rely on two kinds of sources, first on the corpus of some 80 to 100 17th- and 18th-century German projects and tracts on insurance, especially fire insurance, second on Prussian and Hamburg archival sources of the first cameralist fire insurance institutions (starting in 1676) which help to correlate theory and institutional practice. The English development is looked at in comparison. The first insurance projects of the 17th century remained unpublished, from 1750 onwards more and more at first small texts circulated in enlightenment periodicals such as 'physical-economical' or explicitely cameralist magazines; from 1780 on separate and more specialized books on the subject were printed, now linking insurance projects with wider reflections on society and state.
I will explore these sources by asking four questions: a) how are 'insurances' contextualized in the broader field of enlightenment handlings of nature? b) how is the crucial difference between nature and culture traced in these sources (a question not easy in the case of fire insurances) c) which developments in ciphering and calculating nature can be detected? d) how can we compare premodern natural hazard insurances to modern ones?

623 **Knowledge, Power, and Matter: a Global Perspective on Colonial Forestry in German East Africa, 1885-1918**

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During the second half of the 19th century, colonial powers tried to establish direct state control over the world's woodland resources in the tropics. Their goal was the exploitation of valuable timber species and other useful industrial products. Therefore, a new science was developed: colonial forestry.
My project explores in a dialectical way the imperial history of this new science and its concepts at the case of the German colony East Africa. On account of this, in bringing together the history of science, transnational history and environmental history, it is necessary to analytically classify the ideal concept of state forestry derived from Europe and its application in hitherto nearly unknown ecological and social colonial spaces. In discourses colonial forestry was intended to serve against so called overuse or abuse of forest resources, though its implementation has caused questions about its legitimacy as well as social resistance because indigenous and private interests were excluded from forest usage. Furthermore, unintended secondary effects like the co-evolution of weeds and pests appeared through material transfers of plants and seeds. These problems were discussed by colonial foresters acting in a global network which went beyond the boundaries of national empires, therefore even generating forms of cross-boarder ecosystem management - the locus classicus of transnational environmental history. With regard to this, my project tries to develop a global analytical framework through which effects and difficulties of colonial forestry in East Africa could be explained. Therefore, I focus on the production and changes in colonial forestry knowledge systems which took part through transnational cultural transfers of knowledge and technology.
Though, co-operation on the transnational level was crucial for colonial forestry, its implementation would not have been possible without collaboration on the local level. Hence, my study develops a complex framework of conflict and co-operation transcending common metaphors like centre and periphery by analyzing discourses of colonial forest policy and values behind different interests. At last, by focusing on hybrid forms of colonial forestry the objective is to show how local relations of people to the forest have effected transnational exchanges and vice versa.

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624 **Trees & Forests**

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For 20 years the percentage of trees has been used as a database for analysing landscape management. The concepts of forest and agriculture tend to be overly focused with polarity. This simplistic botanic approach lacks nuance and does not correspond to the understanding of the far more complex surroundings we distinguish through archaeo-geography, structures and remains. The open landscape, with its human habitations and the road network, is the environmental vector of the territorial layout.

Therefore, the renewal and variety of environmental sciences show a multitude of habitats which were all useful and farmed. In this rural economy, trees were sparse and scattered or grouped in woods, and there were omnipresent. Forest is another specific and juridic big and massive trees'population. This dispersed trees have still to be scientifically quantified and estimated to get a statued and conclusive data.

A rereading of botanic assemblages and better understanding of the archaeological structure modify and target new research. Recent means of sampling, pond studies, analytic study of ditches, distribution of windfall-treeholes are some of the new way of ascertaining the presence and type of trees in ancient landscapes.

Some of the first observations from recent archaeological excavations in Ile-de-France, will be discussed with their methods and results.

625 **Environmental risks and cultural knowledge in Burgundian agriculture**

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The progressive modernization and transformation of agriculture in Burgundy, France includes the mechanization of labor, the intensification of agricultural productivity, and an aging farm demographic. Cultural knowledge about agriculture has also been significantly modified during the last half-century, with a proliferation of training and certification programs for farmers, evolving and often complex environmental guidelines elaborated at the national and European Union levels, an increase in number of part-time farm workers, and the progressive reduction in number of small-scale, family-owned farms. During this same period, amplified fluctuations in climate and weather have arguably accentuated the risks exposure of farmers who have specialized and intensified their production processes. The cumulative and profound transformations of Burgundian agriculture have substantially altered the cultural knowledge and diverse strategies that farmers deploy to mitigate and successfully navigate these various environmental risks.
In this paper, we examine the range of farmers' perceptions about environmental risks, the cultural knowledge that they mobilize to address these, and the role that inter-generational transmission of this cultural knowledge plays in agricultural success. We report here on a longitudinal study of farming households within a network of small rural communities in southern Burgundy, France. Ethnographic interviews with Charolaise cattle farmers were conducted prior to, during, and immediately following the drought and heat wave of July-August 2003, which was one of the worst natural disasters in the nation over the past fifty years. This calamity provided the impetus to examine the means, both material and in terms of cultural knowledge, that farmers had at their disposal to deal with the risks that this arduous situation presented for each of them.
In this research, we pay particular attention to the role that knowledge and memory of previous environmental risks play in the repertoire of farmers' disaster mitigation practices. During our interviews, we focused on the strategies of those farmers who purely followed the directions provided by agricultural specialists from the Department's Agricultural Chamber and the guidelines of various French Ministries, and contrasted these with the strategies of farmers who supplemented this information with cultural knowledge about environmental risks transmitted from their parents and grandparents. The objective was to ascertain the various decisions and actions that constituted the range of farmers' responses to the crisis, including short- and intermediate-term water-management strategies. Our research results notably highlight the creation of small ponds on individual farms after 2003 which are in fact reconstructions of previously-existing ponds. Based on our analysis, the prevalence of these historic ponds peaked in the 18th-century, and then were gradually phased out or abandoned over the next two centuries. Thus, the reappearance of these ponds over the past four years mark a development suggests that inter-generational transmission of local knowledge also offers meaningful solutions to environmental crises.

645 **The future is not what it used to be: reconciling historical narratives of African environments with climate change projections**

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Most future climate change projections for Africa suggest an increase in temperature of between 2-6 °C and a decrease in rainfall particular in the drier northern and southern African subtropical regions (Christensen & Hewitson, 2007). The implications of such climate changes for the ecology and agriculture of the continent and for human society in general have been investigated (Fischlin et al., 2007). Predictions are generally gloomy and areas that are considered most vulnerable to future climate change have been mapped in an attempt to mitigate their impacts and to plan for the future (Thornton et al., 2006).

In contrast, historical narratives of Africa's recent past (i.e. the 19th and 20th centuries) find little evidence for wide scale decline in the continent's environments (e.g. Leach & Mearns, 1996; Nyssen et al., 2007). From a reassessment of deforestation in West Africa and soil erosion in Kenya and Ethiopia to bush encroachment and grazing impact studies in southern Africa there is little evidence to support a widely held view of environmental degradation in Africa. Most historical narratives suggest a wide-spread increase in vegetation cover, a decrease in erosion and a general improvement in environmental stewardship. Considerable emphasis in these accounts is placed on a reinterpretation of colonial perceptions of land degradation and management.

This paper investigates the apparent paradox between the generally optimistic findings of African environmental historians about the past and the gloomy predictions of climate change researchers about the future. It first develops a typology of environmental history studies in Africa including their geographic and thematic focus. Next it highlights their key findings in the context of the climate change literature. Finally, the paper explores the main contributions that environmental history can make to the climate change debate. Primarily this is to establish the reasons for and the extent and rate of environmental change so that future changes can be more appropriately evaluated.

646 **The great rockslide on the Moenchsberg (City of Salzburg, Austria) in 1669**

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The great rockslide on the Moenchsberg (City of Salzburg, Austria) in 1669
This study of the great rockslide on the Moenchsberg and its circumstances is presented from a cultural-historical point of view and describes how the residents initially perceived the calamity, how they interpreted it, and later how they managed to overcome it.

The rockslide took place on the 16th of July 1669 between 2 and 3 a.m. A wall of rocks fell on houses which were built adjacent to the mountain. Fortunately, most of the people were sleeping when the disaster happened. Neighbours tried to help, but were thwarted—and actually buried—by another rockslide that compounded the tragedy.

The church of Saint Mark, a chapel, the Roman Catholic seminary, and 13 houses were destroyed. There were more than 220 victims. This number was determined by a thorough analysis of the death records from the years around 1669. Another result of this research was the determination of the duration of an epidemic plague that lasted in Salzburg from autumn 1675 to spring 1677.

Immediately following the rockslide, people started to clear the streets from the debris and help the injured. The dead were buried in the nearby cemeteries. The interpretation of the rockslide was clearly influenced by baroque Catholic beliefs during the Counter-Reformation. Written accounts of the catastrophe (among them written sources from priests and monks) referred to God when they tried to interpret the cause of the event. Some felt God was angry because of their sins while others were glad and thanked God that they were still alive.
In addition to the written sources are pictures and drawings of the rockslide, although only five such pictorial representations could be found. It appears that an etching by Matthaeus Merian was used as a template. People tried to overcome the catastrophe by rebuilding the town, and by drawing and writing about the calamity. Within the next centuries, the rocks of the Moenchsberg were regularly controlled by the so-called "Bergputzer" ("mountain cleaners").

Finally, the great rockslide on the Moenchsberg was compared with the rockslide of Plurs (Switzerland) in a broadsheet. This rockslide took place on the 25th of August 1618. Both Salzburg and Plurs were trading towns that developed comparable perceptions, interpretations and management strategies to overcome these natural disasters.

648 **Historical climate change in southern Africa as inferred from the population dynamics of Aloe dichotoma, a long-lived desert succulent tree**

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We investigate the population dynamics of a widely distributed (from ~21ºS to 31ºS) and long lived (+200yrs) southern African succulent tree species, Aloe dichotoma, to explore historical climate change in the region. Abnormally high mortality and low recruitment rates in northern populations have been interpreted as a southward 'shift' in the range of A. dichotoma and have been posited as a 'fingerprint' of recent anthropogenic climate change (Foden et al, 2007). Our study investigated the possibility that the present day distribution has instead been the result of natural climatic fluctuation over significantly longer periods of time.

We conducted both a rapid and a detailed survey across the species' range to map the density, age class structure and occurrence of populations on different aspects. These data were correlated with key environmental variables. We also explored growth rates, recruitment dynamics and mortality patterns in key populations spanning the full distribution.

Three key findings were made: 1) A. dichotoma densities varied by up to four orders of magnitude across its distribution, which was characterised by large areas of complete absence; small areas of extremely high density; and large areas of very low density. 2) At the southern end of its distribution, population age class structure was skewed toward juveniles and young adults, while the middle of its latitudinal range was typified by a more variable age class structure, with populations in drier areas becoming locally extinct. Age classes of northern populations were heavily skewed towards senescent and dead individuals, with little new recruitment. 3) Individuals in the south preferred relatively warmer northern and western aspects, while southern aspects were favoured in the north for the opposite reason. No clear pattern existed in the central parts of the distribution.

Present day distribution and density patterns suggest that A. dichotoma was more widespread and evenly distributed in the past. This could be ascribed to cooler conditions at the time of the last glacial maximum (~32-17ka) when the winter rainfall zone (WRZ) was expanded over southern Africa (Chase & Meadows, 2007). Subsequent contraction of the WRZ has led to a more contracted distribution and more isolated populations. The hotter, drier northern end of the distribution has been most affected by gradually changing climate, as rainfall events sufficient to trigger recruitment episodes and maintain growth have become increasingly infrequent.

Current species level distribution and densities suggest that the patterns we are observing are not necessarily the impacts of recent anthropogenic climate change but reflect instead the 'ghost of climate past'.

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650 **"Weather Central": Antarctic Science, Globalism, and Climate**

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Antarctic weather data collection during the International Geophysical Year (1957-59) instigated a continuous sphere of data exchange from Pole to Pole, and thereby created the first global meteorological model of climate circulation. Integral to the process of gathering data was the role of weather stations, and in particular the centralisation of systematic synoptic weather and atmospheric observations at the United States Antarctica Weather Central. In contrast to the earlier iterations of weather observations, most notably those meteorological experiments performed by Admiral Evelyn Byrd at the Antarctic base, Little America, Weather Central rationalised the production, synchronisation and distribution of weather data (Fogg, 1992, 303). Weather Central provided the first daily Antarctic weather maps and was responsible for handling weather information for the South Pole area and distributing it to all nations to allow planning of scientific operations (Kaplan, 1956, 5). Importantly, when these weather maps were consolidated with world-wide maps, scientists could study the effects of Antarctica's cold air mass on atmospheric circulation both north and south of the equator.

The authors will argue that the establishment of a networked Antarctic weather system during the IGY integrated the poles into an infrastructural globalism that came to define the configuration of climate change today. The environmental history of polar warming, long-term climate change, glacial retreat and ozone monitoring, now understood as the most global of phenomena, find their first expressions in the research agendas of the IGY. Research questions to be tested through long-term weather observations during the IGY included the prediction that in 50 years time Arctic waters may become navigable in the summer time and that world-wide warming was greatly effected by polar warming. The legacy of this weather work during the IGY was to provide baseline data for the contemporary scientific-environmental phenomena of climate change, ozone depletion and albedo. Antarctic weather was not only important to the production of globalism through the enclosure of earth with Pole to Pole weather stations, but the Poles were considered, "Home of the World's Weather" (Ewing, 1957, 407), and thus, central to the production and regulation of global climates.
While, it has been argued that it was the view from space—the Apollo photographs—that finally integrated Antarctica into global systems (Cosgrove 1994), it was the garnering of these weather "facts on the ground" (and in the air) that allowed the construction of climate as a globalized system of data exchange. While the

space photographs may well have provided the geographic imaginary of Antarctica as interdependent to global systems, arguably, data gathering at weather stations had a much greater influence in securing the Antarctic environment as crucial to earth systems and global models.

651 **The Nation in "European" environmental history**

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This brief presentation for introducing our Roundtable outlines the persistent issue of NATION within environmental history. By discussing the challenges, limits, and opportunities of a nation-scale approach to understanding Europe's past, we expect to touch on several of the major historiographical issues confronting historians of the European environment. We believe that choosing a particular scale can be instrumental in constructing a "scientific" environmental narrative. Europe is an ideal arena for discussing the limits and challenges of national environmental histories, with its long history of both national memory and local identities, and with a recent quest for a collective character.

655 **Considering Europe Whole**

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Pre-World War II environmental history of Europe can most meaningfully be studied only as a part of a global environmental context, in my view. Internally diverse, it cannot stand alone as a unit of analysis, although a case can be made for regional studies within Europe. However, ever since the Neolithic Europe has been in the business of exporting and importing crops, domestic animals, diseases and other life forms, as well as technological systems for managing and using resources. We need only think of the Arab Agricultural Revolution in Spain or the spread of tropical Asian and African crops via Europe to plantation systems established in the New World. The extension of the European plantation model of forestry around the world is another good example. On the other hand, the postwar integration of Europe has created a qualitatively different situation in which Europe could be viewed as an economic, political, and hence, economic unit.

656 **Climate change, cattle, war, pestilence and famine: Reading Central Namibian landscapes through repeat photographs from the Palgrave expedition of 1876**

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The Palgrave expedition of 1876 produced one of the first, and certainly the most comprehensive photographic record of central and southern Namibia in the late 19th century. The author has made repeat photographs of 25 of Palgrave’s landscape images that show in detail how rangeland vegetation has changed during the last 130 years. Using these images, in conjunction with detailed vegetation surveys, archival research into the land-use histories and climatic records of each site, has facilitated the construction of an historical ecology of landscape change from before the onset of German colonial rule of Southwest Africa.

This landscape history research is cross-disciplinary, bringing together natural and social science methodologies to interpret repeat landscape photography. It gives rise to new evidence bearing on contemporary debates about the causes of environmental change in Namibia. Bush encroachment resulting from overgrazing since the onset of German colonisation in the early 20th century is often cited as the cause of environmental degradation. The photographic evidence reveals a more complex story: in 1876 the grazing lands of central Namibia were more grassy and less woody. Rangelands were highly disturbed by large pastoral herds, transhumance routes, temporary settlements and the use of fire to manage grasslands. During the 1890s, several cataclysmic events converged to bring about an ecological revolution: the rinderpest, small pox, and the German – Herero War of 1904-7 effectively decimated indigenous peoples and their herds. The resulting hiatus in land-use resulted in the recruitment of a cohort of the long-lived tree species Acacia erioloba, as well as other native trees and shrubs that persist in the landscape today as a signature of the radical political, cultural and socio-economic events of 100 years ago. However, contrary to many accounts of environmental degradation that are attributed to overgrazing in the more arid southern rangelands of Namibia, we find that during the last 130 years the vegetation has remained remarkably stable and persistent in spite of continued grazing pressure.

These findings demand a reassessment of the ecological processes that determine semi-arid and arid rangeland change in Namibia. They also have implications for future land-use policy as well as for interpreting evidence of contemporary climate change impacts.

660 **Conflicting Needs, Adapting Demands: Fuel Supply, Improvement and Modernity in Scotland c.1750-c.1850.**

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In 1750, despite growing difficulties of supply in many lowland areas, peat was still the main domestic and industrial fuel type for most Scots. Poor communications infrastructure development and levels of duty meant that coal remained available or affordable only very close to mines. By 1800, rapid urbanisation and industrialisation in the lowlands had brought new and conflicting pressures to bear on fuel supply. Improving landlords saw higher profits in converting peat-land to agriculture but continuing poor availability and high cost of alternatives for the urban and rural poor added ‘fuel poverty’ to the social ills of early 19th-century Scotland.

Fifty years later, technological advances, cheap transport and changing socio-cultural values had seen coal replace peat as the fuel of choice in most of Scotland. This transition from peat to coal use reflected a wider transition to Modernity in Scotland's economic and social organisation. It also marked a change in cultural attitudes which saw perceptions of peat-land shift from the positive of 'resource' to the negative of 'waste', with concomitant environmental consequences as 'waste' was subjected to processes of 'reclamation'. Peat, and to a lesser extent wood, became the fuels of the economically impoverished and culturally backward, coal the symbol of prosperity and development.

This paper will examine the process of transition and its environmental consequences in Scotland. It will trace the growing conflict between the needs for fuel and the demands of agricultural expansion in the late 18th century and in particular the breaking into cultivation or destruction of significant expanses of moss in the period c.1780 to c.1840. Discussion will focus on the motors for change, principally the concept of Modernity, Whiggish belief in 'scientific progress' and the impact if growing cultural materialism, but will also explore the inverse process of the economic, social and cultural marginalisation of traditional fuel resources and the environmental consequences for some regions of the devaluation of a once prized asset.

661 **Sustaining historical grazing regimes in Scotland: common good versus common greed**

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The Garrett Hardin paper of 1968 has elicited a number of responses since it was first published and, in a northern European context, the recent volume by Shaw-Taylor, Warde, and de Moor, represents a valuable contribution to the debate about common land and its usage(s). A discussion of the Scottish experience was notable by its absence from that volume even though both Bil and Dodgshon have made contributions to the discussion during the last twenty years. These latter contributions have, however, consisted of regional studies that did not take account of the rigorous underlying systems of land division and assessment found across Scotland. It is only through understanding these systems of land division and assessment, many of which remained in use unchanged for over 900 years, that we can begin to understand why Hardin's fears about the exploitation of the commons were very rarely realised in Scotland. Part of the reason for this was that agistment was practised in Scotland from a much earlier date than is commonly realised, bringing it into line with other European countries that had adopted a similar strategy.

662 **Risk Management and Disaster Prevention in the Late Middle Ages. Facing floods in 13th to 16th century Central Europe**

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Risk management and disaster prevention have become more important since the High Middle Ages, when numerous new (or re-established) towns were founded along the rivers in Central Europe. They could only achieve economic prosperity, if they were able to develop strategies against the permanent danger of floods. Besides new techniques to build houses near the riverside and to construct efficient defences against flooding, also urban and regional solidarity was necessary for flood prevention. It is remarkable that this solidarity had obviously not worked automatically. In several charters the urban and regional authorities had to force monasteries and other landowners in the neighbourhood to help the afflicted towns. Towards the end of the Middle Ages, also warning systems were built up, mostly among monasteries of the same order or through merchants using the rivers frequently. In this way, the loss of people and properties became significantly less at the end of the 15th century, because most of the floods did not appear unexpectedly any longer. Furthermore, also the local economies acquainted with the permanent risk of floods. In the city of Wels, Upper Austria, the carpenters earned 15 to 20 percent of their yearly income by repairing and reconstructing the bridge after floods and ice.
All examples are taken from cities located at the Danube River and its catch area in late medieval Austria, Southern Bohemia and Bavaria. This paper follows the methods developed in Rohr (2007), but will concentrate on new examples and a wider range of archival sources. The approach follows the concept of the so-called "new cultural history", combining methods from traditional social and economic history, from a history of mentalities and from historical hydrology.

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664 **The Relationship between Human Being and Wild Animals in Chinese History**

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Here are a series of papers on the topic of the relationship between human beings and wild animals through historical periods in China. They includes 7 articles refers to tiger, lion, bear, elephant, rhinoceros and deer totally 6 spices. The articles mainly talked about human being's realization, treatments and usages on wild animals. And these researches were worked out from the "Research Team on Historical Animal Resources' Evolution" in Center for Historical Environment and Socio-Economic Development in Northwest China of Shaanxi Normal University of China.

666 **Rowing against the tide of environmental change? Norse home-field management across the North Atlantic region**

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Land management practices employed by Norse settlers in their home-field areas, the area of land immediately surrounding the domestic dwelling, were an obvious and key factor in determining the long-term success of each settlement. A number of recent studies have examined site-specific aspects of early landscape management such as land husbandry and fuel-resource use, at settlement sites including the Faroe Islands1, the Mývatn and Laxá valley region of Iceland2,3, the South-west region of Iceland4, and in Norse settlement areas in Greenland5. Where available, historical information allows both contextual and quantitative understandings of such land-management practices to be developed. When combined with geoarchaeological methods, such information may allow consideration of both temporal changes and geographically-related adaptations of the Norse settlers in respect to their environment. This paper considers the contrasts between sites of Norse settlement, examining farming practices adopted by the settlers in the home-field in relation to the constraints presented both by the inherited landscape and by climate. Contextualising the rôle of home-field management within a wider landscape allows discussion of the adaptive strategies adopted by the Norse during the landnám and later periods across the North Atlantic.

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668 **The introduction of cash crops and the plantation economy**

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In the nineteenth century agriculture became integrated on a global scale on a level not known before. Not only high value but also bulk crops from tropical as well as temperate zones took part in long distance trade. Earlier relatively extensively used areas came under intensive cultivation. (Friedmann/ McMichael 1989) In the South the expanding cash crop production was organized in large scale plantations and by peasant farmers integrated on the world market though a diversity of different middlemen. The world agricultural map 1900 was drastically different to situation a century earlier. A viewpoint at 1800 gives a possibility to grasp world agriculture before the great extension of cash crop production for long distance markets. The classical plantation system based on slavery was still present although in many cases approaching crises and decline. This will give an excellent opportunity to better understand the changes of the second half of the nineteenth century and the dynamics of new agricultural units, cash crop producing peasant farm, ranching and more explicit capitalist farms. The implications for land use patterns differ considerably between the forms under which the actual production was organized and need to be further scrutinized.

670 **Why write river biographies? Actors, institutions and historical narratives along the Rhine from a transboundary perspective, 1800 – 2000**

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Rivers are very complex social and environmental entities. They possess physical features like gradient, flow quantities and habitats that differ considerably between the upper, middle and lower parts of their course. Living conditions for species and opportunities for industry, agriculture, shipping, energy production etc. vary considerably. Environmental problems too, like floods or pollution, have primarily regional origins and impacts. Finally, administrative and national boundaries have helped to establish a strong hegemony of the regional scale in the uses, institutional regulations and narratives of rivers.
So why write river biographies, and who did it in history? An examination of the historical contexts in which river biographies were written will uncover in most cases specific socio-ecological interests and crises which motivated certain actors to create such narratives. Taking the Rhine as an example, the paper will focus on historical publications of water engineers and biologists, on which a good part of scholarly environmental historiography is based, and include some socio-economic narratives like the famous book by Lucien Febvre

(1935). It then discusses some conceptual patterns of this type of literature. Finally it demonstrates, using historical examples from 1800 up to the European Water Framework Directive of 2000, the value of a transboundary institutional approach and an analytical perspective that embeds rivers into their watersheds and landscapes.

671 **Interdisciplinary sources and methods to examine environmental history of seas and oceans**

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Environmental history of oceans and seas is a neglected topic in environmental history studies world widely. The aim of the paper is to discuss reasons for this lamentable state of art of studies, to compare different marine regions in terms of studies and to present interdisciplinary approaches, methods and sources that may be adopted to investigate marine environmental history in different regions of the world. Social scientific, natural scientific and ethnographic approaches will be presented. The paper is based on experiences gathered over the past 10 years of directing interdisciplinary marine environmental history projects.

674 **Detecting human footprints over the Late Holocene in a biodiversity hotspot: the Eastern Mountains of Tanzania**

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The Eastern Arc Mountains of Kenya and Tanzania are an area of high species richness and endemism and have been proposed as an area with a long history of ecosystem and climatic stability protected from climate change by the stabilising influence of the Indian Ocean. The high level of endemism and diversity in this biodiversity hotspot suggests that the forests have not experienced a major loss in moist forest taxa as a result of climate change. The Eastern Arc Mountain forest cover has also survived historical forest clearances, albeit in a significantly reduced coverage. Relatively intact islands of forest across the Eastern Arc Mountains suggest these areas have maintained continuous forest cover surviving pre-historical land used changes that have seen significant areas of other montane forest throughout East Africa converted to agricultural land.

Vegetation history is reconstructed using pollen, charcoal, carbon isotopic and fungal spore evidence derived from a series of sedimentary records from the Uluguru, Udzungwa, Usambara and Pare Mountains. These forests are likely to have witnessed human interaction for much of the Holocene albeit at a very low density with little impact on the forest cover. The emerging picture from the palaeoecological research shows a temporal sequence in human-impact on forest cover. The first areas to be affected appear to be the Uluguru Mountains where a dramatic decline in Podocarpus frequencies, a montane coniferous tree, seems to be initiated some 1000 yr BP providing a clear indication of forest clearance. A synchronous rise in coprophilous fungal spores (Cercophora-type) and charcoal is indicative a marked increase in fire frequency and pastoralism in the area during the past ~1000 years. Human-induced fires may have played an important role in the maintenance of a mosaic of high altitude grasslands and Morella salicifolia forest patches. Father west on the Udzungwa Mountains, a similar expansion in grasslands on the high altitude plateau of the increases in fire frequency, coprophilous fungi and algal blooms indicate an increase in human impact during the late Holocene. The presence of Neurospora spores also indicate frequent fires coinciding with clear signals of decline in Podocarpus and Psychotria trees; possibly representing selective logging. The signal of human impact is somewhat later than the Uluguru Mountains (c. 300 yr BP from the Udzunwga Mountains), pointing to an area which has, until recently, been relatively intact. Such a historical perspective may explain the relatively large fragment of forest surrounding the Udzungwa Mountains relative to other components of the Eastern Arc. The picture from the Usambara and Pare Mountains is still emerging but we expect to be able to present a spatio-temporal perspective across the Eastern Arc Mountains that documents the timing and impact of prehistorical human population on these biologically and economically important forests.

675 **Holland's energy economy c. 1400-c. 1600**

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Holland’s rise started in the 12th and 13th century and propelled rapidly in the subsequent centuries. It developed from a free farmer agricultural economy to principally a trading and industrialised economy with well established markets. The industrialisation not only occurred in the towns but in the countryside. The county exported beer, textiles, peat, fish and dairy products and imported grains, wine, glass and iron. Obviously, the society moved from low energy intensity to high. Greater energy needs were related to urbanisation, industrialisation and the change-over to building in bricks and tiles. In this paper the energy economy of Holland in the late Middle Ages is analysed with regard to the energy components used, their origin and is compared with that of the European countries in the northern regions.

The energy needs of the growing and more urbanised population geared to industrial products increased greatly from the 13th century onwards. The forests on the neutral fen-type peaty soils were already cut during the period of reclamation and on the more acid bog type soils trees did not grow. Hence, wood producing forests were limited to the dunes and some sand and clay areas in the eastern part of the country. Wood was in great demand both for building purposes and as a fuel source. Already in the 12th century inland production did not suffice. Timber and firewood had to be imported and alternative fuels such as peat were excavated on a large scale. In Roman times peat was already known as a fuel source and, hence, was the obvious and cheaper alternative to fire wood. By 1500 some 85-90% of the total fuel need was covered by peat. Firewood and

charcoal was still in use for specific applications such as in malsters' drying kilns, glass and pottery making and as a luxury fuel. Coal was used by blacksmiths and in lime kilns, providing no more than a few percent of energy needs.

Compared to other regions energy consumption levels in Holland were probably the highest in northern Europe in the 15th, 16th and 17th centuries. Because of its bulky nature and the enormous quantities that were required the transport of energy was of critical importance. Holland greatly benefited from having its own energy resource. Peat was abundantly available and located near the industrial centres. Transportation infrastructure, that is waterways, was excellent. In that respect the cheap peat provided Holland with a competitive advantage. In north-western Europe peat as a fuel was used in quite a number of regions and temporarily met shortages in firewood. Coal made its real breakthrough in the 17th century.

679 **Landscape made weapons – the usage of landscape idealization in environmental conflicts**

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Considering landscape not just as mere representation detached from the environmental context that it is supposed to stand for, but as a social-historical process deeply embedded in an engagement between humans and their surroundings, we mean to discuss some of the vectors that turn landscape into:a)a social-historical process;b)an instrumental dimension used by individuals in the course of environmental conflicts. What if social movements, at a particular time, make use of landscape as a socially and historically rooted category, incorporating it amidst the trends of social conflicts? The present communication encompasses this question, focusing on the analysis of a conflict that opposed a group of smallholder peasants to a mining company in the Portuguese inland (1974-1977). Fighting against the company's will to dredge scarce plots of farming land spared by earlier exploitation, the opposing landowners recalled the damages infringed upon their agrarian and environmental resources by the multinational mining companies that stood in the valley from 1912 until 1962. There, environmental depredation and landscape transformation were used by local defiant peasants as an additional weapon against mining (handling it in 2 ways: to fully reject mining works or to increase the value of the land while negotiating).

After the 25 April 1974 Revolution, the quarrel presented some unique aspects differentiating the resistance movement from the main confrontational trends of the post-revolutionary period in Portugal. When the media, political analysts, politicians, among others, defended the launch of programs for industrial and agricultural modernization, in a small inland village, a group of smallholder peasants came face-to-face with a mining company, declaring openly their opposition to mining works and justifying it by stating their past and present engagement with the landscape and the agrarian resources that allowed them to maintain sustained small-scale agricultural practices. Their line of speech, emphasising sentimental bonds with the environment and mining-free landscapes, directly confronted the mining company's rhetoric and action based on a utilitarian rationality. The conflict we propose to study might add more clues on how local collective resistance action takes shape and how environmental issues can interleave such displays, besides the current political, ideological and economic factors laid out as the basis for social movements.

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682 **Growth Trajectories-A Study of the Phoenix Region**

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In the post-war period, Phoenix has grown at exponential rates epitomizing the Sunbelt city phenomenon (Gober 2006). Much of the growth has occurred in large subdivisions and planned communities on the fringes of the urbanized area, which many label as "sprawl." The link between sprawl and land use institutions is not straightforward, although some work indicates that zoning may inhibit development of land for urban uses (Fischel 1985) while others argue that zoning may cause sprawl through large lot requirements (Irwin and Bockstael 2004). Developer fees are another means to manage growth, although the impacts on growth (Brueckner 1997), sprawl (Heim 2000), and the local housing market are unclear (Ihlanfeldt and Shaughnessy 2004).

Some historically rural jurisdictions in the Phoenix area have limited experience with the negative impacts of uncontrolled development and a desire to stimulate their local economy, so are aggressive in residential and commercial development. Like many western cities with lax annexation rules, cities in Arizona compete in land grabs to capture the future property tax base (Heim 2006), so fringe development may also be encouraged in order to broaden the tax base area and strengthen claims for future grabs. In the Phoenix area developers exert a powerful political force in local politics (Gober 2006), which certainly influences institutional adoption and implementation within communities.

This study brings together land use and cover change research with institutional analysis of land and growth

policy and local economic and political actors for selected areas of the city. Central Arizona Phoenix-Long Term Ecological Research Site land use and cover change data from 1912 to 2005 will be used (Keys et al. 2007) in addition to economic development and zoning institutional data collected for selected cases. The purpose of this study is to understand localized conditions and drivers that affect the patterns and types of growth in a major, rapidly growing and sprawling city.

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686 **Relations between hydraulics and social use in an irrigation field in Arequipa, Perú**

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The interaction between the hydraulics of irrigation systems on the one hand and human actions on the other is examined through a field study in Arequipa (Perú) where one primary canal guides the water to three autonomous Comisión de Regantas (water boards) in line. By means of a hydraulic analysis it is shown that the system's structures and their configuration support a head-tail phenomenon (hydraulics are in the advantage of upstream water users). The social analysis, however, shows that a 'pure' head-tail phenomenon is not present. At primary level the autonomy of the water boards makes the system act like three different fractions, all with their own daily norms and actions. As a result the layout of the irrigation system and its parcels show a different pattern in each water board. At some places at tertiary level farmers have taken measures in their own hands and do not let the water board interfere in the water allocation. The increase of responsibility per farmer has created awareness of the use and the state of their irrigation system. As a result the use of irrigation water is becoming more efficient and relations between farmers are becoming stronger. In addition, the irrigation system is benefiting from the increase of responsibility through an increase in maintenance which in turn has improved the operational flexibility of the system. Knowing the social and hydraulic relations and their interaction is vital to understand and predict how a change in hydraulics shapes the social use of an irrigation system and visa versa.

687 **Foresters at War: How Military Service in France Affected American Timber Policy**

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This paper will discuss the experiences of American foresters Henry Graves and William Greeley before, during, and after World War I. As early leaders of American forestry and conservation and the second and third chiefs of the U.S. Forest Service respectively, both men were instrumental in shaping federal lumber and timber polices between 1910 through 1930, policies affected by their military service experience in France during the war and that continue to have influence today in the United States. Historians have failed to take into account in any detail what the two men saw and experienced in France that influenced their thinking about forest conservation and federal timber policy. I will draw on their personal diaries and memoirs, as well as their published materials and secondary sources for my research.

Both men were in the U.S. Forest Service when the United States entered the war—Graves had been running the federal agency since 1910 and appointed Greeley as his chief of the Branch of Forest Management shortly after taking over. At the time of U.S. entry into the war, the American lumber industry had been mired in an economic depression for a decade. Despite accusations of collusion between producers and of the existence of a lumber monopoly, Graves and, especially, Greeley had been stressing federal cooperation with lumbermen to help the industry but meeting resistance from conservationists led by Graves' predecessor, Gifford Pinchot. Pinchot and other foresters and conservationists favored federal control of private forests to enforce the conservative logging rules and techniques they favored as part of their conservation agenda.

When America entered World War I in 1917, Graves and Greeley were selected to lead U.S. Army regiments composed of loggers and forest engineers that would provide wood for American forces in France. What they learned when working with French forestry officials during the war led Graves to revise the Forest Service's policy position when he returned to the agency in 1919, and only served to reinforce Greeley's thinking about his position. This paper will examine U.S. Forest Service lumber and timber policies as crafted by Henry Graves and William Greeley before the war, discuss their wartime experiences in France, and how that led them to push for closer public-private cooperation.

692 **Getting to the Root of the Problem: The State University and the Plague of the Sap-Sucking Insect**

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In the nineteenth century, Europe faced an epidemic that destroyed most vineyards. The phylloxera, a sap-sucking insect native to the Mississippi River Valley in North America, found its way across the Atlantic where it fed on rootstock of the grape vitis vinifera. Lacking a natural resistance, vines across Europe gradually succumbed to the epidemic.

After a number of unsuccessful remedies, state universities, particularly at Montpellier, France, began to contemplate hybridization and grafting as possible solutions. The phylloxera gradually made its way to Californian vineyards in the United States. The University of California took a lead in developing strategies to combat the pest. Ultimately, these universities concluded that the solution lay in grafting v. vinifera onto disease-resistant American rootstock such as St. Georges Rupestris.

The University of California is a land-grant institution, created under the federal Morrill Act and intended to teach agriculture. Over the course of the twentieth century, this statist agrarian institution worked hand in hand with industry in developing grape clones, vines, and rootstocks so as to shape consumer tastes, increase yield, and improve disease resistance to pests.

However, in pursuing these diverse goals, the university unintentionally contributed to a new phylloxera infestation in the 1980s and 1990s. All American rootstocks are not equally resistant. Between the 1960s and the 1980s, many growers used a rootstock called AxR1, although it had failed in many parts of the world. Developed first in France but enhanced over decades by viticultural experts at the University of California, AxR1 is a hybrid that combines a v. vinifera cultivar with Rupestris. The University supported its use because the rootstock proved more productive and more adaptable to various climatic and geological conditions. Moreover, Phylloxera did not feed heavily on AxR1 roots initially. However, this state intervention had unexpected results. Within twenty years, mutation and selective pressures in the Phylloxera population overcame this rootstock, resulting in the failure of most vineyards planted on AxR1. Expensive replantings followed.

U.S. environmental historians rarely grapple with the role of the state beyond wilderness protection or the damming of wild waters. Rural America, however, has served as an important location for the construction of a modern U.S. state, through grand schemes such as the cadastral mapping of the land survey system but more frequently in smaller ways such as the associational relations between land-grant institutions and agriculturalists. Some scholars have contemplated the social and economic implications of these relations, but few have considered the environmental implications of such policies as this paper will.

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695 **Duhamel du Monceau and the "Traité Général des Pêches": An Essential Source for the Study of Global Fisheries during the 18th Century.**

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Due to its growing economic, environmental, social and political importance by the 18th century, greater knowledge of maritime fisheries became essential for the French monarchy. Nevertheless, there was no comprehensive study of the country's fishery until the last third of that century. The Traité Général des Pêches, published between 1769 and 1782, was meant to address this deficiency. Its author would be one of the central figures of the august French Royal Academy of Sciences, the agronomist Henri-Louis Duhamel du Monceau (1700-1782).

This work is undoubtedly one of the major works in epistomology of maritime knowledge in France. Not only does it consist of 1246 pages and 229 illustrations, but it represents a watershed in the study of fisheries. Until its publication, any understanding of maritime fisheries, either by the State agents or by naturalists, was mostly beyond comprehension. There was little but anecdotal information derived from oral histories of refutable veracity.

What made this work so innovative was that it was written using many diverse sources. Unlike its predecessors, it did not merely content itself with being a compilation of anterior knowledge. If Duhamel based his work, in part, on the classics of natural history, he also resurrected the work of the first French Royal inspector of fisheres, Fançois Le Masson du Parc (1671-1741), whose Histoire des Pêches françaises et étrangères, was sadly aborted. Most importantly, Duhamel would undertake his own personal correspondence with fisheries experts in other countries in order to have the most up-to-date and trustworthy data. Due to its quality of work and the detailed conclusions, it was accorded a privileged place in Diderot's iconographique Encyclopedie.

This paper will present the sources, the writing, the contents, and the scientific reception of this text in order to

show the value of this work to historians interested in studying 18th century fisheries, as well as highlighting Duhamel's enlightened reflections upon the sustainable use of marine resources.

696 **The Rhetoric of Water Law: Russian colonial experience and the problem of legal pluralism**

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The rights and obligations concerning the use of water resources have been discussed in hundreds of languages. The plurality of linguistic forms and the rhetoric of water laws are strikingly manifested at the intersections of legal regimes and especially in the colonial experience of European empires in the nineteenth century. This experience provides interesting examples of the strategies and practices of reconciliation and adjustment of different visions of water as the object of competing interests and common use. The Russian case of imperial policy of water rules regulation offers a unique source for an analysis of the process of building a common language for the description of rights and duties; it helps to reveal the incompatibility of different legal rules and institutions, as well as points of convergence.

This paper focuses on the emergence of a pluralistic system of water laws in the Russian Empire in the late nineteenth - early twentieth century. Russia was a multinational state with an immense territory that covered different climatic zones ("wet North" and "dry South") and was faced with a plurality of legal regimes. These regimes had different confessional origins (Catholicism in Western provinces, Georgian Orthodoxy, Islam in Central Asia and Transcaucasia); they arose under the influence of various legal systems (Shariatic tradition, Roman law, peculiar combinations of different elements in Russian national law), different social policies and a variety of property right regimes.

Paradoxically, maintaining the plurality of regimes (for instance, private property rights to water in Russian European provinces and the regime of common water use in Transcaucasia and Central Asia) required the creation of a common language for their description. It turned out, that the language was a crucial problem for the imperial government. The terms of Russian legislation - such as "private property", "state property", "possession", "use" and "disposal" - could not convey the meaning of indigenous legal practices and rules in Transcacasia and Turkestan. As a result, the government had to question the universality and flexibility of the imperial system of water rights and to reevaluate the scope of rights and duties that the Russian water law implied.

699 **Maori intellectual property claims to indigenous flora and fauna in Aotearoa New Zealand: The living history of resistance and the WAI262 claim**

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Maori, as the Tangata Whenua (indigenous peoples) of Aotearoa New Zealand, submitted a claim (WAI262) to the Waitangi Tribunal in 19991 in order to protect their rights to the indigenous flora and fauna of Aotearoa New Zealand. WAI262 is one of over 700 claims brought to the Tribunal, all of which seek remedies for the marginalisation of Maori and their relationship with the natural world as the result of Crown breaches of the Treaty of Waitangi, the founding document of the nation. The WAI262 claim specifically relates to the Crown's failure to ensure that Maori heritage, knowledge and resources are protected from exploitation; it is intended as a mechanism for protecting Tangata Whenua rights over cultural objects and indigenous species, and the traditional knowledge associated with them. Maori resistance to exploitation has been ongoing since colonisation, and contemporary commentators (for example, see Mead and Ratuva 2007; Rixecker and Tipene-Matua 2003) have documented the legal and cultural issues related to indigenous rights and natural resources since WAI262's inception. This 17 year old claim, which has yet to receive a decision, provides an example of how living history is critical in and to indigenous rights and property rights discourses, policies and outcomes. The paper provides an outline of the contemporary history of this case, using indigenous rights (Cant, Goodall & Inns 2005; Kawharu 2002), political ecology (Robbins 2004) and environmental justice frames of reference.

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705 **Water, ecology and political economy in a colonial public work: the drainage of the Valley of Mexico in its rural environs, 1608-1900.**

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Like many hydraulic public works, the Desagüe de Huehuetoca of Mexico has often been cast as a triumph of technology over nature. This drainage project sought to save the city of Mexico, wealthy capital in the Spanish

empire, from periodic flooding by its surrounding lakes. It eventually succeeded in this, which severely impoverished the ecology of that once teeming enclosed basin and the livelihoods of indigenous peoples who depended on it. As a 13-km-long system of canals and tunnels begun in the colonial period (1608), the project was concluded almost a century after Independence, with both metropolitan and creole technicians worked on it over time. As a result, since the nineteenth century, the history of the Desagüe has also loomed large in nationalist history. By looking away from the blinding light of these heroic perspectives we can gain insight into how public works express social and spacial relationships of power and contention over nature in ways that can be relevant to our current environmental predicaments.

This paper explains how the Desagüe articulated the victory of the city and its elites over its rural hinterland and its people through its technology and management of land and water. Using sources generated by the public work, its indigenous neighbors, its technicians and urban authorities, the paper analyzes how technological choices in the Desagüe allowed the urban elite to shift onto rural populations a large part of the cost of its own flood protection. Alongside technology, Desagüe authorities prohibited various local customary usages of water and land around its facilities, in fact shifting control if not outright property over these resources from indigenous rural producers to urban elites. Restricted access to water meant not only losses for agriculture and horticulture, but also loss of access to wetland ecosystems that were complementary with cultivation and animal husbandry. By looking at the restriction of access to land and water together with the process of ecological change, the paper stresses that they interacted to impoverish the livelihoods of rural people.

The paper advocates a methodology that combines a focus on how public works and other projects create ecological change over time (instead of on the ultimate "ecological impact") with simultaneous analysis of social relations of power over access and use of elements in that ecosystem. The benefits of this method, it argues, are that it avoids the telescoped view of looking at beginning and end result of ecological impacts of hydraulic public works and it explains more fully how and why resulting ecological changes affect societies over time. The current world crisis of food production might benefit from such an understanding, since the social problem of control over land and water is as much a component of it as purely environmental factors.

709 **Creating a "continent for science": environmental history and the origins of the 1959 Antarctic Treaty**

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On 1 December 1959, representatives of twelve nations signed the Antarctic Treaty, which suspended all sovereignty claims to Antarctica and created a "continent for science." Through a sustained analysis of the origins of the 1959 Antarctic Treaty, this paper builds on the work of Stephen Pyne, William Fox, and Tom Griffiths to propose Antarctica as an excellent place for "doing environmental history" (1). It suggests that the origins of the treaty can only be understood fully by looking at the dynamic interaction of the Antarctic environment, Antarctic science, and Antarctic politics. Writing about the natural history of the Antarctic Peninsula, the biologist Sanford Moss notes:

"Even though Antarctica is the fifth largest of the continents, it has the fewest forms of life inhabiting it. This fact provides unparalleled opportunities for naturalists. The plants and animals that visit, breed, and in some instances thrive here are of special interest to students of natural history. They offer one of the least complex webs of ecological interrelationships to be found on earth. This is the place for the ecologist to formulate and test theory". (2)

In a similar fashion, the relative simplicity of the Antarctic environment makes it a good place to understand the interactions between human understanding, human activity, and the natural world, and think about questions of historical causation within environmental history.

During the 1930s and 1940s, relatively little was known about Antarctica. Fantasies of Antarctica as a "Frozen El Dorado" helped to generate international interest in the ownership of Antarctica, and by the 1940s seven countries laid territorial claims to parts of the region. In the late 1940s, several proposals were made for the internationalization of the continent, but these came to nothing. It was not until the late 1950s, in the immediate aftermath of the International Geophysical Year (IGY) of 1957-1958, that the limited internationalization of Antarctica was negotiated. In seeking to explain why this Treaty took place when it did, this paper pays particular attention to the scientific results of the IGY, which helped to explode – at least in the medium term – the idea of Antarctica as a treasure trove of mineral wealth. At the same time, the rapid decline in the Antarctic whaling industry also changed perceptions of the economic worth of Antarctica. By taking into account these changes, this paper suggests that political pragmatism rather than idealism was the major cause of the signature of the 1959 Antarctic Treaty.

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712 **Recycling, Lend-Lease, and Public Opinion in Britain during the Second World War**

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To feed its population and its industries, Britain has long relied on the importation of large quantities of agricultural products and raw materials. Inexpensive overseas supplies of food, wood, metals, and other resources helped Britain to become a great power, but they also posed strategic risks, particularly in wartime. During the Second World War enemy forces occupied many of Britain's trading partners. In addition to cutting off the supply of raw materials into Britain, the closure of these countries to goods from Britain reduced the latter's ability to earn the foreign currency that it needed to pay for imports. To make matters worse, the exigencies of modern warfare pushed the demand for steel, aluminum, oil, and rubber to unprecedented levels.

In response to these pressures, the British government embraced a set of environmental policies that are now familiar as the three Rs: it required individuals and businesses to reduce consumption, to reuse goods and materials whenever possible, and to recycle them when they were no longer fit for their original purpose. Local government was required to institute a regular collection of household salvage (as recyclables were then known), and it became a crime for anyone to burn or throw away anything that might be useful to the war effort.

This paper draws upon a wide range of published and unpublished sources, including once-classified government documents, in an attempt to assess the role of recycling in the British war effort between 1939 and 1945. It argues that Britain's wartime recycling campaign had a significance that extended well beyond its ostensible aims. In addition to helping maximize domestic supplies of essential raw materials, recycling played a vital part in the British government's strategy to maintain civilian morale and unlock billions of dollars in Lend-Lease assistance from the United States. Most members of the British public embraced recycling, but morale suffered and Lend-Lease officials expressed dismay on occasions when the recycling program seemed to be driven more by public relations concerns rather than by practical ends.

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717 **Bringing the Canvasback Duck Back: An Ecological, Social, and Economical Restoration of a Prairie Pothole Watershed In Southwestern Minnesota, USA**

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This presentation is spatially centered over the Prairie Pothole Region (PPR) of the North American. The PPR, due to indigenous culture resistance, lack of fuel-wood for energy, and dense unplowable prairie turf remained the last suitable unsettled landscape in the USA. Associated with the historic PPR were many large shallow clear water lakes that supported a robust submerged aquatic vegetation community which fed a vast migration of waterfowl, while bison, elk, bear, and wolf roamed the terrestrial corridors between the wetlands. Regional settlement occurred at the advent of petroleum, resulting in a rapid and thorough transformation of the landscape from prairie to industrial agriculture. The speed and intensity of the transformation stripped the region of its historic environmental context. Only a species of duck, the canvasback (Aythya valisineria) allows any reference to regional environmental history. Fossil energy inflow altered regional ecology at the landscape, ecosystem, community, and organism levels. Eventually ecological quality, quantified by the sum of ecosystem services, collapsed. Fossils energy inflow also transformed regional socio-economic interactions. Eventually socio-economic quality as quantified by Census Bureau data collapsed. The first signal of ecological collapse was observed in population decline of the canvasback duck, which was associated with a lucrative market hunting and sporting industry. From the canvasback industry emerged the first machine gun, the first national & international wildlife laws, and the first conservation bureaus in North America. Early game laws and commissioned reports failed to reverse canvasback declines. Despite heroic attempts, efforts failed due to lack of intellectual framework allowing complex systems analysis to identify canvasback constraints at various ecological scales. By 1935, the year Arthur Tansley coined the term ecosystem, the halcyon canvasback days were over. Continued fossil energy inputs are correlated with local socio-economic declines in population, social programs, local commerce control, and self reliance. Tax free zones, ethanol plants and a transnational labor force have failed to reenergize local socio-economic systems. Current community discussion questions "business as usual" in reference to peak oil. There is still significant interest in restoring canvasback populations and since 1995 reductionist efforts have spent $13 million dollars on canvasback restoration projects without any favorable results. 70 years post Tansely, an intellectual framework based on systems theory allows a fresh perspective into the dynamics associated with the current ecological and socio-economical conditions. A systems perspective offers the PPR an alternative to the present. Low gain post petroleum agriculture makes possible an ecological, social, and economic restoration at the watershed level. Using the canvasback as a flagship for a watershed level socio-economic and ecological restoration provides the community with a sense of place in time

and space. In essence, bringing the canvasback back revives a regional environmental history and provides the framework for a future sustainable commerce, social, and ecological system.

719 **"When you ride alone you ride with Hitler": Carpooling and Public Transit in Detroit during the Second World War**

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During WWII, the US government promoted conservation of gasoline and rubber as essential to the war effort. It identified civilian automobile use as a major source of rubber and gasoline that had to be reduced. In Detroit, as in other cities, labor unions, company management and city officials worked together to maximize mass transit use and to organize carpools of war workers. The Detroit Street Railways readily acknowledged that its system of streetcars and buses was insufficient to meet the city's transport needs. In order to reduce private car use, many war industries staggered their hours so that workers' start and end times were spread out more evenly throughout the day, thus allowing greater use of mass transit. The United Automobile Workers organized carpooling clubs so that no car would be driven unnecessarily, strongly encouraging workers who could not take mass transit to travel five workers to a car.

This paper considers how effective such efforts were in getting Detroiters to use alternatives to individual car use, how carpool and transit riders viewed their own actions, and the legacy of these automobile conservation programs in the postwar era. Beyond the traditional narrative that the automobile companies eliminated transit options, it is an attempt to understand how individuals' actions contributed to the decline of alternatives to private car transport.

As with rationing of other goods during the war, the government encouraged Americans to think of these changes to their consumption habits as temporary sacrifices for the good of the country. The billing of mass transit and carpooling as a wartime "sacrifice" encouraged Americans to think of carpooling and taking mass transit not as practical, economical, and efficient methods of transport but instead as something to avoid once such a sacrifice was no longer demanded. Unpleasant aspects of the ride, such as overcrowding, contributed to riders' sense that they were indeed sacrificing. Finally, mass transit during WWII was a major site of racial conflict with blacks and whites coming into close physical proximity on overcrowded streetcars.
Among possible outcomes of WWII taxing Detroit's mass transit system beyond capacity, there might have been an increased demand for the expansion of mass transit or more frequent streetcars and buses. Instead, many wartime mass transit riders and carpoolers switched to private car use as soon as they could. This turn away from mass transit after the war helped pave the way for an increasingly car-centric future with fewer viable alternative methods of transport.

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720 **Slash-and-burn agriculture and the nutrition transition among atlantic rain forest african-brazilian peasant populations: Historical trends**

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The current nutrition transition (NT), characterized by increasing rates of overweight/obesity and associated chronic health problems such as diabetes and hypertension, is a major public health concern in both developed and developing nations. Most of our knowledge regarding this global health trend comes from descriptive studies that summarize data from national health surveys which tend to draw disproportionately from urban populations. While it is accepted that changes in diet and activity patterns are responsible for rising rates of overweight/obesity, little is known about the processes by which these changes occur, including the roles of historical, economic and environmental factors. In this paper we consider the role that historical and environmental changes are having on the health (weight, diet, activity patterns) of two rural African-Brazilian peasant populations (Quilombos) located in Atlantic coast forests in the Brazilian State of São Paulo. Quilombos were formed by runaway and abandoned African slaves during the colonial and empire periods in Brazil. In the Upper Ribeira River Valley, these communities date to late 18th century. Since then, these communities have developed a subsistence system based on the shifting cultivation of rice, manioc and maize, the extraction of forest products and hunting. Although they have always had some degree of involvement in the local and regional market economy, it was only in the last 50 years that major socioeconomic changes took place, pushing these communities to completely integrate into the national political economy. The abandonment of shifting agriculture in favor of more intensive cultivation practices and market-oriented crops is striking and related to environmental restrictions on land-use and increased integration into the market economy. These changes have lead to an increased reliance on industrialized, energy-dense foods including refined sugars,

vegetable oils and canned meats along with reductions in energy expenditure, especially among women, contributing to the NT.

726 **Rewilding the Rio Grande: The Construction of the Bosque del Apache in the U.S.-Mexico Borderlands**

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In the 1930s and 1940, the U.S. Fish and Wildlife Service (originally the Bureau of Biological Survey) constructed a series of artificial wetlands for migratory birds to compensate for the natural wetlands that had once dotted the American West. These wetlands offered wintering and breeding grounds for sandhill cranes and other birds along broad corridors, including what is sometimes called the Rocky Mountain flyway, which extended from northern Mexico to Canada and Alaska. Among these wetlands was the Bosque del Apache, located along the Rio Grande, on the northern edge of the Chihuahuan Desert near Socorro, New Mexico. As early as the 1870s, irrigated agriculture in the river's upper reaches had depleted the flow of water through New Mexico; this was compounded by the erection of a series of dams and canals beginning with Elephant Butte Dam in 1916. During the New Deal, federal officials worked to mitigate this loss of habitat by diverting the Rio Grande with a complex system of drains, dikes, canals, and laterals. The result was nearly 13,000 acres of wetlands, including a managed complex of marshes, ponds, riparian woodlands, and even farmlands, where corn fields feed birds. This highly engineered environment reflected and reinforced the surrounding landscape of irrigated farms. Nonetheless, wildlife managers hoped to "rewild" the area by creating habitat not only for migratory and native birds but also for muskrats, deer, antelope, and other species. As a measure of their success, by the early 1960s, the sanctuary offered winter refuge to the single largest concentration of greater sandhill cranes in the United States; today, they number more than 12,000. Paradoxically, just as refuge managers sought to restore wildness to the wetlands, they fought to control wild nature, whether in the form of predators, beavers, invasive plants like salt cedar, or the unruly river itself.

The Bosque del Apache was but one part of a wintering area that stretched from the Mexican states of Durango and Chihuahua to the San Luis Valley in southern Colorado. By the 1930s and 1940s, American scientists had begun to study habitat loss in Mexico and its effect on sandhill cranes. And yet those managing the Bosque del Apache worked in relative isolation, largely insensible to the transnational nature of their endeavor. My paper—part of a larger project exploring the idea of "wildness" along rivers in the western U.S. and Mexico—will examine the degree to which a dialogue regarding a transnational management strategy emerged and how the transnational nature of migratory birds like the sandhill cranes became visible.

731 **Debating the local with reference to zoological natural history in British India**

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A trenchant review in 1891 of the 'Journal of the Bombay Natural History Society' regarding the publication of 'Reptilia and Batrachia' as part of the omnibus 'Fauna of British India' series forms the basis of the treatment of what might have connoted the 'local' in the subcontinent. Both the author and the reviewer were British, yet one had never laid eyes on India, while the other had spent much of his life there, a fact that is made explicit in the denunciation of the effort in the 'Fauna of British India' for privileging the taxonomic over the ecological for want of immediate exposure to the latter. The notion of the 'local' is particularly complicated since the Indian Forest Act of only 14 years earlier had explicitly overturned traditional rights of usufruct setting the imperatives of the state against the indigene. While calls to speak for the local (here seen as distinct from 'native') therefore were clearly predicated on a sense of entitlement, the question remains as to whether distinctions were made purely in terms of domicile, where the fact of being British and white were taken for granted in the first place? Using the 'Journal of the Bombay Natural History Society' itself as well as the 'Fauna of British India' against the backdrop of key ecological texts in recent history, the role of Indians and Anglo-Indians (in the original sense of the term, i.e. people of British descent born, bred and often making their careers in India) across class structures in shaping discourse on zoological natural history at the turn of the twentieth century in British India is examined.

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732 **Travelling Expertise: The US Fish and Wildlife Service in India**

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In the early 1970s, the Government of India embarked on an ambitious conservation program (creating Project Tiger and its less famous cousin, Project Crocodile, passing the Wildlife (Protection) Act which formalized National Parks, and taking the first steps towards what became a Ministry of the Environment). At the same time government officials became deeply suspicious of non-governmental Indian and US scientists who played such a crucial role in Indian ecology in the 1960s, fearing a challenge to government control of conservation policies and areas. Simultaneously, across the world, the US government passed the Endangered Species Act, which gave further authorization for the US Fish and Wildlife Service to take a more active role in promoting global species conservation. By the late 1970s, the government of India turned to the US Fish and Wildlife Service as its preferred collaborators on conservation science projects. These US government scientists had the distinct advantage (from an Indian government perspective) of being expert in North American species, and of always being short-term visitors in Asia. In this paper I'll discuss the history of these collaborations, and the role of the USFWS in training and encouraging a new generation of Indian conservation scientists. In the process I'll consider the role of site-specific knowledge in conservation science expertise, as well as questioning the success of the GOI attempt to monopolize conservation science expertise within the government bureaucracies. The work of US scientists in India explicitly leads to the question of how knowledge (in this case conservation science) circulates across the globe, and in this case study, how governments might attempt to control the conditions of this transnational exchange.

733 **Blood Horses:Equine Breeding, Lineage and Purity in South Africa, c.1652 -1952**

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This paper explores the role of the state in horse breeding in South Africa, from the introduction of horses in the mid-seventeenth century to the twentieth century. The emphasis is on how this influenced the genetic development of the horse itself. The paper thus discusses firstly how breeding regimes reflected shifting social preoccupations, both practical and ideological. Secondly, it offers an analysis of the constant interplay between state officials and private breeders that helped shaped the process. There was a concomitant continuous recalibration of what "good horseflesh" meant. The initial Dutch settler horse stock was set up with ponies from Sumbawa, and other working breeds were fused by the eighteenth century to form the hardy, utilitarian "Cape horse", which was exported to other parts of the global imperial network.

The introduction of horse racing to southern Africa wrenched the breeding industry in a different direction, fostering the spread of English Thoroughbreds bred solely for speed and pedigree. Nineteenth century wars of conquest and human migrations necessitated the utilitarian "Cape horses" but a declensionist trajectory was widely believed and various attempts were made to "save" the breed. The twentieth century offered mechanization and the utility horse was increasingly obsolete. The horse breeding industry had to be redesigned or face collapse: so a new breed of horse, the American saddle horse, was imported to fill a new commercial niche and to fill a niche in the imagination of a new class of people. Discourses of breeding were not hermetically sealed from political discourses in the run-up to and aftermath of Apartheid. Breeding thus set up a fresh suite of debates, in both state and popular arenas, about the relationship between nurture and nature, ideas that were then both applied to and drew on notions surrounding race, class and gender. In the process, breeds from around the world were amalgamated, reclaimed by local breeders and state officials and stamped "indigenous". Thus the changing cultural identity of horses and their changing morphology were wrapped up in human identity politics.

734 **Labor migrations and urban environment in Istanbul in the early 19th century**

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With its spectacular size and diverse population, Istanbul, the Ottoman imperial center, had been a magnet for visitors and workers alike. No official or reliable statistics exist notwithstanding, the city had a population of at least 300,000 around the turn of the nineteenth century. Except for import trade, the city was the largest market for the resources of the countryside. Thus, it was the major consumer of wealth , yet, it was also the major source of wealth, attracting an incessant flow of migrants hoping to find food and subsistence. The proposed paper attempts to offer a detailed profile of the immigrant labor force and their interaction with the urban environment in the early nineteenth-century Istanbul, with a particular emphasis on the social and cultural landscape these immigrants found themselves when they arrived. It aims also to disclose how these migrations changed and transformed the resource use and allocation in the urban context. Considering the conflictual nature of urban resource use, this paper will seek to uncover negotiations and contestations over resource management by looking at the Istanbul labor markets. The primary source upon which this study is based is the register of an original Ottoman survey, conducted in Istanbul districts of the Bosphorus and the Golden Horn, where some 2,000 shops along with their work-force of 6,000 people as well as 1,500 peddlers working as, among others, boatmen, fishermen, and water carriers were listed in a comprehensive fashion. Through an examination of the register, the proposed paper seeks to illuminate the general characteristics of employment, ethno-religious profile of labor-force, the occupational patterns in connection with religious allegiance and migration networks, and the degree to which the military corps were involved in commercial activities, which all were important in determining the urban spatial environment in which immigrant workers found themselves. It also questions the supposed validity of an 'ethnic division of labor' in labor market and commercial activities, and demonstrates the centrality of regional allegiances in occupational specializations. To put in another way, the overall pattern of this study is to encompass the spatial constitution of labor in relation to the uneven conceptualizations and transformations of resource use and distribution in urban contexts as well

as to reveal the relations of urban workforce with the emergent spatial, material, and environmental transformations during the nineteenth century.

735 **Interdsiciplinary research on landscape memory**

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Landscape is a unique source of information about the past times it has witnessed (Gojda 2000). Features of a specific cultural landscape, such as land-use or the presence of historically or ethnically characteristic elements, can provide information about the societies that once inhabited (or still inhabit) such landscape (Beneš et al. 2003). The main aim of the proposed project is to understand how the preindustrial rural community identified with the landscape it inhabited and used. Secondary aim is to evaluate the landscape memory potential (Schama 1996) - the way in which human traditions and rituals are conserved in the landscape.

Such information will be gained through complex interdisciplinary analysis of traditional landscape use in 19th century in two model areas of the Czech Republic. On the example of small relics (e.g. calvaries, chapels, statues, memorable trees), which are abundant in Czech landscape and known to have a role in various rituals (Hájek et Bukaèová 2006), the potential of landscape to conserve the "mental land-use" will be examined.

The project aims to answer the following questions:
- What are/were the functions of small relics in the village and extravillan?
- What natural and cultural context do these relics originate from/exist in?
- What is the occurrence of these relics in (a) traditionally cultivated landscape, (b) early 20th century landscape and (c) contemporary landscape?
- How did people relate to these relics in the times of traditional rural life style and how do they relate to them today?

Methods will combine regional history research from both the cartographic (stabile cadastre and other maps from 19th century) and literary sources (registers of national heritage, local and regional literature) with field research (current state of relics, seeability and visibility of a relic) and geoinformation technologies (spatial analysis of the relics in the landscape with the use of Arc Map software).

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736 **Demand for Floating Channels and Roads – Finnish Forest Industry, the Infrastructure and the Environment, 1950–2000**

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During the recent years the Finnish forest industry has encountered serious challenges, which have caused reducing the capacity of pulp and paper industry. In order to improve forest industry's competitiveness, there have been suggestions of nearly 100 million euros yearly support. Over 80% of it would to be aimed at the improvement of the transportation infrastructure, which illustrates how significant influence the forest industry even today has on the infrastructure in Finland.

In this study the main focus is on the timber transportation infrastructure, floating channels and roads, and how the forest industry has shaped location and construction of it. It is also asked, how the infrastructure has affected the environment and everyday life of the citizens, and how attitude towards this changing infrastructure has developed from 1950s onwards.

Up to mid-1960s floating was the major long-distance transport of timber. The total length of these partly constructed and yearly used floating channels was over 10 000 km. Floating prejudiced for instance fishing and other use of watercourses. After the floating ceased in 1980s, rivers have been reconstructed. The floors of the rivers have been rebuilt, and fish, especially salmon, have been restocked.
In the beginning of 1970s timber lorries exceeded floating in timber transportation. This became possible, when the road and especially the forest road network had been constructed dense enough. Nearly 130 000 km forest roads were constructed in 1955–2005, approximately 2 600 km yearly. These forest roads enabled efficient and fast transportation of timber, and reduced forest industry's timber procurement costs.

The greatest looser in the progress of building infrastructure has been nature. The rivers were constructed e.g. by Cater-Pillars, which destroyed breeding ground that salmon needed. Forest roads have covered and fragmented most of the remote forests, and doing so, diminished the wilderness areas.

After Finland's economy has shifted from primary production to the tertiary production these losses are discovered more clearly. Nowadays forests and forest industry are no longer the only financial bedrock of the society. Inhabitants, who earlier were dependent on forest work and to whom constructing infrastructure offered better living, are nowadays employed in the other braches. Forest roads, which earlier enabled forest workers to commute daily from home to cutting areas, are nowadays more and more often used for recreation

purposes. Environmental protection and nature tourism have challenged the forest industry also in constructing infrastructure.

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740 **Future in Fire? Anticipated Timber Famine and Heating Revolution in 19th Century Finland**

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Throughout history Finns have been using a lot of timber for various reasons. Energy needs are considerable partly as because of cold climate, and because there used to be an easy access to ample firewood resources. Furthermore, timber has been used for various other purposes than heating as well.

In the 18th c., Finland was a leading exporter of tar. At the time, its exports of round timber, sawn timber were increasing. In addition timber consuming slash-and-burn cultivation was common round the country. The minor industrial sector was biased to timber-intensive production, such as manufacturing charcoal bar iron and iron products, sawing timber by water mills and building wooden ships.

Some influential contemporaries became convinced by the early 19th c. that the extensive use of timber is leading to overcutting forests and decreasing standing stock. The consumption of timber was irrational. Valuable forests were claimed to be cut for economically less productive purposes, such as for slashing and burning, potash and tar production and primitive space heating. Consequences of timber famine in Central Europe were known by Swedes and Finns since the 17th c. That was a destiny the government wanted to avoid.

Public debate focused to accuse primarily on the slash-and-burn cultivation and other "lavish ways to destroy forests". Nevertheless, the biggest consumer of timber resources was space heating, where a quiet and profound reform took place during the 19th c. In the countryside around the country, peasants took the initiative and voluntarily replaced primitive smoke-filled log cabins by decent houses equipped with chimneys, efficient stoves, proper insulation and glass windows. The paper claims that this was the most significant technological change in 19th century Finland because it had outstanding economic and environmental consequences. The claim is based on the examination of broad quantitative data.

By rationalising its timber use and paying more attention on forestry, Finland did not only succeed to avoid timber famine but was able to start its industrialisation on the basis of wood-processing industries. Although the conservation of forested nature was not the main argument to limit the timber use, the results of rationalised forest management were predominantly favourable also to the environment.

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749 **The Chinese and Mongolian Perception of Grasslands in the Late Qing Dynasty**

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The traditional Han society has been regarded as a "peasant society" based on agriculture. The Han people considered grasslands and the life style there barbarous and backward. Meanwhile, Han people disliked the grasslands because the warlike nomadic groups fought often with the Han people for supremacy throughout Chinese history. To prevent the attacks from nomadic groups, the Han authorities adopted various methods, including the construction of the Great Wall, the policy of pacification through marriage, and the immigration of the Han people to the grasslands, all of which were efforts toward sinicization, and were described chiefly as sort of tragedies in ancient Chinese literature. In general, the Han people always seemed extremely reluctant to live in that region, and Inner Mongolia experienced a negligible sinicization till the late Qing Dynasty.
After the establishment of the Qing Dynasty, the Manchurian rulers prohibited the settlement of the Han farmers and the cultivation in the grasslands chiefly because of their fear of the rise of Mongol power as a result of the reclamation in Inner Mongolia. In the early 20th century, the Qing monarchy was forced to permit the cultivation of the grassland chiefly because they hoped to get more money to pay for the war compensations to the western nations. In the meanwhile, they did so in order to alleviate the political instabilities as a result of the widespread famine and the growing desire for land.

The massive immigration of the Han people inevitably stimulated the resistance from the native Mongolians. As a typical nomadic group, the Mongol people highlighted the importance of the grassland, regarded the pastures as an important component of their economic system, and attached the grasslands with many social and spiritual values. Despite the violent resistance of Mongolians, however, the agricultural culture gradually gained the superiority over the nomadic culture in the 20th century. To some extent, the settlement of the Han immigrants and the extensive reclamation in the early 20th century was the victory of sinicization and the turning point of the irreversible desertification in Inner Mongolia.

750 **Russian Nobility Provincial Estates of the 19th and early 20th centuries:**

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History of Russian landownership and Russian noble estate landscape gardening and park design are rather well developed research topics (Hoch, 1986; Roosevelt, 1995; Randolph, 2000). In spite of that, history of estate management and general household maintenance as well as implication of agricultural and industrial innovations is given not enough consideration so far. The question on how implication of innovative land use practices affected landscape changes needs to be further clarified. It is especially feasible to do that on the basis of case studies from one particular region.

This paper deals with landscape transformations which took place in Russian country noble estates as a result of changing managerial practices. This changing went along with agricultural and industrial improvements introduced into practice by landowners to make their estates more profitable. On the basis of descriptions of everyday life in the estates it examines the varying perceptions (including religious, moral, aesthetical and intellectual values) of the changing agricultural and park landscapes and associated practices held by different groups of Russian provincial society. It focuses particularly on one of the central regions of the Russian Empire, Tver province.

Different perceptions of landscapes and attitudes towards technical innovations and new managerial practices may be considered as a barometer for measuring provincial response to reforms at the most basic level. Through analysis of these different attitudes towards the landscape, economic and cultural changes the paper attempts to reveal different groupings with steadily diverging cultural orientations (social, professional, gender) which often opposed each other, but together configured a specific provincial milieu. Debates on agricultural and industrial innovations and landscape changes became an arena where legal, social, and cultural identities were forged. Paper is based on local archives and published memoirs of members of noble families in the region.

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751 **Mapping the Modern Urban Forest in 1960s Ottawa, Canada**

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In the 1960s, residents of Ottawa observed that many of the city's original street trees had succumbed to disease, neglect, over zealous arboriculture, and the changing urban environment. Dutch elm disease, in particular, had destroyed several beautiful avenues of elm trees. In 1962, city officials announced a modern era in urban forest management with a report, "Shade Trees and Parklands: Planting, Cultivation and Preservation." This paper will examine this new era of modern urban forest management. It will focus upon three innovations -- the shift to small species, the development and promotion of decorative hybrids, and the reforestation of the suburbs – and consider them in light of 1960s modernity. Although the analysis is cultural, with a focus on modern environmental esthetics, the paper is grounded upon an empirical analysis of canopy cover: aerial photographs of the city from 1930-2000 have been analysed with GIS mapping techniques to measure changes in the forest canopy cover over time. This innovative methodology, adapted from landscape ecology and applied here to the historical study of urban areas, provides a baseline against which to track popular and political perceptions of change to the streetscape.
The 1960s saw a shift away from large "forest' trees in the city core. American elm, sugar maple, and white ash had served the needs of the nineteenth-century city by providing shade, reducing dust, and lending grace to the undeveloped streetscapes. These large trees had proven difficult to manage in the city core, and after the devastation of Dutch elm disease, (and the heavy cost of the removal of hundreds of the large elm trees) there was a new emphasis on smaller decorative trees. Smaller trees accommodated the built infrastructure of the twentieth century city; they did not interfere with utility lines, and their roots were less likely to disturb sidewalks and paving. The ultimate small tree was the container tree: optimistic planning sketches show bright green "lollipop" trees planted in small containers along inner city streets. This approach has come under criticism by environmentalists for its impact on canopy cover; analysis of aerial photographs will show whether this shift had a measurable impact.
Ottawa is Canada's capital city, and much of the landscaping was under the control of federal planners. When Canada celebrated its centennial year, 1967, these bureaucrats selected the crab apple as Ottawa's centennial tree and encouraged home owners to plant crab apples as part of the national celebrations. The crab apple was a designer tree: small and exotic, available in multiple shades of bright pink and red thanks to the

manipulations of science, it was a symbol of the new modern Canada. The impact of this program on canopy cover was significant on certain avenues, where the crab apple replaced the elm.
The reforestation of the suburbs appears to represent a countervailing modernity. Sprawling residential communities were created from the 1950s as the middle class sought a retreat from the urban landscape. They were commonly built upon agricultural land, and preliminary mapping of aerial photographs of suburban areas suggests a dramatic reforestation in the years following construction.

754 **Ecologically unequal exchange, landesque capital, and landscape transformations: On the historical-political ecology of Kinmen Island and Orchid Island**

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Ecologically unequal exchange emphasizes material flows between places, time-space appropriation of distant resources, and material load displacement (displacing the ecological footprint of a society onto other societies). Ecologically unequal exchange results in ecological impoverishment in some places (primarily sources of resource extraction for distant economies), and material overload with high levels of pollution in other places (spaces of production for distant markets), while the most 'successful' societies are able to 'export' these environmental consequences of their own consumption (Hornborg et al. 2007). The formation of landesque capital – durable improvements to land resulting from labor being invested in the land (Håkansson & Widgren 2007) – emphasizes the potential for human activities to improve 'natural' conditions, possibly altering "conditions for future sustainable use for the better, and not only for the worse, as is often the unproven assumption in much writing on environmental history" (Widgren 2007:63). Both ecologically unequal exchange and investments in landesque capital can have powerful and enduring impacts on landscapes. In this paper we analyze the historical-political ecology of Kinmen Island and Orchid Island (Taiwan) from the perspective of these two processes. Kinmen Island has a long history of being utilized by distant powers for extraction of resources and production for distant markets. Orchid Island has only recently come into more regular contact and exchange with Taiwan and the wider world, most notably as site for nuclear waste storage. Investments in landesque capital on Orchid Island have rather been primarily endogenously generated, strengthening the local economy. Analyses of ecologically unequal exchange, landesque capital and landscape transformation on the two case islands are conducted up to the present day, and are injected into ongoing deliberations and debates concerning policies for sustainable development.
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755 **Groundwater Irrigation in the Western Desert of Egypt: Ancient irrigation technologies in context**

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This paper is based on research from my dissertation examining several cases of ancient and medieval 'qanat' irrigation practices in Iran and the Mediterranean world. Comparisons and connections among these landscapes are based on similar technologies of groundwater extraction in arid environments; common constraints and techniques; and a discussion of human contacts and the spread of ideas, including imperial expansion, throughout the broad region between the highland plateau of Iran and the mountains of the Balearic Islands of the Western Mediterranean.

The site of qanat irrigation dating to approximately 500 BCE, in Kharga Oasis in the Western Desert of Egypt, is chronologically the earliest case of my study. This region, also sometimes called the Libyan Desert, is west of the Egyptian Nile and north of present-day Sudan. The Western Desert is classified as hyper-arid, one of the most arid environments on Earth, averaging less than 1 mm of precipitation per year.

Kharga Oasis is located 200 km west of present-day Luxor (site of ancient Thebes). In effect, Kharga Oasis is located at the geographic center of the modern political state of Egypt, though it takes at least eight hours on the new paved road to reach there from the densely populated Nile Valley. Today, the Egyptian government refers to Kharga as the 'new valley,' part of an initiative that sees Kharga and other oases as a solution to population and resource pressures along the Nile.

The Nubian Sandstone Aquifer is geologically one of the oldest aquifers in North Africa, and is certainly the largest. The present-day states that overlap this aquifer are Egypt, Libya, Sudan, and Chad. Much of this 'fossil water' is trapped in geological layers beneath the Sahara, and is not renewed on a human timescale. An oasis, by definition, is a depression in the desert plateau, and is located closer to groundwater. The part of the Nubian aquifer that is available to Kharga was trapped in sandstone during climatically humid periods of geological formation, 100 million years ago. Hydrologists estimate that in 1998, water tables of southern Kharga had dropped up to 60 m since the start of deep well pumping extraction in 1960.

Keeping in mind these facts of aridity, non-renewable freshwater aquifers, and the struggles of farming in an arid environment, how do we make sense of the fact that this oasis was an exceptionally productive site of

agriculture during the Greco-Roman period in Egypt? Moreover, the site of qanat irrigation systems currently under excavation by archaeologists in Kharga is estimated to have lasted for approximately 700 years of continuous use before running out of available water. What interpretations of this data can we draw upon to understand timespans of agricultural cultivation dependent on non-renewable groundwater supplies? How how might it change our perspectives on technologies of groundwater extraction and depletion in a longer historical timeframe?

758 **Social memory and landscape: slash-and-burn agriculture in the formation of an atlantic rainforest area inhabited by quilombola communities, ribeira valley, brazil**

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The Atlantic Rainforest is considered one of the world's biodiversity hotspots, and only 8% of its original cover remains. The Ribeira Valley, in the State of São Paulo, Brazil, is one of its biggest and most representative remnants sheltering several Quilombola populations. These populations were formed during the 18th century by the descendents of fugitive or abandoned African slaves, brought to the region to work on river gold mining. For two centuries, Quilombolas have developed a productive system based on slash-and-burn cultivation and extraction of forest products, with peripheral involvement in market economy. This picture has been changing over the last decades, bringing profound transformations to the Quilombola subsistence system and the landscape. The landscape is here considered as a place of interaction between time and space, nature and history, biological communities and human societies.
Semi-structured interviews were applied to the community's eldest individuals, focusing on their life history and associated slash-and-burn agriculture activities, and family landscape units. Old swidden and old household plots were visited and registered in a GIS, together with information on the size, shape and use history of each plot. Floristic composition and phytossociological analysis were undertaken, in order to determine forest structure and dynamics and species composition. Multitemporal analysis of Landsat satellite images complemented field studies.
Preliminary results show that part of the agricultural production of the communities was already composed by market oriented crops in the 1920s. Commercial banana production and palm heart extraction, in the 1930s, increased the role of cash economy in the Quilombola productive system. The creation of Natural Protected Areas, since 1950, has restricted the agricultural activities to smaller areas than the ones used in the past and imposed changes in land use. These factors, together with road constructions and the building of schools, in the 1970s, promoted the concentration of the households around villages, with the swidden plots maintained nearby. Until then, the houses were sparsely distributed and the swidden and fallow plots occupied vast areas troughout the landscape.
These results indicate that slash-and-burn agriculture erosion is producing changes in the landscape, such as improvement of permanent cultivated areas, decrease in the number of areas maintained in the early stages of forest succession, increase of secondary forests, loss of crop diversity and impacts on forest biodiversity. If this process continues, it may generate a homogenization of the surrounding forested landscape, possibly causing local biological and cultural diversity impoverishment, and reducing the role of quilombola management in the constuction of the landscape.

764 **The environmental history of cassava cultivation in the ribeira valley, são paulo state, brazil: Market economy and shifting cultivation among quilombola agricultural systems**

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At the beginning of the colonial period, cassava played a central role in people's diet in the State of São Paulo´s coastal plain and near plateau. However, starting in the 17th century, cassava began to lose importance due to settlers' increasing penetration and establishment into the hinterlands. The growth of a plantation system in early 19th century focused on wheat, coffee, and sugar cane, also contributed to the decrease of cassava's cultivation in the state. Moreover, during the first half of the twentieth century, the state government launched major development enterprises to modernize local agriculture model, which led to the "green revolution" of the last 50 years. This process led to land use intensification as well as loss of crop diversity, in favor of a few market crops, accelerating the decline of cassava cultivation in the state of São Paulo. On the other hand, in the state's remote mountain areas, characterized by its steep topography and/or poor soils, agriculture remained

focused mainly on subsistence food crops such as cassava and maize. One of these areas is the Ribeira Valley, south of the state Capital, covered by the largest remnants of Atlantic Rainforest and inhabited by traditional peoples such as Quilombolas, descendants of runaway and abandoned African slaves that formed rural settlements in the 18th and 19th centuries. Quilombolas have developed a productive system based on shifting cultivation and extraction of forest products. One of the main characteristics of this agricultural system is the high inter and intra-specific diversity of species, mainly rice, maize, beans and cassava. Some crops were also cultivated for sale in regional market places. Until early 20th century, rice was the main market crop, followed by tea and coffee, and finally, banana, which rose as an important product in the 1930´s and still dominates the agrarian landscape nowadays. Despite some integration into regional market economy through these few market crops, Quilombola agricultural system had always been focused on subsistence. However, over the last 50 years, their productive system has undergone profound changes due to the gradual abandonment of shifting cultivation and increasing integration into the national market economy. These changes have also promoted the emergence of alternative subsistence strategies, such as the increasing importance of homegardens and areas near or adjacent to households for subsistence cultivation. These areas are now the main loci for cassava cultivation - previously cultivated in forest gardens. Nevertheless, alongside with its decreasing role in the local subsistence system, cassava is also undergoing significant variety loss. The deepening of Quilombolas´ integration into the Brazilian market economy appears to be leading to the gradual abandonment of traditional agricultural practices - especially cassava cultivation-, as it happened in the most part of the state of São Paulo in the 20th century.

779 **Population Displacements and Forest Resource Management in the Ottoman Empire**

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The ecological change triggered by the massive demographic displacements in the nineteenth and twentieth centuries constitutes an important part of environmental historiography. The large population movements usually affected the forested lands, more than any other geographical space, especially when these movements occurred in a relatively short time span. These movements put a great pressure on local resources and produce a challenge to the conventional resource management regime. By looking at the different layers of resource management, this paper will analyze the relationship between scientific forestry and resource use and allocation following the massive population displacements in the Ottoman Empire, occurred especially after the Crimean War, Russo-Ottoman War, Balkan Wars, and the First World War. The influx of immigrants into town and cities in the second half of the nineteenth century as result of the above-mentioned wars greatly affected the social and economic organization, which resulted in a re-conceptualization of resource use and distribution in the urban and rural contexts. In due course of these migrations, the central government received many letters of complaint from the provincial forest officials about the forest clearances carried out by immigrants. There were also conflicts and contestations between the immigrants and local inhabitants on the exploitation of forest products. The government, upon the increase of similar resentments, decided to remove some of the immigrants and resettle them to different spaces. On the other hand, the spatial dissemination of scientific forestry in the Ottoman Empire emerged to be the central feature of Ottoman approach to resource management in the nineteenth century. The field of forestry also exhibits a striking example of shared historical experiences between Europe and the Ottoman Empire. Though the Ottoman case did not always conform to the European models, it constituted a distinctive politico-legal regime that enforced the state ownership of forests through the claims of administrative authority and monopoly over the extraction and redistribution of resources. Focusing on the development of scientific forestry in the Ottoman Empire and the problem of settlement of immigrants, this paper will examine the economic and political transformations within the Empire caused by the uneven and contingent transformations concerning forest resource use from the mid-nineteenth century to the early twentieth century. This period witnessed a major transformation of the state and society relations in terms of environmental/ecological issues. Thus, this paper will also cover the interactions between the urbanites, population movements and forest resources. This includes looking at the ways in which people of different socio-cultural and religious backgrounds use forest resources. The relationship of natural resource use, environmental change, and societal negotiations and contestations over utilization of these natural resources will provide new openings by crosscutting conventional boundaries and relations between the state and civil society in relation to management of natural resources.

782 **The scientific knowledge and environmental NGOs: a historical approach**

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The questions of the production and consumption of the scientific knowledge have been a matter of academic concern in recent decades. However, in relation to environmental non-governmental organizations (NGOs) science has been given insufficient attention so far, although social movements can be rightly considered "seedbeds for new modes of practicing science and organizing knowledge more generally, and also as sites for critically challenging and reconstituting the established forms of scientific activity" (Jamison 2001).

Environmental NGOs have forcefully emerged into the public domain and have become increasingly accepted as new actors in the realm of science and politics. As Yearley (1991: 38) argues, "scientific expertise remains the principle form of legitimation in the leading environmental organisations there are no viable alternatives". Their treatment of the scientific knowledge and rhetoric of scientificity need to be examined more carefully from a historical perspective as their role in environmental governance is becoming stronger.

Historically, a great number of environmental campaign groups emerged as the carriers of a particular holistic worldview which is based on spiritual values and non-scientific forms of authority. In the early days of their emergence, some of them skeptically treated science as they were ideologically opposed to the scientific and technological progress which was often associated with environmentally-damaging consequences (e.g. pecticides, ozone-damaging CFCs, nuclear power, etc). However, as the time goes and the scientific and technical expertise becomes more sophisticated, environmental NGOs has no other option as to engage with science to back up their own arguments. Hence the practical challenge arises: how to carry out and/or commission research, how to interpret and communicate the available scientific expertise and how to react to urgent queries if no original research has taken place before?

In the presentation I will deal with the historical perspective of environmental NGOs in their treatment of the scientific knowledge. I will highlight their attempts to have in-house research capabilities and/or to commission research to academic institutions. I will put forward a complex interaction of social and political implications in the production and communication of science. Then, I will demonstrate the applicability of actor-network theory in regard to environmental NGOs and the scientific knowledge as well as examine the use of scientific arguments in their campaigns.

790 **"Those Cattle Thieves": Immigrants, Land-Use and Violence in a Nineteenth Century Ottoman County**

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This paper focuses on the provincial debates revolving around land-use and immigrant settlements in a small county in the Ottoman Empire, Vidin, located on the Danube River in the northwest corner of modern-day Bulgaria. In the 1860s and 1870s, the Vidin County was a part of a prototypical administrative unit designed by Midhat Paşa, the mastermind of the provincial restructuring of the empire and one of the ablest Ottoman administrators of his time. The documents produced by the newly-designed administrative institutions in Vidin shed light into the "politics of administration" in this community. Mass migrations of Circassians and other Caucasian peoples to the Ottoman Empire started in the 1850s; the Ottomans settled the earliest wave of immigrants in the Balkans. Initially, a significant number of them were sent to Vidin. There they were immediately embroiled in ongoing conflicts that eventually led to the withdrawal of the Ottomans from the region after 1877. The settlement of Circassians corresponds with that of other Muslim and Christian immigrants from Serbia and Wallachia during this period, when the economic developments in Ottoman-administered Bulgaria and the institutional transformation of the Ottoman Empire made natural resources (particularly land) highly valued and the debates regarding these resources highly charged. Of particular interest to me are discussions about three different immigrant groups that were settled in the region in this period: (1) The Circassian immigrants from Russia; (2) Muslims fleeing Serbia in the period leading up to and following the 1876 Serbian-Turkish War; (3) Bulgarian émigrés who left the region for Wallachia during the 1828-1829 Russo-Turkish war, but chose to return in the second half of the nineteenth century. A comparative study of local debates regarding immigrants settled in a already cosmopolitan city would reveal how the inhabitants of Vidin perceived their own Ottoman-ness vis-à-vis the new-comers in the context of nineteenth century transformation. While there are limited works on the experiences of the immigrant communities, no single study treats their impact on the community and environment in a comparative way. During the second half of the nineteenth century, Vidin's regional situation made the self-identification processes of denominational communities and ethnic minorities a more accentuated and the governance of diversity a highly problematic issue. These immigrants were held exempt from tax and military service for five years and were given weekly allowances. Matters were further complicated by the fact that some of them were returning émigrés who had claims over their former property. Facing these complex issues in a period that recent scholarship identify as "the high tide of its prosperity", local authorities were often required to report on the settlement of the immigrant population. The proposed paper studies the debates within the provincial administrative institutions regarding the challenges posed on the local populations' land-use patterns by the settlement of the immigrant populations.

793 **Metropolitan Problems and the Rural Environment in Seventeenth-Century Venice: Iseppo Paolini's map of the Piave River**

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Venice’s unique geographical circumstances lend themselves particularly well to environmental history. Most work on the history of lagoon management has examined the relationship between the urban fabric of the city and the surrounding waters, yet almost all of this work has ignored the connection between local problems and environmental changes on the peninsula. The Venetians themselves understood this relationship well, and wrote extensively about the threat posed by alluvial sediment to the integrity of the lagoon. Because the Venetians feared that sedimentation would eventually swallow up the lagoon and make it part of the mainland, they undertook a series of large-scale projects aimed at reducing the amount of sediment that surrounding rivers dumped into their lagoon. Such projects necessarily forced the Venetians to confront the connection between the lagoon and the mainland in a systematic way as early as the fifteenth century. This paper will explore Venetian ideas about the links between deforestation, agricultural techniques, and the pastoral economy in the Alps, and sedimentation problems in the lagoon at the turn of the seventeenth century. The main focus of the paper will be a map of the Piave basin and accompanying proposals for regulating local agrarian practices that Iseppo Paolini, a landowner from the town of Belluno, presented to the Venetian Senate in 1608. Because they constitute an appeal for state patronage, Paolini's map and proposal reveal a great deal about what Venice's

mainland subjects imagined the Republic's rulers thought about the connections between mainland environments and the lagoon. In this sense the map and accompanying illustrations shows how the mutually constitutive relationship between the metropolitan expertise of the Venetians and the concerns of mainland landowners could create a regional view of complex environmental problems.

795 **Historic Ponds in Rural Southern Burgundy: Water management from the Medieval Period through the Present Day**

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This paper presents research on the patterns of water resources and management from the early medieval period through present day in a region of Southern Burgundy located in the foothills of the Morvan along the Arroux River. This landscape has been an area of rural agricultural production from at least the late Iron Age up to the present day. The landscape in the research area is still predominantly agricultural, consisting mostly of small farms, some of which have a documented history going back 500 years. Animal husbandry consisting of beef and dairy cattle, sheep and goats is currently the primary farming activity, supported by fodder crops, pastures and meadows. Historical changes in the water management of the area have been tracked through such documents as the medieval cartularies of monasteries, the terrier or land holding records of the aristocracy, the deeds, bills of sale, and other family records of local farmers, 19th century cadastral records, and several types and dates of modern satellite imagery. Six sets of historic maps were utilized, dating from 1750 to 1983. This work included georegistration of the maps using a new and more accurate method, extraction of specific features, and analysis using GIS. These new hydrological and water usage data have been incorporated into and analyzed as part of Dr. Madry's extensive GIS data base of the research area that was begun in the 1980s. This database contains well over a hundred layers of information based on prior archaeological excavation, historical and cartographic research, survey and remote sensing. The time periods included in the data base range from the Bronze Age through the modern era. For this study, additional ground verification consisting of pedestrian and aerial surveys has been conducted to pinpoint the location of pond sites depicted on the historic maps as well as to identify vestiges of former water-related features such as mills and dams. The various types of mills (such as oil mills, cloth fulling mills, sawmills and mills for grinding grain) and their relationship to the landscape is explored. The role of fish in the economy and culture is examined as well. The relationship between mill ponds, fish ponds, ponds for soaking hemp, and the water for crops and animals is analyzed in the context of changing climate, economic fluctuations, and political upheaval.

Changing types of land ownership that range from feudal estates to pre-Revolutionary sharecropping on large communal farms to modern individually-owned small farms are investigated for their impact on land use and related water exploitation. The paper includes a brief discussion of the types of sources available for this research, the issues involved in integrating different types of data in a GIS environment, and the methods used in temporal and spatial analysis.

797 **Remaking the "Calabria of the North": Development, Pollution, and Environmental Politics in the Lower Elbe Region**

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In the aftermath of the Second World War, the West German state played a major role in facilitating the so-called Wirtschaftstwunder, or economic miracle, which underpinned the new liberal democratic Germany. The country's stunning success lent further momentum to the German corporatist model in which the state, in partnership with industrialists and the major labor organizations, engaged in massive development schemes, many of which required the total re-engineering of landscapes and waterways throughout the country. And since many of the nation's major industries required enormous quantities of water, river banks became increasingly crowded with aluminum smelters, petro-chemical facilities, and nuclear power plants. In short, the story resembles what James Scott describes as a high modernist scheme; the process whereby the modern bureaucratic state employs science, technology, and rational social planning by trained experts to re-order society in order to make it more productive and easier to control. However, unlike most of the examples that Scott uses, West Germany was a liberal democracy rather than an authoritarian state. In democracies, high modernism waxes and wanes according to the strength and conviction of particular governments and politicians, the degree to which large industrial enterprises exert control over the state at various times, and the relative strength of civil society. The complex interplay between these forces means that the state's ability, indeed, its desire, to plan and carry out high modernist schemes varies according to changes in political opportunity structures. Times of crisis, whether real or perceived, frequently provide opportunities for states to attempt massive development schemes with little opposition. At other times, however, a vibrant and empowered civil society has tenaciously opposed such schemes, sometimes quite successfully.
This paper will examine the efforts of the German state, at both the federal and Länder level, to transform the Lower Elbe region of North Germany from an underdeveloped "Calabria of the North" into "ein zweites Ruhrgebiet." As well as constituting a massive attempt at environmental and economic engineering, the development, I argue, gave rise to new forms of environmental protest, particularly various kinds of nonviolent direct action. One result of this was the emergence of a vibrant ecology movement, exemplified in the rise to prominence from the late 1970s of the German branch of Greenpeace. In addition to the new forms of protest, the state's high modernist schemes also revitalized an anti-modernist discourse with roots in pre-war German Naturschutz movements. Furthermore, the international outlook of groups like Greenpeace and Friends of the

Earth meant that ideas and protest strategies from North America, suitably adapted to fit the local context, became part of the German environmentalist repertoire. Naturally, such protests were rarely able to derail the plans of a determined high modernist state.
Nevertheless, there is considerable evidence to suggest that protest movements, though unable to stop the state's development scheme, were nonetheless able to reduce their scale and their environmental and social impact.

799 **Designer Weather: Irrigating the mid-20th Century U.S. West**

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Although meteorologists barely had a grasp on forecasting short-term changes in the weather in the late 1940s and early 1950s, the "science-and-technology-can-fix-anything" culture of post-World War II America spawned a variety of attempts to control the weather. Unlike most efforts to control nature, such as the major water distribution projects involving numerous dams, reservoirs, and hundreds of miles of irrigation canals snaking throughout the west, or the taming of the Mississippi River with extensive levee systems, weather control was not confined to a given geographic area. Therefore, the history of weather control in the United States—the story of designer weather and the private entrepreneurs who sought to provide it and the governments that sought to exploit it—is by its very nature an international story regardless of the local disputes that it often provoked. And at its root it is a story about water—in this case, water that can break a drought or bring a flood, or guarantee a bumper crop or bring agricultural ruin. Twentieth century French geographer Jean Brunhes once wrote, "Water is pre-eminently the economic wealth: it is, for men, more truly wealth than either coal or gold." Nowhere is this more apparent than in arid regions. As people migrated to arid lands west of the Mississippi, they quickly recognized that the lack of water was a problem. As the trickle of people turned into a flood in the post-World War II years, the problem became even more acute. Water was a, if not the, limiting factor to growth and advancing the American way of life.
It soon became apparent to government officials, farmers and ranchers, and individual entrepreneurs that nature must be controlled to provide water for both agriculture and the everyday activities of life. Massive irrigation projects flourished as engineers diverted water from the Colorado River and its tributaries to make the desert bloom. This expensive fix would have serious environmental impacts. The post-war zeal for exploiting the technological fix for all problems—natural and man-made—inspired people to look for a more efficient, and much less expensive, source of water. Instead of human built reservoirs, why not use the naturally provided one? Why not treat the atmosphere as a giant water reservoir to tap on demand? In the United States, the U.S. Department of the Interior launched Project SKYWATER to do just that. This poster examines the problems and the outcomes of this attempt to design weather that would make irrigation obsolete.

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803 **Transportation, Economic Transformation, and Resource Use: A historical case study in Southern Wisconsin**

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The development of the railroad in Southern Wisconsin in the mid 19th century took advantage of a U.S. economy based on diffuse agricultural resources (low gain) that were capturing the sun's rays. This diffuse resource needed to be harvested and concentrated, and thus towns blossomed as points of concentration. The railroad system emerged connecting these agricultural towns, transporting these resources to markets. The turn of the century brought an industrialized (high gain) economy based on higher quality resources, namely, fossil fuels. This economic transition from low to high gain was accompanied by an infrastructural transition, from rail to road. A town once supported by a railroad may or may not have been supported by a nearby highway. Currently the U.S. economy is again in a state of transformation, but this time, back to a diffuse resource base - information (the Internet) and sunshine (biofuels). This research narrates the position of one town in Southern Wisconsin in relation to its broader transportation, economic, and resource use context. Evansville flourished during the 19th and early 20th century as a stop on the rail connecting Chicago and the Twin Cities. It saw a decline, however, with the establishment of the highway system. It is currently in a state of rebound, as it has been chosen as the location for the largest biodiesel plant in Wisconsin, because it is still on the railroad. While both roads and railroads show a fractal pattern of networks within networks, the way the respective systems developed is opposite; roads cascade upwards in scale while railroads cascade downwards. This research explores how this subtle difference in development as a consequence of the broader economic shift from low to high gain may have had reverberating impacts on regional demographic, land use, and energy use trends.

The theoretical basis of this research is centered on concepts of high and low gain energetics in social-ecological systems. GIS and network theory are utilized to analyze the development of transportation infrastructure in this context. The resulting interdisciplinary narrative blends insights from ecology, economics, geography, and history through a systems framework to explore multi-scale interactions and responses to large-scale transformation in social-ecological systems.

804 **Mining Indigenous Canada: The Tahltan First Nation, Royal Dutch Shell, and Coal-Methane Gas Exploration in Northwestern British Columbia.**

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This paper examines the alliances that have developed between environmental and human rights organizations and First Nations in Canada as a strategy to confront local dislocations, environmental degradation, and global capital. Canada is one of the largest suppliers of gas and mineral resources to the global market and the extractive industries have a tremendous impact on First Nations communities (Bielawski; McPherson). This case-study presents the current controversy surrounding Royal Dutch Shell's coal-bed methane gas exploration and development in the Klappan area of northwestern British Columbia, the headwaters of three major river systems and the heart of Tahltan traditional territory. This massive project, supported by the provincial government's granting of mineral rights to Shell in 2004, has met opposition from local, national, and international environmental organizations. While the Tahltan's elected leadership has consulted with the company over the terms of the exploratory drilling, the community's response to the mining development is much more complex. Iskut and Tahltan community members, represented by the Kablona Keepers, have forcefully opposed this development and point to the failure of the consultation process. In 2005, the Klabona Keepers issued a public moratorium on industrial activity in their territory and in 2007 they placed a "call for help" to the international conservation community. The Kablona Keepers have asked that Shell and the province postpone development until they document their Indigenous environmental knowledge of the area and develop a land stewardship plan.
This paper traces the history of industrial development in Tahltan territory in the post-WWII period, Tahltan resistance to and/or support of mining, and, importantly, the varied perceptions surrounding the accumulative effects of the bust and boom cycle of industrial development on local communities. It also examines local debates about the nature of the stewardship responsibility over development occurring within one's traditional territory. In other words, this paper explores how the Tahltan's relationship to the environment has been articulated in these various political contexts and asks, how are Indigenous understandings of the environment and stewardship brought to this issue both in support of and opposition to mining? This research, based on extensive interviews with Tahltan community members, highlights the relationship between multiple environmental knowledges and strategies of resistance. It allows for further theorizing on the relationships among Indigenous discourses surrounding the environment and those employed by resource extractive companies, the state, and international human rights and environmental organizations (Turkel).

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807 **A Multi-Proxy Reconstruction of Environmental and Land Use Changes from Medieval Aged Reservoir and Mill Pond Sediments, Southern Burgundy**

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This paper presents the methods and preliminary results of a multi-proxy study of natural and human-induced changes in the Burgundian environment, as recorded in the sediments of several small freshwater basins within the Arroux River Valley region, east-central France. Accelerator mass spectrometry radiocarbon dates constrain the age of sediments within the cores, and suggest that some basins were constructed by at least 1200 A.D. The reservoir and mill pond sediments are predominantly massive, organic-rich muds, but contain discrete sand and gravel lenses likely related to episodic flooding and/or basin drainage. Elemental analysis of cores by X-ray fluorescence and sediment magnetic susceptibility measurements reflect changes in material flux to the water bodies, primarily as a result of catchment soil erosion. Variations in sediment core organic carbon content indicate changes in reservoir and mill pond primary productivity, also related to soil erosion and the changing transport of soil nutrients to the basins. Catchment deforestation, agricultural production, field abandonment, and plant succession, as well as vegetation in the basins and related water nutrient conditions are reflected by pollen deposited in the sediments.

Direct comparison of reservoir and mill pond sediment core data with known local land use histories (see Madry, Jones, and McDaniel, this panel) and also with regional climate records (e.g., Chuine et al., 2004, Nature 432, 289-290) provides a unique opportunity to examine the direct cause-and-effect relationships between human activities, natural environmental changes, and long-term watershed dynamics. Reservoir and mill pond sedimentary archives, in conjunction with historic records, can thus be used to better understand past land management strategies. Moreover, the documented landscape changes can be examined within the context of prevailing climatic conditions over the last ~800 years in an effort to establish best management practices and the most sustainable land uses under future climate change scenarios. This has broad implications not only for local research, but also for the global community of researchers interested in understanding how the sediment

record from freshwater basins can be used to interpret past (and predict future) human and environmental impacts on the landscape.

808 **Hark! A Tale of New Narratives: Complexity, Post-Structuralsim, and the Space Between**

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Historians are in the story-telling business.

History is about offering compelling narratives that give shape to our perspectives in order to guide future action. Formed in the image(ination) of the present, the past is always being invented to fit contemporary proclivities, preferences, and ideals. Bound only by ourselves, the eternal task of historical analysis is to illuminate those same bounds in order to understand, incorporate, and move beyond them. There are many approaches in historical analysis – as many as there are historians, armchair or otherwise. We can focus on local or regional activity and actors, convincing ourselves that there is a real and necessary distinction between the two. We can write histories that move through the different scales that manifest in our analyses. We can place particular significance in particular people, particular ecologies, or particular events. Through all of this, however, we should not forget that these analyses and narratives are a function of ourselves as writers and imaginers.

This paper explores the potential in combining two seemingly distinct and unique discourses – ecological complexity theory in the guise of self-organizing holonic open (SOHO) systems and high-gain/low-gain concepts of resource acquisition, use, and the developmental processes contained therein with post-structural theory in the form of performativity and actor-network theory – towards the goal of writing powerful and compelling narratives of historical change. Through these tools, I demonstrate how disparate modes of thought can inform each other and our perspectives on the social and ecological systems that interest us. I focus these two discourses on the migrant Swiss community of New Glarus, Wisconsin, a colonial extension of an economically uncertain Swiss canton circa the early to mid nineteenth century. Emblematic of many of the settlers in the American upper Midwest at the time, I focus on how cultural narratives, informed by the ecologies of their historical development, become alternatively incoherent and essentialized, and how this process and its extension impacted on land use patterns up to and including current suburban development in the Midwest.

The past lingers in our beliefs and ideologies, informing our present as much as it recursively informs the past. The intention of this paper is to highlight the power of these post-structural and ecological complexity tools and analyses for the further extension into and development of other socio-ecological systems. In addition, it argues away from both simple, deterministic as well as overly particular, non-relatable narratives of historical change. If we want new stories and new narratives, we need new tools and perspectives. This paper demonstrates one possible route.

813 **The Pursuit of Harmony: The Dujiangyan Irrigation System and the Traditional Chinese Vision of Nature**

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The Dujiangyan Irrigation System in Sichuan in the Southwest of China, had been built around 2300 years ago before the Qin dynasty unified China and is the most ancient damless water system in the world which is still functional today. In the ideas behind its design, building, and management, this project embodied the traditional Chinese vision of "tian ren he yi" (the unification of nature and humans) and "wu wei er wu bu wei" (doing nothing is doing everything following the law of nature). Rather than over-exploiting nature, this project attempted to transfer nature's excessiveness: flooding into water resources beneficial for human beings, imposing as little external or artificial force on nature as possible in order to gain the harmony between nature and human beings.

This paper intends to explore the ideas of the irrigation system from two aspects. First, the Dujiangyan combined a comprehensive approach and intimate local knowledge of the geo- and bio-landscape in its construction. The comprehensive approach not only suggested the intention of realizing the multiple values in economic, social, and aesthetic realms, but also adopted a vision seeing nature as a holistic system in which all the elements, water, soil, fauna, and flora had their own niche and order. In the effort of making water a useful resource, the natural system was to be respected and followed; thus, the major theme instructing the entire project was to channel the river instead of damming it. This comprehensive approach set its foot on the ground, applying local natural materials and studying the flow and amount of the water, the characters of the soil, and the local people's various needs.

Second, from the outset of its construction, rather than pursuing instant profit, the Dujiangyan aimed to accomplish a sustainable irrigation system for the sake of future generations. This foresighted view was coherent with its comprehensive approach. The latter regarded nature as a system of fluxes; and the former found society a process of changes, more unstable and unpredictable than nature. Thus, any instant profit might have been a celebration for its own generation, but would likely be a disaster for its descendants. And any negative effects occurring to the system of nature might have been indiscernible in its own time, but would become even bigger and more severe crisis in the future.

The harmony the Dujiangyan was searching for was not a stagnant or inanimate situation between man and nature, but a kind of complicated balance attained through different confrontations and concessions. The role of man in this relationship was far from being a passive acceptor. He was active but not aggressive, participating

but not intruding. In its essence, the construction of the Dujiangyan intended to unify the law of nature with the law of society, seeing them as two sides reflecting and supporting one vast and complex system.

819 **In the Steps of the North American Indians: Woodcraft Roots of Czech Environmentalism**

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Unsuspecting foreign summertime travellers visiting more scenic parts of the Czech countryside might be taken aback by frequent sights of teepee cones. They might be similarly perplexed, when visiting a newsagent, by a front cover of a children's magazine adorned by pictures of teepees, totem poles and headdresses. Our travellers might also, if they are lucky, as this is a rarer sight than the first two, stumble across a spectacle of what appears to be a 1880s camp of a prairie Indian tribe busily preparing food and tools. Equally, if not more confusing might be a TV show based on the competition in starting fire by rubbing a piece of wood against a bow. The phenomenon has also become a subject of cinematographic representation, both foreign (If Only I Were an Indian [Canada 1996]) and Czech (Indian and a Nurse [2005]).

Domestically, journalists (e.g. Zachovalová, 2005; Feřtek, 2006) and academics (e.g. Librová, 1994 and 2003) alike have been trying to get to grips with the phenomenon of voluntary simplicity, the associated belief of significant sections of the Czechs population in education-induced lifestyle changes as a way of addressing environmental problems and the predilection of Czech environmentalists for combining hard manual work with games and campfire bonhomie (Librová, 1986; Hanuš and Jirásek, 1996).

A person at least cursorily acquainted with the history of 20th century outdoor movements might get a whiff of understanding by a glimpse of a mainstream bookshop shop-window well stocked with Czech translations of 100 years old books on North American wilderness by E.T. Seton, an author who in his native (British) and adopted (Canadian and US) homelands passed into obscurity shortly after his death in 1946 (Morris, 1970; Anderson, 1985). Seton was also the originator of an educational programme called woodcraft. It was informed by the Enlightenment-related theory of recapitulation and the late 19th century US woodcraft as a set of skills for survival in wilderness. Seton's original contribution was to combine these two strands and to relate them to the rituals and the character of the Indian as a role model.

The central argument of this paper is that today's Czech environmentalism owes much of its ideational orientation – the emphasis on simple lifestyle, low consumption, outdoor education and working knowledge of nature - to the legacy of woodcraft. In developing this argument I will proceed in three steps. First, I will highlight the often unrecognised, yet lasting legacy of Seton's Czech follower Miloš Seifert who was responsible for the early import and adaptation of woodcraft to the conditions of the interwar Czechoslovakia. Second, I will show how Seifert, as a high school professor of biology, from the 1910s onwards systematically promoted woodcraft as a movement for environmental education and nature protection and how he sought to attract contemporary leading biologists to the movement. His efforts laid ground to the long-standing tradition of prominent academic ecologists' association with woodcraft. Third, I will demonstrate how the woodcraft ideational legacy continued by influencing Czech major environmental organisations established in the latter half of 20th century including Tis (1958), Czech Union for Nature Conservation (1979) and the Rainbow Movement (1990).

825 **The Cold War Landscape**

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In the paper two different "cold war landscapes" and two different views at them will be presented. In the first part a former military training area of Mlada will be presented. It is a large area that was in hands of Soviet army for over 20 years. Despite the use of heavy machinery (tanks, cannons, missiles) a lot of vulnerable and endangered animal and plant species managed to survive whilst they have disappeared from the neighboring countryside. Currently there is an ongoing discussion about the future management of the area. The presented research is aimed at the land cover development of the area in contrast with the land cover development of the neighboring farm land. Moreover, some examples of the possible future development for this area will be shown. These conclusions are based on experiences gained abroad, where there was also a need for a new development in ex-military training areas. For instance, newly established management in such areas in Poland (Borne Sulinowo) and in Germany (Königsbrücker Heide and Döberitzer Heide) will be presented.

The other part of the paper will be aimed at a broader view in which we can perceive the "Cold War Landscape" because the border land will be under a research inspection, precisely Czech-Austrian borderland. This particular area played a very important and, from a military point of view, a crucial role in the history of the last century. It has been significantly influenced by the events related to WW II. During the late 1930's there was built a belt of bunkers to protect Czechoslovakia against fascist threat. Later, when the war was over, the Czech Germans have been transferred from this area. For more than forty years, large parts of this area were closed to public and served as a "border military area" (the term "iron curtain" comes from this period). These events together with establishing communist systems in central and East Europe have left its imprints in landscape. The presentation would like to discuss and show what actually the "iron curtain" was and how it has influenced the landscape development. Moreover we would like to show some examples of a "landscape memory". It will also be presented a land use development at the Czech and Austrian side together with the land cover development

of case areas.
We would also like to have a closer look how the above mentioned events have influenced biophysical relations in respect to main material and energy flows which support local economies. For this purpose we use the concept of social metabolism and the methods of material and energy flow analyses which deals with an economy as an analogy with living organism which extracts materials from nature (landscape) and emits back wastes to support itself. Historically Czechoslovakia used to be strongly industrialized and had a prerequisite to be a country with a high volume of flows of materials from its very beginning. Moreover the post-war period (after WW II) was strongly characterized by further development of heavy industry, coal mining and massive agricultural intensification. This was projecting into volumes of material flows of biomass and had strong impact on land use structure development with sharp regional differences.

826 **"When Elections Go to the Dogs: How Parliamentary Politics Drove Canine Evolution in England in the 19th Century"**

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We have recently seen a surge of interest among historians in ways in which human beings have shaped the evolution of other species (Russell 2003; Schrepfer and Scranton 2004). Most studies of this process have focused on proximate causes. Studies have shown, for example, the impact of breeders on wheat and of medical scientists on hemophiliac dogs (Schrepfer and Scranton 2004). This paper examines a longer causative change and identifies electoral politics as one social force driving evolutionary change. It uses a case study, the impact of electoral reform in the British Parliament in the first half of the 19th century, as a case study.

This story focuses on two watersheds. The first is Parliament's banning in 1835 of blood sports, including baiting (setting dogs to attack a variety of species, such as bulls and bears) and fighting (having dogs attack each other). This law threw bulldogs, a breed that specialized in baiting bulls and was suited for few other jobs, out of work. Only a few bulldogs survived as pets for the rare owners who did not mind the bulldog's nasty temperament. With pet keeping as one of the few markets for bulldogs, breeders reversed the temperament of the bulldog, from the ferocious beast suited to bull baiting to the sweet pet suited to family life. The development of dog shows in the last half of the nineteenth century created a major new market for bulldogs. Attacking people or other dogs disqualified show dogs. The upshot was that, over the nineteenth century, the behavioral traits that defined working bulldogs (courage, tenacity) were replaced by the opposite temperament because Parliament's 1835 eliminated the dog's former employment and forced it to adapt to a different environment.

Explaining the 1835 act takes us another upstream to another watershed, the Reform Act of 1832. Parliament had considered bills to ban bull baiting in almost every session from 1800 to 1832, and all had gone down to defeat. Conservative aristocrats, many of them from rural areas with utilitarian views of animals, saw to that result. Before 1835, then, electoral politics had almost no impact on bulldog evolution. That changed, as we just saw, in 1835. The reason was that the 1832 Reform Act had increased representation of urban areas, where the respectable middle classes and human sentiment thrived. The election of a new breed of Member of Parliament led to the passage of the 1835 act, which in turn led to fundamental changes in the bulldog breed. Electoral politics thus drove changes in canine evolution.

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830 **Environmental Social Justice Norms in Japan**

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This paper will examine how ideas of environmental social justice can be used to evaluate environmental movements in Japan. Japan has a rich history of local environmental activism, ranging from anti-nuclear and anti-dam movements, to movements to protect natural areas from destruction. Although environmental social justice is a relatively new concept for Japan, even many older movements can be understood through environmental social justice lenses. As economic inequality spreads in Japan, environmental social justice issues are gaining new credence in Japan. This paper will explore these issues through several case studies of environmental NGO activism in Japan.

831 **The search for a blank canvas: the reclamation of the Agro Romano between ruralismo, corporatismo and (dis-)urbanesimo**

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The massive programme of land reclamation of the Pontine Marshes (Agro Romano) in the southern periphery of Rome was one of the most ambitious projects carried out by the Fascist regime in the late-1920s and 1930s. The programme combined successfully the Fascist rhetoric of ruralismo and urban decongestion (disurbanesimo / sfollare la citta) with the desire to enact a genuine socio-economic utopia, based on corporatism and productivism. 'New cities' (nuove citta) and communities (borgate) were created in the reclaimed lands, where a

growing number of people were relocated in the 1930s in a glorified economic, social and natural environment. The socio-economic and anthropological developments in the Agro Romano became favourite topics of Fascist propaganda, with Mussolini visiting the areas on every possible occasion and with maximum publicity, of course.

The reclamation of the Agro Romano by the Fascist regime was a symbolic instance of the Fascist 'conquest' of both abstract space and nature - in the name at the service of the reborn Fascist 'new man' (uomo nuovo). The Agro itself had been a notoriously unmanageable and unusable area in spite of efforts to reclaim it since ancient times. The Fascist success in this domain was celebrated as a triumph of Fascist will and a manifestation of the Fascist regenerative project that was both highly symbolic and eminently visible. At a time when most of the Fascist utopian ideas about the revolutionary transformation of life (corporatism included) were failing to translate into reality, the reclaimed Agro constituted the perfect blank canvas on which the Fascist regime could enact in miniature an ideal scenario of what life could have been under Fascism.

In the 1930s the various projects involving the Agro Romano were publicised by the Fascist regime as the blueprint of revolutionary socio-economic transformation in a regenerated natural space. The organic integration of natural, economic, and anthropological space was celebrated as an ideal alternative to overpopulated cities and under-utilised natural resources. With the reclamation of the Pontine Marshes the regime was capable of claiming that it had at last bridged the gap between city and rural periphery, conceiving of the entire area as a self-sustainable region (hence the discussions in the late-1930s for a genuine regional plan involving Rome and the Agro as a single unit).

The paper focuses on the rhetoric of bonifica integrale used to describe the various projects implemented in the Agro Romano. It shows how the area was deployed by the regime as a living museum of Fascist technological, environmental, socio-economic and anthropological utopias. However, the paper also underlines how the environmental significance of the project was overshadowed by the aggressive rhetoric of 'conquest' and 'victory' over space and nature, and undermined by the unresolved contradiction of a Fascist policy that glorified ruralismo but also promoted urban expansion. By the late 1930s the Agro had become a largely isolated, unfinished showcase of a would-be Fascist revolution, soon to be overshadowed by the massive programme of urban expansion to the south of Rome in preparation for the ill-fated 1942 Universal Exhibition (E42).

842 **Wood and wood products in the English economy, c.1550-1750**

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This paper will present new findings on two key aspects of England’s highly unusual path of early modern economic development: the transition from wood to coal use as a provider of thermal energy, and the importation of wood products (especially ash) as a key resource. England’s precocity in the use of coal is well known and has led to widespread debate over its importance relative to wood and the reasons for this change. The paper provides some quantification of this shift, suggesting that heat energy from coal had become more important than that from wood by the 1620. It also provides new consideration of price data that has often been employed to give inaccurate comparisons (such as not comparing like with like products) to suggest that 1560-1620 was a key period in price divergence between wood and coal in south-east England, and to suggest reasons behind this.

It has also long been recognised that from the middle of the seventeenth century England imported large amounts of timber and naval stores from Scandinavia and the Baltic. The paper also provides new estimates of this trade and its significance for the English economy. A key, but barely discussed aspect of this trade was the import of wood- and potash, employed as an alkali in numerous industrial processes. Ash import for the English and Dutch economies consumed more wood at its peak than either timber importation, or domestic firewood consumption in both countries combined. The extent and parameters of this trade will be outlined, providing a novel sense of the dependency of north-west European economic leadership on very extensive exploitation of the wood reserves of the east.

845 **Institutional dynamics governing forest resources in Babati district, Tanzania**

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This paper focuses on results of a study on institutional dynamics governing forest resources in Babati district, Tanzania. The study was conducted in four villages with Miombo woodland vegetation. The objective of the study was to track institutional dynamics and its corresponding condition of forest resources. Institutional dynamics is defined here as change of institutions over time. The paper covers Africa-subsaharan region and touches topics of governance; and forest and woodlands during modern period in 1945 until 2005. Institutions are defined as established rules and norms governing forest resources. The study covered both bureaucratic and socially imbedded institutions. The bureaucratic institutions are those formalized arrangements based on explicitly structures, contracts and legal rights, often introduced by governments and development agencies. Socially imbedded institutions are those based on culture, social organization and daily practices (Cleaver, 2002). Governance in this document refers to set of regulatory processes and mechanisms and organizations through which political actors including state, communities and NGOs influence environmental actions and outcomes (Lemon, 2006). Research design used in this study was a case study and data was collected using in-depth interviews.

Results of the study indicated that prior to independency (1945-1960) the bureaucratic institutions were used in

governing government owned Bereku forest reserve. The institutions prohibited cutting of trees, allowed grazing of cattle during certain periods and offenders were fined. Forest cover during the period was very think as perceived by farmers. However, deforestation occurred in 1945 and 1955 during tsetse fly eradication campaigns. Socially imbedded institutions before independency to 2005 prohibited cutting of some tree species associated with water sources. Non compliance sanction included prayers of traditional elders for wishing offenders bad luck. After independency, in 1961 the new government implemented similar bureaucratic institutions as before. But, the villagilization process in 1974/75 disrupted the enforcement of the rules leading to deforestation. In 1975 to 1994, the government prohibited grazing and collection of firewood in the forest reserve. However, foresters and elites were involved in illegal logging leading to bear land. Local people also obtained timber, trees and firewood illegally. In 1994 to 2005, new governance institutions were established. Tree cutting was prohibited, dry firewood collection was allowed, village environmental committees, foresters and NGOs were involved in implementation of the rules. The forest cover was restored similar to the period during villagilization process. The study concluded that deforestation occurred during the period of institutional failure and tsetse fly eradication campaigns while forest cover improved during the period of forest governance involving government, local community and NGOs.

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847 **Was the governmental prohibition of slash-and-burn a reasonable solution for Northern Karelia in the end of nineteenth century?**

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In the beginning of 1870s Olonets province was occupying a total area of about 132.000 square kilometers. At the same time the land owned by local peasantry and suitable for agricultural purposes amounted to not more than 19 percent of the total territory. According to Karl Weber, the great share of this land (62 percent) was absolutely unsuitable for any kind of farming. At the same time ploughed fields together with personal plots occupied only one fifth of the land suitable for agriculture (38 percent of the total area) and had not even made up one fourteens part (7.3 percent) of the whole land spectrum.

It is known that the harvests from regularly ploughed fields on average reached a little more than four times sown seed-corn (sam-4), often - sam-3 and not infrequently - only sam-1.5. Extremely unfavourable climate conditions aggravated the situation even more and quite often deprived peasants of any results of their work in the northern part of Karelia.

However, at the times we are focusing on, the productivity of regularly ploughed fields was not as important, as crop yield on slash-burn cleared fields. These plots formed a special kind of strips, every one of which was used recurrently every certain number of years, being cultivated by families and village artels. Based on continuity of this ancient tradition of slash-burn farming, even contemporary experts determined this system as ´rotation of slash-and-burn agriculture'. Slash-burn fields harvests always reached much larger volumes, which were almost not comparable with the yields from the village fields. Gomilevsky being an expert in agricultural history, believed that 'harvest sam-25 was very normal, often reaching sam-30, sam-35 and even sam-40; it could even reach up to sam-60'. Assuming that an average harvest on the plots cleared of forest was such that it exceeded the amount of seeds 30 times (sam-30), the researcher did not doubt that not only the rye, but also the turnip, which was most preferable in this area and represented a significant part of local food ration, gave guaranteed good yield on slash-and-burn fields.
Unfortunately, this traditional farming that sufficiently provided peasants with bread, vegetables and root crops, was undermined by the reform of 1861, and then became almost abolished by a number of prohibitive governmental decrees. Officials believed that the forests in Karelia were about to be exterminated based on forestry experience of Central Russia and consistently acted for destruction of this local ancient way of farming. Countless verifications given by contemporary experts of the sensibility and practicality of Karelians did not succeed in affecting utterly short-sighted administrative policy of prohibitions and additional duties in the area of forest use, which led to eradication of not only slash-burn clearing, but also a number of very profitable trades such as tar extraction and firewood trade, and — inevitably — resulted in making it impossible for any local peasant family to provide for itself.

849 **The development of fish resources in the economy of Early Modern Karelian society (limits and informative potentiality of written sources)**

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The fishing took a significant role in the traditional economy of local Karelian communities. With the exception of rye harvests obtained from arable lands the fishing provided the great profit as well as hunting or gathering. The fishing water area began to develop with the process of dwelling. The bounty zone had become more definitive by the early modern time and was fixed in written tax sources. However, the challenge of humanity wasn't as striking as the challenge of the nature was. The traditional pre-industrial society considered the fishing as a significant share in the economical structure for the well-known territories were divided among the

state peasantry, the low clergy, the monasteries and the nobles.

The prime aim of the report is to reveal the development of the fishing area as well as its influence on the social situation in the region. The study will be based on the comparative analysis of the two chronological slices. We will examine the situation for the Early Modern time, and then turn to the half of XIX-th century. The first task here is to trace the changing of fishing area and to evaluate the average profits obtained by the local communities. The resource area could be mapped and the overlapping zone might be defined as well. Another task is to investigate the peculiarities of social tensions arisen due to the conflicts around the privilege to use and own defined fish areas. It is supposed to explore the strategies of the actors and the role of the administrative power in the process of regulations. However, the subject here is to trace the changes of the conflicts and the relations through the ages.

The report will involve a wide complex of written materials. As for the Early Modern time these are the tax and the state documentations, petitions from the local communities. It is necessary to outline that the Scribe books are the earliest written sources describing the beginnings of the permanent explorations of the water fish resources. Being composed for the purposes of taxation they fixed the fishing area, the local communities which hold fishing dwellings on a lakes and rivers, the number and quality of fishing equipment, the size of annual taxes taking by money or sometimes by fish for the tsars' meals. Concerning to the half part of 16th and the first part of 17th centuries Scribe books give a possibility to trace the origins of the fishing area. As it seems the documentation of local self-government (zemstvo) as well as the state statistic documentation from the 19th century could provide the comparative study. Another type of our potential sources are petitions of local communities composed through the ages and as some notes, diaries of travelers and expeditors. These materials give a lot of information for the revealing of social relations on the subject of fishing. The main task is as use the information which is performed in documentary sources, as examine the possibilities and limits of our archive and published informative materials devoted to the subject.

850 **The industrial objects and transport system in Karelia in the beginning of eighteenth century: human activity and the local environment changing**

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The evolution of industrial object and transport system played the great role for the local environment changing. The peculiarities of that process were fixed in the historical sources, but only early maps could provide us with the information about industrial objects' location. The maps of Olonets province with the catalog were made in 1728 and those sources contain valuable information about factories, roads and watermills location, so that objects' anthropogenic influence was defined.

Four metal factories were joined to "Petrovskie zavodi" administrative-industrial union and its consisted the heavy industrial sector in the time of 18th century beginning. That objects' anthropogenic influence was connected with the necessary of raw materials collection, so the forests were destroyed to produce charcoal and the ore deposits in the bogs and lakes arrears were developed till its exhaustion.

The changing of local environment was also provided with the water mechanisms' building, so the water level of Karelian rivers was changed radically. Those mechanisms were built under the iron factories, but its majority was consisted with the watermills. Those object total number was 197 units and only 32 of them were demonstrated by the map of Olonets province. Their watermills were consisted from wood and grainworking types. The activity of woodworking mills was connected with the destroying of neighboring forests, so the erosion of banks' soil and reducing of hydrologic accounting were quite essential. The grainworking mills supported the agriculture activity of local population and there weren't so negative consequences to local environment.

By the data from map of Olonets province and scientific literature provide us information that the main and country roads with the water-ways consisted the local transport system. The main roads' condition was supported by government, but the country roads' working was provided with the efforts of local communities. In the both cases the natural resources as soil, wood and stones were collected from the environment to support the those objects' functioning.

Finally it should be mentioned that the humans' influence to local environment was quite essential; that influence was supported mainly with the industrial objects' building and activity. The building of new factories, roads and watermills with its activity led to the environment's changing, so we can judge about that process with the using of wide range historical sources, where the early maps should play especially role.

863 **Critical Habitat**

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In the 1960s, Paul Ehrlich and a group of scientists sought to turn a butterfly that lives in small remnant patches of native California grasslands into a model system for population biology, at the same time that Ehrlich was making population the global issue of the times. Ehrlich succeeded on both scales. Although the population bomb was controversial, population and consumption remain core concerns. And Ehrlich and his colleagues did turn the Bay checkerspot butterfly into a model system, out of which grew important developments in population ecology, conservation biology, and the first habitat conservation plans. But while they studied the

checkerspot and turned its habitat on Jasper Ridge in the hills above the Stanford University campus In California into a biological preserve, the butterfly went extinct locally, and their efforts to protect it may have been one of the causes. Politics and science are entwined, and the history we know and tell shapes conservation efforts for better or worse. In this case, the history that was constructed to justify protection, and elimination of grazing from not only Jasper Ridge, but other areas, may have limited the scope of conservation and restoration across a wider landscape, and contributed to the demise of the butterfly. This history goes back to 18th and 19th century data sources to re-examine the 20th century narrative of the transformation of California's grasslands and how that history shaped modern conservation. By conceiving of conservation as necessary to protect relict spaces where time seemed to have stopped, opportunities were foregone for conservation across a more heterogeneous, ever-changing landscape. And efforts to protect places like Jasper Ridge from change and disturbance, such as grazing, were the final nail in the coffin for important populations of this threatened species. But it's not too late. While the clock of history cannot be turned back, and some opportunities are lost forever, we may recover and realize future opportunities for conservation by better understanding the importance of history not just for understanding but also shaping environmental changes in space and time.

864 **Tidy but Dangerous. Disposal of household and industrial waste in Austria between 1950 and 1990 and what it can tell us about cleanliness**

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In the late 1980s a big environmental scandal was triggered in Austria: Half a million people were said to be at risk of getting cancer due to the toxic pollution of their drinking water. This water stem from one of the biggest groundwater reservoirs in Central Europe named Mitterndorfer Senke located in Eastern Austria. The area of the reservoir coincided with an area that had been exposed to industrial growth after World War II. The industry's toxic waste had been disposed without any protection against the environment despite protection regulations. This paper looks at how waste disposal was treated and regulated between the end of World War II and the revealing of the groundwater pollution in the 1980s. The focus on both, the disposal of household waste and industrial waste will show that their treatment followed a joint logic that can explain how toxic waste was treated: While from the 1960s onwards the government regulated and executed the disposal of household waste ever more strictly, industrial waste disposal was little regulated and certainly not controlled because it was meant to be disposed on the industry's private ground. This suggests that the treatment of waste was a question of visibility, and its regulation a mere method of generating visible order. The scandal around the pollution of the Mitterndorfer Senke from this point of view appears to be questioning the industrial waste's (in)visibility. As a second part of the paper, I will thus put the described case into a broader context in terms of human relations to the material environment and in terms of concepts of cleanliness and dirt by starting off from Mary Douglas' seminal work on Purity and Danger (Douglas 2006). The described case seems to not only tell us something about how people treat waste, but also what order and in succession cleanliness means, how it is produced and how it has changed.

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865 **Cultures of waste and ideologies of materialism in state socialism**

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One common view of centrally planned economies is that they were wasteful: they produced too much trash per GDP, too many rejects, and their products were made with too much raw material input. In the Cold War imaginary the dichotomies of democracy/totalitarianism and market/state for too long have been superimposed on two other dichotomies, clean/dirty and efficient/wasteful. The present paper critiques this imaginary by providing a historical ethnographic study of waste practices in a former socialist country, Hungary. Based on archival documents, interviews and the analysis of visual representations, it argues that a wide culture of material thriftiness developed in Hungary, which while strongly encouraged by the Communist Party resonated strongly with and was thus embraced by workers, peasants, small entrepreneurs and housewives. I will document both the ideologies of waste propagated from above and the actual waste practices developed from below, and argue that what developed early on in the history of Hungarian state socialism was a veritable cult of waste. In closing I will evaluate both the social and the environmental consequences (intended and unintended) of this pervasive ideological and pragmatic materialism.

866 **Turning Waste into Treasure: the Practice and Ideology of Waste Utilization in Chinese Agricultural History**

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Waste utilization for field manure has been a marvelous practice in Chinese history of agriculture. It may be traced back to the Shang dynasty that was over 3,000 years ago. Abundant historical data, in particular several ten (probably over a hundred) types of farmyard manures that were recorded in the ancient agronomists' works suggest that "Turning Waste into Treasure" has been a widely-accepted and deeply-rooted concept among the Chinese farmers. They have developed, for the purpose of soil improvement, very complex technical systems of waste utilization and as a result, the ever-lasting "ecological chains" among different projects of production and

daily-life, uninterrupted circulation cannels of organic materials between cottages and farmland, towns and villages were constructed. In this way, the Chinese farmers have built the bases for "permanent agriculture" which protected the uninterruptedly cultivated land from soil nutrition depletion throughout the Chinese history.

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867 **Climatic variations in the Low Countries during the fifteenth century and their impact on economy and society**

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The vulnerability of human civilization to climate is known throughout history. The Low Countries during the fifteenth century are no exception in this respect. Pre-industrial agriculture which was the basis of economy and society was especially vulnerable to climatic fluctuations. Repeatedly, periods of unfavorable weather caused scarcity of food supplies whereas favorable weather resulted in abundant harvests. This project attempts to shed light on the social significance of weather and climate in a period for which our respective knowledge is still limited.

Initially, a climate analysis is needed. Basic research has already been carried out by J. Buisman and A. F. V. van Engelen who compiled a substantial amount of evidence and summarized it in terms of a temperature index for the summer and the winter half-year (Buisman, J. Duizend jaar weer, wind en water in de Lage Landen; onder redactie van A. F. V. van Engelen. Franeker 1995ff.). However, this project requires a more detailed resolution. Therefore it is necessary to derive seasonal indices not only for temperature, but also for precipitation. This evidence is needed to relate the growth, ripening and harvesting of cereal crops to specific weather conditions.
For allowing to look for the link of weather and grain growth in a given year a data base has been created. It includes until now approximately 1200 information about climate derived from about 80 chronicles and annals. This data base forms the backbone of the seasonal temperature and precipitation indices.
Furthermore these indices have to be compared to the economic development. Grain prices seem to be the most useful indicator of these economic fluctuations. On the one hand grain – especially rye – was the basic foodstuff in those times and was (usually) affordable for all classes of population. On the other hand grain grows for several months on the fields and is therefore exposed to weather.
Grain prices can be obtained from municipal and monastic accounts. Many lists of grain prices from the Low Countries are published. A selection of these price lists will be compared to the above-mentioned indices. Extreme price surges are also described in chronicles, occasionally in combination with the relevant causes. This kind of information forms another part of the above-mentioned data base. About 800 records have been found in the examined chronicles. In this respect it is also necessary to verify, if the economic data, derived from narrative sources, correspond with the price lists.
First preliminary results show that there is a strong connection between long winters (snow cover until March or April) or rainy summers and striking grain price increases as in 1408 or 1437/1438. Apart from harsh weather, effects of warfare, economic reasons or demographic development also need to be considered in order to explain grain price movement.

868 **Analysis of late spring-summer temperatures of early modern Western Hungary based on vine and grain tithes and harvest dates**

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Developing database – new series
According to the present stage of investigation, in Western Hungary, phenological evidence such as the beginning of grape ripenning, vine harvest and tithe collection dates (both vine and grain), and to some extent harvested amounts provide us with a wide overview of late spring-summer temperature patterns in some extent from the late-16th, but mainly from the early 17th century onwards. Although the connection of vine and grain development and some other climatological factors, such as precipitation is as well obvious, due to insufficient length and density of instrumental series and changes in agricultural practices from the late 19th century onwards, at present mainly the connections with temperature can be detected and analysed. Applying simple linear regression model late spring-summer temperature reconstructions could be carried out in each case.

Beginning of grape ripenning and vine harvest dates
Based on town council protocolls and partly on tithes and town accounts, harvest dates of vine, from the late 16th century in the town of Kőszeg (Western Hungary) were investigated: this shows good correlation with Buda May-July temperature series (reference period: 1780-1873); and similarly good correlation with the 18th-19th century Vienna-Burgerspital series (developed by Strömmer, E. 2003) as well as some shorter, eastern Hungarian series (e.g. Kecskemét and Gyöngyös vintage series from 18-19th centuries). Unlike the

more unevenly distributed tithe collection dates, vintage dates show a distribution close to normal which fact increases its potentials in further investigations.
Although with less possibilities of direct comparison (e.g. Klosterneuburg – developed by Strömmer, E. 2003) and more complicated analysis patterns, same is true for the connection between Kőszeg beginning of grape ripenning and July temperatures available from the early 17th century onwards.

Tithe collection dates and amounts collected
Among other factors, Kőszeg vine-tithe collection dates are mainly dependent on the beginning, end and duration of vine harvests: dates well-correlating with late spring-summer temperatures are mainly available for the period of mid-17th to mid-19th centuries. Whereas the collection of grain harvest dates is still in progress, dates of grain-tithe collection show good correlation with July mean temperatures.
Situation is more complicated in case of the amounts collected: up to now investigation covers Kőszeg and the town of Sopron, located 60 km to the north. Due to the overlap between Kőszeg and Sopron tithe series, the amounts collected can be traced back to the mid-16th, in some extent to the early 15th century. Even if showing a correlation on 1% significancy level with summer temperatures, climatological interpretation of grain tithe amounts at the moment are more problematic.

869 **Swedish grain tithes as a source for climatic reconstructions: 1540-1680**

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Is it possible to use tithes as a climatic proxy? Comparing agricultural production with climatic parameters is difficult and presents a range of problems which need to be taken into consideration before it is possible to pick out any climatic signal. Although agricultural performance is dependent upon the weather and climatic conditions, it is not a straightforward relationship. In Sweden, a good harvest seem to require a combination of a warm and wet May, rather cool and dry June-August, but not too dry, and most especially not too cold. Rain in September, seems to be an almost certain means of ruining a harvest.

I think that our greatest problem in transforming agricultural data into climatic proxies is that we will have big problems in calibrating our data against climate records because of the great changes that happened in the 19th – and above all after World War 2 – in agriculture. Also, we have the problem of changes of, as well as within, the sources. Could we really compare harvest estimates from the Middle Ages or the Early Modern Period with the rather well monitored modern harvest estimates? Would it be possible ever to compile such long, unbroken, series that climatic reconstructions based on tithes and similar records would be possible? Is it possible to compare records offered by sensitive agricultural crops to those of the more robust natural tree-ring data? In Sweden, a single frost night in May could blight the entire harvest, while such an occurrence would not even register in a tree.

When comparing causes of harvest failure in the 16th, 17th centuries to those of the 18th century, it is evident that the cause of harvest failure shifts over time. From around the mid-16th century until c. 1700, weather conditions of wet and, most specific, cold summers caused harvest failure. In the 18th century, it was above all dry summers which caused harvest failure. To some extent this might depend upon more drainage being done in the 18th century, which would cause cereal production to be more vulnerable to dry weather condition. However, it also points at a more serious methodological problem with biological data as proxies for climatic conditions. We may calibrate and verify our data during one climatic regime, when the biological proxy reacts in a specific way to certain climatic conditions. However, when we go back in time, and meet another climatic regime, the same proxy might react to a different climatic signal, than the one used for calibrating our series.

870 **The beginning of the grain harvest as a proxy for early summer temperatures, Norfolk c. 1270 AD - 1430 AD**

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For the reconstruction of climate in the Middle Ages data from documentary sources and from natural archives are needed. The documentary sources include narrative sources such as chronicles or annals as well as administrative sources like municipal accounts and – primarily in England – manorial accounts. The advantage of working with administrative sources lies in the highly reliable, continuous and contemporary nature of the given information. The English manorial accounts contain direct references to weather and proxy data.

One of the proxies provided is the information about the beginning of the grain harvest at the individual manors. The date of the grain harvest was largely dependent upon early summer temperatures and thus constitutes a valuable information that helps to reconstruct these temperatures. It can be assumed that the later the harvest began, the cooler the early summer must have been.

The dates of the grain harvest have been extracted from the manorial accounts of Norwich Cathedral Priory. The manors of this Benedictine house are mainly situated in Norfolk, a region that is poor in medieval tree ring data. Approximately 700 accounts rolls survive for the period from c. 1270 AD to about 1430 AD, additional smaller series of manorial accounts from other Norfolk landowners have been included in the analysis. However, there remain gap years for which no information could be gained. The date of the beginning of the grain harvest shows a high short-term variability which must have posed a considerable problem for the medieval agricultural system. Warm and dry growing seasons are visible as well as cooler and wetter ones. The microclimatic and soil conditions of the manors also influence the beginning of the grain harvest. Among the manors of Norwich

Cathedral Priory, five main geographical groups can be distinguished. These five groups react in different ways to specific weather conditions within one summer, and whereas they all show a long-term trend to a later onset of the grain harvest in the portrayed 150 years, two groups have a much steeper trend than the others.

The medieval data are to be calibrated with the help of a comparable series of the dates of the beginning of the grain harvest of the 18th/ 19th century. These can then be used to reconstruct high and late medieval early summer temperatures in East Anglia.

871 **Refugees and the Environment in Wartime China: Henan Province, 1938-1945**

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This paper investigates relationships between military conflict, refugee migration, and ecological change in north China's Henan province during the Sino-Japanese War of 1937-1945. During the conflict with Japan, China's population underwent a massive forced redistribution, with an estimated 95,000,000 people living as refugees for at least a time. In general, the direct environmental consequences of military combat have proven far more fleeting than the impact of preparation for war. Yet refugee flight in wartime China presents a major exception to this conclusion. The environmental effects of war-induced migration proved long lasting, leaving an enduring mark on China's natural landscape. This paper explores the ecological dimensions of wartime migration from Henan, the province of China where the largest number of refugees originated. In Henan, the causes of refugee flight were largely environmental. Even more than Japanese military devastation, most Henan refugees took flight due to massive flooding, famine, and other war-induced ecological catastrophes. This paper examines how refugees from Henan survived these war-induced disasters and subsisted in unfamiliar environments. The discussion focuses on how refugees reshaped previously uninhabited environments into productive landscapes and rebuilt war-ravaged rural infrastructure. In addition, the paper assesses the impact of these wartime environmental transformations on kinship relations and gender roles at the household level. Along with archival documents held in Mainland China and Taiwan, the writings of Western missionaries involved in refugee relief work in northwest China contain rich materials pertaining to these issues.

872 **Water Calamities and Trauma: Towards a Consolidated Community**

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The yuan ? of the central Yangzi region, an area of land and water surrounded by dikes, was a key element not just in water resource management, but in state administration, the maintenance of local order and the development of local cultural and social institutions. This paper will examine one of the working mechanisms – water calamities and trauma – of the yuan society in the late 19th and early 20th centuries. It emphasizes the social and cultural dimensions of the yuan unit, whose economic functions and historical-geographical changes have been much examined in previous scholarship.
A conceptualization of the "yuan society" will be discussed. This project defines the "yuan society" in three dimensions: firstly, the spatial and temporal dimensions of the yuan unit; secondly, the institutional dimensions of the yuan; thirdly, the cultural dimensions of the yuan, including the creation of public spaces, folk beliefs, and group identities within or between the yuans. As the yuan had approached maturity to a substantial level in the Jianghan plain in the Ming-Qing times, adding to its economic functions as well as some of its derivative administrative and military functions, a "yuan society" as a cultural and social entity was emerging in this area. One of the major characteristics of the "yuan society" was the sensitivity and vulnerability of water-surrounded communities. In every flood season of each year, people were in horror and anxiety of water calamities. Such a water psychology of people was critical in the intertwined relationship of the human daily life with its water environment: on one hand, water calamities destroyed the households and belongings of people, and caused catastrophic damage to people's life; on the other hand, as few scholars have realized, water disasters would nonetheless stimulate the recognition among people towards nature and the establishment of a responsive system within the yuan society. As scholars of social organization have asserted, "disasters were observed to strengthen rather than paralyze the communities that they affected." This argument led to the controversy over the conceptualization of the "therapeutic community". This paper would argue that the erratic and destructive attacks from disasters in this region incubated a responsive system within the yuan to fight off disasters collectively, which in turn consolidated the yuan communities.

873 **Social transformation, Environmental change and the acculturation of Oroqen in China (1858-1945)**

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Oroqen is a small ethnic minority in Northeast China. In Qing dynasty, Its forest and mode of production (hunting and gathering) was protected by the central governmental policy that closed the forest frontier and prohibited the entry of sedentary agricultural ethnicities. However, in 1858, China signed a unequal treaty with Russia. The traditional hunting ground of Oroqen in the north of Heilongjiang river was ceded to Russia, and Russia managed to seduce Oroqen people to pledge allegiance to Tsar. In order to maintain the integrity of its domain, the Qing imperial government opened the forest frontier and encouraged farmer to cultivate around the Oroqen's forest. This meant that particular Oroqen culture was eroded through the exchange of goods with agricultural ethnicities. As the Japanese-Russian war was broken in northeast China in 1904, and the gold mine was discovered in Oroqen forest in 1883, the central government decided to develop it and transform its mode of production further. After the Republic of China set up in 1912, the central government promulgated a development plan in 1914, that would transform Oroqen people from hunter and gatherer to sedentary famer,

namely forced them to move from forest to plain. In 1931, Japanese began to colonize the homeland of Oroqen and captured their remaining hunting guns. Due to meeting the demands of timber during the war, Japanese army deforested in Oroqen area. This signified that the material basis of Oroqen culture was destroyed.

The change of Oroqen culture is a typical case that combines ethnic studies and environmental history in the great transformation of Chinese history. From the story of Oroqen, some new findings will be got, such as the acculturation of small minority is not only functioned by dominant ethnicity, but also resulted by colonial invasion; the decreasing of ratio of environment and population of Oroqen is not led by environmental degradation or the rapid increase of population, but led by compulsory policy regulated by central government which wanted to strengthen the nation-state building and state capacity; environmental change played a role in the transformation of Oroqen just as a symbol or a media of social change.

874 **Cultural Behavior and Animals' Life: The Relationship between the Tribute and Asiatic Lions' Crisis (1400-1600)**

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The Asiatic lion once lived in the Turkey, Iraq, Iran, Afghanistan, India and south of middle Asia. Today only 200 to 260 of these magnificent animals survive in the wild. We can only find them in a single location in the wild, the Gir forest in India. Why? The reason is very complex, including natural factor, the people's action and some cultural influence. My paper will probe one of history factors which results in the impact of that some countries in middle and western Asia assorted with china upon the lions that ever lived in there.
Refer to plenty of Chinese historical literatures, it is found that from BC 2nd century to AD 16th century the lion was a very important tribute that nations in west and central Asia paid to China. Presenting one lion would gain approximate 30 big boxes which were full of valuable reward from Chinese emperor. For the interests from China, capture and domestication of wild lion had become an occupation which was undertaken by people with many practical skills who also divided the work specifically. In Chinese historical records, this action culminated in Ming dynasty (1368-1644). In 15th-16thcentury, this area paid lion as tribute was highly frequent. However, at the beginning of 17th century, the lion disappeared in the present list from west and middle Asia.

It is well known that Chinese natural condition do not adapt the lion's existence. But the lion in Chinese traditional cultural played an extraordinary role. The lion is not only an auspicious animal but also symbolize the power and dignity. Why could this foreign animal bring such significant effect? Even today you could see many arts related to the lion, such as all sorts of sculptures of the lion.

There was a great cultural demand for the lion in ancient China, moreover, presenting lions could make a fortune. Catching lions became a way to be wealthy, especially in 15th-16th century. This cultural demand had brought the crisis to the Asiatic lion. The relation between culture and environment should arouse our attention. Though its force to the environment appears to be less serious than economical, political and even some haphazard, the impact of culture can hardly be changed in a short time. Therefore, for the research on environment history, the factor of culture has its special function.

876 **Wild Animals and Humans in Asia before 1900**

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Large and potentially dangerous wild animals have become rare in most regions of Asia. This applies for instance to bears, rhinoceroses, crocodiles, large snakes, wolves, tigers, leopards, wild elephants, wild buffalo and wild cattle. They have been hunted down, their habitat has been destroyed, and there is insufficient prey available. Officially, most of these wild animals have protected status, and attempts to secure their survival in nature reserves are being undertaken. Wild animals, even the dangerous ones like the tiger, are hugely popular, perhaps mainly because their plight is shown daily on television.
However, not so long ago, the same animals were feared by many and persecuted relentlessly. That was when they were still fairly numerous – although perhaps not always easily spotted – and accidents with humans were not rare. In many regions in Asia this was still the case only 50 years ago.
In this paper, I look at the – usually uneasy – relationship between large wild animals and humans prior to 1900. We find people killed and eaten by animals, animals hunted and trapped by humans, but also some form of coexistence. The paradox I will be dealing with is that many of these animals were feared and hunted down on the one hand, and revered, often regarded as family, and sometimes even fed on the other.
Most of the literature and the sources published before 1950 or so, mainly reflect the inimical aspects of the human-animal relationship. Hunting and trapping, by indigenous peoples and foreigners (mainly Europeans), were dealt with extensively. Europeans hunted as a pastime, but prior to the 1870s not on a significant scale. They also shot or trapped specimens for museums and zoos. Indigenous people hunted and trapped some large animals for their meat, and other ones for parts that had some value in trade, such as rhinoceros horns. Damage to crops and livestock were emphasized in the older literature, as was the threat posed to humans by the presence of ferocious predators.
However, there were also successful attempts to tame or domesticate some of these animals, which implies close proximity and, up to a point, co-operation between beasts and people. In addition to this, there is often the notion that humans and animals are somehow related, and that killing them without provocation would invite retribution. Recent anthropological publications often stress these more benevolent features of the human-animal relationship. This paper attempts to strike a balance between these views.

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878 **Our Friends in Nature – natural born friends and enemies of late 19th century Danish agriculture**

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Perceptions of animals and nature were highly contested subjects in the late 19th century.
Through the foundations of animal protection movements, new methods for intensive animal breeding and the popularity of pets and zoos the concept of "Animal" became differentiated and more heterogeneous. This tendency was further increased by psychological and physiological animal research and the acceptance of kinship between man and animal which arose from the theory of evolution.
The same period was characterized by a shift in Danish farming practice from reliance on crops to emphasis on animal production, especially meat and dairy products.
The discourses on animals in Danish agricultural literature in the late 19th century reveals a differentiation between animals, not only as wild or domesticated, but also among the wild animals which were considered either harmful or useful. Thus insects, birds, rodents and also larger animals could be considered either friends or enemies of the individual farmer. One kind of animal could be a benevolent friend that attacked harmful animals, but could at the same time be an enemy who threatened the farmer's property.
As a consequence farming was not only a question of controlling nature, but also of taking advantage of nature and it's internal struggle for survival, and the farmer could for instance choose to support his natural friends in this struggle.
A closer scrutiny of the rhetoric and instructions of the agricultural literature illuminates both these and other central aspects on the perception of nature/culture, the environment and its animal inhabitants in this decisive phase of Danish agricultural history.
The paper is a part of a post-doc. research project: In Lion's Cage and Pig's Sty – animal rights and roles in Denmark c. 1850-1920. The project is funded by the Danish National Research Council for Communication and Culture.

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879 **History of Vicuña Management in the Peruvian Andes**

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Vicuña (Vicugna vicugna) is a wild camelid native to the Andes and pursued for its fiber, renowned as the finest in the world. By the 1960s, vicuña in Peru were in imminent danger of extinction. Since then, populations have increased and international fiber trade is allowed. Yet we still don't adequately understand what caused vicuña to decline in the first place. Extant literature uniformly depicts the history of vicuña-people relations as: sustainably managed under the Inca, overhunted under colonial rule, and endangered by poachers in modern times. This paper fills in some of the gaping temporal and conceptual holes in the history of vicuña management. I contextualize vicuña hunting as part of larger political economies that demanded fiber for high-end textiles. I discuss how vicuña have comprised part of puna ecosystems and pastoral communities. Finally, I review state intervention in fiber trade and hunting. Vicuña fiber is a commodity that has long connected impoverished Andean villagers with textile consumers from Inca royalty to global elites. This paper contributes to the history of Andean human-environment relations and Latin American conservation.

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881 **De mortibus animalium: livestock pestilence in Carolingian Europe, c. 750-950 CE**

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Until recently preindustrial livestock disease has received scant attention. In fact, the health and disease of the animals on which past European populations depended upon largely remains unexplored. To address this gap in scholarship, this paper surveys the livestock pestilences of Carolingian Europe, c.750-950 CE. It examines all available texts – annals, histories, correspondence, vitae, capitularies and gesta of bishops – to illustrate a) the number, frequency and extent of infectious livestock disease occurrences, and b) aggregate impact on the

Carolingian economy (as surveyed by Verhulst) of cattle panzootics and localized livestock infections. This paper also investigates connections between livestock disease and subsistence crises, military conflict, weather anomalies, and climate (as recently addressed by McCormick et al. and Cheyette), as well as the ability of ninth-century government and farmers to curb the spread of infectious disease. Consultation of contemporary texts from beyond Carolingian borders (namely, Ireland, England, Spain and Italy) also serves to illuminate pan-European outbreaks. The European experiences of mass livestock mortalities in the early fourteenth, and eighteenth, centuries are also addressed in order to provide some insight on the potential effects of losses of a similar scale in the ninth century. Ultimately, this paper seeks to assess the modern academic's ability to diagnose individual outbreaks of Carolingian livestock disease. It is argued that there are little zooarcheological, textual or philosophical grounds to identify anthrax, contagious bovine plueropneumonia, foot-and-mouth disease, rinderpest or any infectious disease of livestock in Carolingian Europe.

Estimating the impact of livestock pestilences in the past is a delicate matter. Cipolla stated the effects of preindustrial livestock pestilences "were comparable with the consequences of large fires which would destroy machines and power stations in a modern industrial economy". While the potential for livestock mortalities to cause considerable devastation to agrarian economies exists, assertions of this nature must be tested – devastation cannot be assumed. Accordingly, livestock disease must be carefully assessed within the agricultural, medical and economic context of the period in which it occurred, especially since the significance of any animal in European husbandry and agriculture has not been static. In this manner this paper examines data overlooked by modern historians that points to phenomena of great significance for early medieval Europeans.

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882 **Pig Husbandry in Late-Medieval England (1250-1400)**

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The proposed paper looks at the nature and extent of pig husbandry in late medieval England. It will attempt to establish main demographic trends within the porcine population, as determined by exogenous (mainly, ecological) and endogenous (economic) factors; to consider regional variances and trends, dictated by environmental conditions and managerial decision-making; the degree of commercialization of pigs and pig products in the given period; the effect of the Black Death on pig husbandry; occurrences and of pig mortality, including the outbreak of 1343 Anthrax panzootic and its devastating impact on animal husbandry on the eve of the Black Death; and the decline of pig husbandry on the demesne, in the late-fourteenth century, which went hand-in-hand with the shift from direct demesne farming to leasing of the demesne, a process referred to by some German scholars as a switch from Gutsherrschaft to Grundsherrschaft. The project shall address all these questions in a wider environmental and economic context of late medieval England, a period of prolonged ecological crises. These included population pressure, deteriorated weather (both floods and droughts) leading to catastrophic harvest failures of 1314-1322 and mass mortality of sheep (1315-6) and cattle (1319-1325), rise in commodity prices and fall in real wages, and the Black Death (1348-1351). What impact did all these crises have on pig husbandry and porcine population in late-medieval England? Beyond figures and numbers, terms and processes, however, there is another important, yet much overlooked point: the interaction between humans and animals. Both the suidae and homines sapientes were a part of a larger biological cosmos; for, they existed each by other's side and depended one on another. It is crucial to realize the role and significance of the animals, especially to the student of history; perhaps deviating from the ever-prevailing anthropocentric approach could be instructive. The paper will be based on some 2,000 manorial accounts from different parts of England, with a special emphasis on East-Anglia, a region with exceptionally high number of surviving accounts. These are all hitherto unpublished documents, deposited in various libraries and archives of the UK, consulted and digitized by me in the course of my research trips.

883 **The Fish of the Sea in Late Medieval law**

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Among the most important sources to study the changing sensibilities of 14th century Europeans toward the natural world and the disparate ways they found of utilizing it are preserved in legal texts. Law and legal writing were at the forefront of European efforts to describe and to benefit from the environmental resources about them. This essay examines this significant perspective by focussing on the legal innovations of the famous jurist, Bartolus of Sassoferrato (d. 1357), whose writings brought together the notions and practical experience of legal practice for centuries before him and which will remain authoritative for centuries after he wrote. His work exemplifies the way that the lawyers conceptualized the waterways and oceans of the world particularly as they considered who had the right to the fish that inhabited these regions. The later Middle Ages was a time when access to the common resources protected by earlier custom was eroding before the pretensions of seigiorial, monarchical and urban authorities. Bartolus depicted this this movement and also participated in creating a more nuanced legal view of the actual qualities of aquatic environments by applyimng new ideas about the mapping of these physical spaces and explaining the way that they can change over time. On the template of earlier beliefs about the endless seas as free from anyone's control and about the fish of the

sea as the property of no one, Bartolus helped to construct new definitions of these spaces and their denizens as part of the property and territorial claims of interests on the shore. He is credited as the first to define what territorial waters are. He set down rules for the geometrical definition of changing water ways and explained how to map them. Finally, he added his ideas to the discussion of who exactly controlled rights to fish by underlining how access to them was to be managed.
His perspective adds to our understanding of the varied relationships Western peoples have developed with the natural world over their history and is fundamental to modern ideas and practice.

884 **Hunting birds to eat in Italy, thirteenth to sixteenth centuries.**

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Medieval Italy was full of birds. Intersected by migratory routes and rich in woods, fields, marginal lands and wet areas Italy's bird population was rich in species. The paper wishes to identify and explore patterns of human use and consumption for the smaller and the migratory birds especially in northern and central Italy between the thirteenth and sixteenth centuries from an environmental perspective. In the absence of an Italian tradition in zoo-archaeology the paper is based primarily on record sources and manuals. It identifies the birds species in question and places the techniques for their capture in the context of the medieval written evidence. As well, on the basis of statutory evidence it maps out the patterns of sale and consumption of birds and categorizes the hunters by social rank and economic function. Both the hunting and the hunters pertained to a larger and changing pattern of land-use and commerce that was culturally determined and environmentally propelled. Changes in the attitudes towards both land use and commerce affected the hunting and the role it was afforded in society. As such this kind of hunting was geared towards efficiency rather than elitist display of status and these factors affected its ecological impact and role. This efficiency and the market economies that often lay behind it affected the modes by which the birds were caught as well as the organization of both the hunters and the legal and customary framework within which they were increasingly placed. The activities were regulated and the hunters themselves became professionalized. Finally, where possible cautious hypotheses are advanced as to the sustainability both apparent and self-conscious of these kinds of hunts.

885 **Monastic responses to the theft of natural resources in medieval Germany**

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Though the theft of cattle and other animals is generally seen as a hallmark of early medieval political symbolism, animal theft needs to me more broadly understood and explored. In this paper, I will explore instances of early medieval animal theft found in religious sources. Looking to religious literature shows not only what types of animals were stolen, but also how religious communities, villages, and victims responded to theft. One peasant, for example, whose cow was stolen, not only searches for the cow, but also goes to a church and berates the saint who had not protected it from theft. These stories also provide glimpses into the motives of the thieves (as imagined by the narrators): one author, for example, views a man who stole and ate a consecrated ram as gripped not only by temporary depravity, but also by an overwhelming hunger. Such miracle stories add religious and cultural dimensions to the concept of livestock theft, allowing an inclusion of medieval conversations about morality and immorality to the discussion of resource use.

This paper will explore why monastic and ecclesiastical communities chose to remember and record these stories, and to associate their saints with the protection of animal resources. The protection of resources and the punishment of thieves became part of the way that saints built and maintained relationships with local communities. Abbots, saints, and other religious leaders took steps to protect their properties during their lives (as recorded in religious biographies) and after their deaths (as recorded in stories about their posthumous miracles). Finally, by linking religious power to resources, these stories allow us to ask some more abstract questions about the relationship between medieval people and the natural world. In addition to helping establish how animals were viewed as resources, they can also be used to address the question of medieval views about the moral, cultural and social implications of both proper and improper resource use.

887 **Is shipbuilding to blame for? Issues for reconstructing local factors affecting the history of medieval Mediterranean forests**

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Forest history of the coasts and the islands of the Mediterranean during the ancient and medieval times is strongly associated with anthropogenic influence factors such as tree felling for heating and shipbuilding. The widespread deforestation is usually attributed to non-sustainable tree felling since the antiquity. Significantly enough the strategic demand for timber used for shipbuilding has often been considered as a major motive of the Muslim sea raids in the medieval Mediterranean since the 7th century AD. Thus, several historians have attributed the military conflicts between Muslim Arabs and Christian Byzantines to the rivalry related with establishing or maintaining access to the rather scarce Mediterranean woodlands which could provide naval timber in the quality and quantity needed. The strongly fragmented Mediterranean landscape, the variation of the climatic conditions and the unequal distribution of forests in the North, South and East Mediterranean tend to accentuate the mismatch of a local concentration of appropriate timber-providing trees at few places and a global demand for shipbuilding timber.

Such conflicts are (partially) traceable in historical sources and can be reasonably presumed in reconstructing

the historical frame of that period. However, perceived or reported timber scarcity might be (e.g. ideologically) biased, thus deviating from the real state of the environment. What environmental traces might still remain from these conflicts? What would they imply in respect with forestry practice and landscape change?

The present study follows this questioning in the case of Crete focusing on the period of the Arab occupation, e.g. 824/827-961 AD. The available, quite scarce historical evidence (e.g. reports of contemporary Arab geographers) is considered critically, and then compared with archaeobotanical data. The interpretative model follows issues of the history of shipbuilding technology on the basis of the few finds of field survey and underwater archaeology. The results imply several forms of anthropogenic influence on the reduction of forested area during the 10th and the 11th centuries.

889 **Foresting a grassland: History and Policy Implications of Tree Planting in Lesotho, Southern Africa**

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Fruit and fuelwood trees - and the idea of planting them - arrived in Lesotho (land of the Basotho) on missionary wagons in 1833. Whether foresting imagined denuded landscapes or enriching domestic spaces, first missionaries, then British officials 60 years later, introduced alien trees and derided indigenous ones. They ignored - or were unaware of - Basotho tree value and protection systems. Scientifically informed 19th C Europeans believed in trees' power to restore landscapes, enrich marginal lands, and initiate climate change. Trees were tools to moderate southern Africa's climate and a scarce essential resource. Government institutions, corporations and entrepreneurs promoted plantations of quick growing alien trees in southern African grasslands for afforestation, fuel, industrial infrastructure, and aesthetics. All trees were thought to increase rainfall, while masses of Eucalyptus trees were claimed to be better than pipes in draining marshes. Parallel to European tree planting was its largely undocumented embrace by Basotho in Lesotho, and their selection of trees for planting in particular parts of the landscape: domestic spaces and unused land. In the 20th C, trees' reputation for preventing or stopping soil erosion while supplying food or fuel justified massive tree planting campaigns in British Basutoland and independent Lesotho. International reverence for trees' alleged powers was undiminished in the early 21st C; tree planting continued to be proposed for soil conservation, fuel (local household and international biofuels), and climate change (carbon sequestration).

This paper identifies trends in beliefs about trees and their powers as well as their importance in Basotho and European cultures using archival materials, project documents, and interviews. A regional history of alien tree introduction, promotion and use was constructed as context for discussing official and private tree planting in Basutoland/Lesotho. Attention was placed on Lesotho's most dominant trees today (eucalyptus, wattle, pine, peach) and their utility in erosion control, fuel and food provision.

From this historical base, changing meanings of bio-physical realities and cultural constructions of scientific theory and scientific certainty are discussed. Aliens introduced as crops were valorized and indigenous plants became weeds, despite aliens becoming liabilities. When drainage, poles and firewood were needed, Eucalyptus was promoted. Overlooked was the consequence for adjacent agriculture of Eucalyptus' water extracting abilities. The persistence of scientific belief (ie the goodness of trees in general - Eucalyptus in particular) in the face of facts to the contrary leads to an assessment of the dangers for public policy of ahistoric, single factor analyses. Unintended bio-physical consequences can result from misinterpreted vegetation-landscape dynamics.

890 **Foresting a Grassland: Consequences of Planting Alien Trees in Lesotho**

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Plants and animals that evolve together develop ecological balances that are imposed by environmental barriers found in those specific environments. These barriers help to maintain distinct species assemblages such that each area has its own unique characteristic biodiversity. Thus, biodiversity and patterns of species are the result of many factors that include biophysical relationships, ecological processes and historical events. Some species introduced into Lesotho's grassland by humans have had positive implications but others have spread and displaced indigenous species.

Some may not pose threat to local biodiversity; however, others break the nvironmental barriers leading to the emergence of new biological communities. This may lead to extinctions of many indigenous species and have an inadvertent impact on the livelihoods of people resident in those environments. Introducing trees into new environments is fueled by the belief that unforested landscapes need to be normalized by planting trees as trees are good for the landscape regardless of where the grow. This perception is essentially Eurocentric in nature and has been spread around the world by missionaries, scientists and subsequent technology transfer, education and commerce.

Fruit trees were immediately embraced by indigenous people (the Basotho), and were mainly planted around homesteads while the timber trees were planted in valleys and ravines. Later Eucalyptus and Pines were introduced for mass planting on marginal lands, degraded slopes and plateaus around the country by a twelve-year old project in 1973. The resulting plantations created mosaics of forest reserves throughout the country in a biome which was hitherto a grassland with isolated pockets of shrubs in sheltered valleys.

Questions began to be raised about the impact of these alien trees on the environment that had never been forested, such as, what changes may have been brought by these trees on the other vegetation that was

indigenous to the areas? What impact may the trees be having on soil minerals? What changes may have occurred in the communities that were supportrd by those landscapes that may have been caused by those tree-induced environmental changes? To begin an investigation of these complex issues, we formed an interdisciplinary team that came up with multiple and complimentary methods that were premised on treating the subject matter in a holistic fashion. These included interviews and botanical surveys of understory growth within the selected forest reserves for species composition and hydrology. The soil samples were collected and analyzed for various essential minerals. Other methods included extensive transect walks and community mapping of key land use features juxtaposed with high tech recent satellite imagery.

891 **Foresting a grassland: Exploring layers of meanings, perceptions and tensions between state institutions and community-based styles of tree management and use**

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The earliest documentation of tree planting in Lesotho (Southern Africa) can be traced to the arrival of the French missionaries in 1833. In his collection of accounts of missionary life in lesotho, Germond (1967) makes occasional reference to trees in the landscape while Hewood (1908) provides a more systematic description of indigenous and planted trees. As historical antecedents, the significance of these and other accounts is irrefutable. the same holds for the contemporary consultancy reports and academic papers. Missing in this record is the knowledge about the socio-cultural dimensions and/or consequences of introducing trees into Lesotho's grassland landscape. Likewise, little is known about these changes as narrated through oral tradition as well as what the coming of new tree species meant in the context of their socio-cultural universe, belief and value systems.
Based on the evidence gathered from four research sites in Lesotho over a period of 15 months, by means of reinforcing data collection techniques, this paper emphasises the social science component of an interdisciplinary endeavour to understand the various layers of meanings associated with the scheme to impose a tree cover on what is essentially a semi-arid grassland. This research confirms the power of interdisciplinary approach and its potential to contribute in new ways to the enrichment of methods. Tree planting needs to be seen and understood not merely as function science but also as a dependent socio-cultural variable.
The paper will demonstrate the complexity of the ways in which local communities in each of the study sites have appropriated the tree planting initiatives, turned them around to assert a virtual control over the 'forest areas.' In this way trees and the space on which they grow have not only acquired multiple meanings but have also become a subtley contested terrain. In addition to exploring the policy implications for these intiatives the paper also contrasts the perceptions and latent tensions between the formal state institutions and common sense practices at the local community/village level.

896 **The Nevada Test Site: Ongoing victimhood, complicity, and denial**

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During the last few decades, scholars have struggled to understand how Americans could have accepted their own radiation poisoning during the years of continental atomic testing in the 1950s. This paper focuses particularly on the “Downwinders” of southern Utah, who lived near the Nevada Test Site and suffered higher rates of cancer due to fallout that was deliberately shifted in their direction. To this day, many Utahns refuse to believe that any physical harm occurred. Those who do call themselves victims often forget the ways in which Utahns participated in their own victimization, either as actual makers of weapons, or as willing agents in the rush to modernization that occurred during the mid-20th century.

The fact that Utahns were a separate religious and ethnic group during that era has encouraged scholars to depict events in derogatory terms. The Utah Mormons, scholars constantly tell us, were gullible patriots who never questioned authority and thus became perfect subjects in the deadly lab experiment of continental atomic testing. This myth has maintained its academic popularity, despite mounting historical evidence that Americans from across the nation and from a variety of religious and cultural backgrounds were equally complacent about deadly weapons facilities built in their own backyards. But a closer look at history shows that Mormon farmers were not pastoral anachronisms rudely introduced to modernity through atomic dust, as they have so often been portrayed; rather, they were full participants in a technological system of expertise that promised them economic security. Once we understand that Utahns were techno-philes from the start, we can better understand why nuclear technology was (and continues to be) accepted among the very people it victimizes.

The Mormons of Utah had long been viewed as racial “others” by mainstream America. (Indeed, around 1840, some political leaders in the U.S. entertained ideas about placing the Mormons on a reservation, as they were starting to do with Native Americans.) By the beginning of the 20th century, the Mormons were struggling to survive on the fragile western lands they had fled to fifty years earlier. Despite Mormon efforts to use science and technology—particularly irrigation technology—to solve their environmental problems, land in southern Utah was so depleted that whole families were migrating northward. Across the West, the frontier was hemorrhaging its settlers. Then, in the 1930s, the small towns of Utah discovered a surefire path to the American middle-class, using technological skills that had been honed in farm environments. Utah colleges began graduating engineers at double the national rate. Many young engineers moved away from Utah in the 1940s and 1950s to work in the nuclear industry, helping in various ways to produce the radioactive fallout that would inundate their home state and damage the very farms they had come from. Thus, well before atomic engineers showed up in the 1950s with bland assurances about the safety of radioactive fallout, technology played a major role in Mormon cult

897 **First Nations and Nuclear Science History**

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Use of government radiation health standards as trusted and reliable sources to define safe exposure levels has been severely compromised by revelations of pernicious practices. In the 1950s, H.J. Muller joined fellow geneticists in arguing that the nuclear legacy from mining, production and testing would persist millions of years into the future, exposing populations to unknown genetic and hereditary effects as the exposure of cells and scrambling of DNA by radiation acts unpredictably.

Since 1945, extensive nuclear pollution from cold war practices has contaminated the earth's biota. While no place on Earth has escaped the signature of atmospheric nuclear testing, certain communities suffered extensive loss. Disproportional exposure has been borne by indigenous communities located near nuclear activities. Worldwide 80% of the nuclear fuel cycle, defined as the mining, milling, production, testing and storage of nuclear commerce, occurs on indigenous lands.

In this paper, I explore the American nuclear west and in particular, the experience of the Diné people—First Nations regions straddling Arizona and Utah— with uranium mining. Not told of any health risks, many of the Hopi and Dine miners and millers suffered and died prematurely from their exposure. The community continues to be radioactively contaminated from the former mining and from a 1979 flood of 94 million gallons of uranium tailings. I further examine the nuclear exposure of the lands of other southwest First Nations, including the Pueblo and Apache people near Los Alamos National Laboratory and the Shoshone, who live near the Nevada Test Site and continue to refuse to be paid for land taken from them without consent. Their experience illuminates Gabrielle Hecht's concept that decisions about "nuclearity" - how nuclear something is – in this case is privileging nuclear producers. In addition, Traditional Ecological Knowledge of traditionalist indigenous communities can be contrasted with nuclear science practice. Drawing on oral history, declassified government documents and little-examined health studies, I ask whether these postwar developments reveal what might be called cumulative genocidal effects.

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898 **The Devil in Brokdorf. The West German Protestant Churches and the Protest against Nuclear Technology**

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In this paper I will address the role of the West German protestant churches during the protests against nuclear technology in the 1970s and 1980s. Although the political positions and responsibilities of the German churches have been investigated with respect to National Socialism, the collapse of the German Democratic Republic, or the protest against nuclear weapons in the 1950s, their unique stance toward nuclear technology during the following decades has been barely investigated. The paper is the first portion of a larger research project that examines nuclear technology within the long history of the German environmental movement and the peculiar role of the church as a moral authority within it. The project will be based primarily on unpublished sources from church archives.

The paper contains three sections, each touching upon a specific discourse I have detected while working with my sources:

The first section of the paper introduces the theological rhetoric used by the environmentalists within the protestant churches. Activists tried to establish theological links between the notions of "environment" and "creation", enlarging the concept of "sin" by including aspects of inter-generational responsibility and respect for all living beings. Visions of a "secular apocalypse" emerged from fears of "omnicide" and were widely discussed in theological circles.

In the second section I will analyze nuclear technology as a peculiar challenge to Christian ethics in a rural context. Since no other environmental issue has caused the same amount of anxiety and protest among rural parishioners, the paper will address the material and symbolic place of nuclear facilities in the German landscape, addressing them as challenges to nostalgic visions of pastoral sceneries as well as psychological burdens in the context of pastoral care.

The third and final part of the talk will tie the two previous elements together. I will present an analysis of the new culture of protest that emerged from the protestant churches' involvement in the conflict concerning nuclear technology. Although there were considerable differences between the leadership of the churches and

the local congregations, the nuclear issue helped foster a new political self-understanding of pastors and parishioners alike. Old Lutheran concepts of the relation between the church and worldly authorities were challenged. New and controversial forms of social activism were established while traditional political loyalties were called into question. In an attempt to link the history of technology and the environment with church history, my talk will help to explain the intensity of this most recent clash of religion with modernity.

900 **The Lucky Mc Uranium Mine: Visualizing an environmental badland in Wyoming.**

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Preparations for nuclear war are usually cast in terms of nations marshalling their scientific, military, and industrial might to produce nuclear weapons systems capable of destroying their enemies. During the Cold War, the dual capacities of the United States and the Soviet Union to mutually destroy each other was supposed to ensure that nuclear weapons would never be used. The populations of the U.S. and the USSR were said to be safe from nuclear holocaust. However, citizens in both countries, as well as many others throughout the world, were exposed to radioactivity through the nuclear fuel cycle of mining and milling uranium, followed by the production, maintenance, storage and testing of nuclear weapons. Not only were human populations exposed, but so was the wider environment.

In the United States, the Atomic Energy Commission used all the public relations strategies it could to emphasize the benign nature of preparing for nuclear war. From uranium prospectors to U.S. Air Force bomber pilots, all those involved were depicted as heroic figures, working for the common good. The AEC controlled the images presented to the public, in order to manage public discourse. Images of people were kept separate from images of explosions. Rarely were nuclear explosions shown with landscapes or people inside the frame. Rather, mushroom clouds were shown as disembodied objects, giving them aesthetic appeal. This strategy made the real consequences of preparing for nuclear war invisible.

This paper makes visible the consequences of nuclear war by focusing on the human, social and environmental consequences of uranium mining at the Lucky Mc uranium mine complex in Wyoming, U.S.A., from its beginnings in the 1950s to the present. Shown here are uranium miners and mill workers who were exposed to significant levels of radioactivity, which was then brought home through their clothing. When the construction industry used mine and mill tailings in the surrounding communities, radioactive contamination was spread even further into the natural environment. And, as with most hard rock mining, uranium mining communities experienced the dysfunctional social and economic consequences of the boom-bust cycle. The natural environment was irrevocably changed. Underground mine tunnels perforate the land. Large open pit mines scar the land, exposing flora and fauna to radioactivity from tailings. Rain and spring runoff filled the pit mines, creating toxic lakes.

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901 **The Canadian Nuclear Industry's Impact on Workers and the Environment**

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An analysis of the Canadian nuclear industry’s environmental record is useful for the Ontario government currently is committed to expanding nuclear power in the face of climate change. This paper focuses on a case study, which exposed the Canadian nuclear industry’s occupational health and safety record and publicly questioned its environmental impacts. Recently, some historians have argued that the environmental history field needs to take more account of social and political theory, an approach this paper explores to evaluate the relationship between the occupational and environmental health movements and the resulting policy ramifications.
In 1974, Elliott Lake uranium miners went on a wildcat strike after learning horrendous revelations. Cancer rates among them were unusually high and their exposure to radiation levels was over the permitted level; governments knew this and did nothing to inform or protect them.

As a result of union, political and public pressure, the Ontario government in 1974 established a Royal Commission on the Health and Safety of Workers in Mines. It confirmed that the government had not informed miners of high cancer rates and radiation levels and learned that the two issues were linked. The Commission forced the federal Atomic Energy Control Board and the Ontario Labour and Environment Ministries into a more active regulatory role in the health, safety and environmental aspects of the Ontario uranium mining industry. Its report first revealed publicly that the prestigious, regulated, and secretive nuclear industry was lax about health and safety standards.
While occupational health was the focus in the 1970s, from the 1990s environmental health issues became and remain a concern. In towns involved in mining or processing uranium, the industry left immense environmental messes that were not cleaned up for years, situations that particularly but not exclusively affected northern Aboriginal communities. Climate change may overcome past divisions between occupational health and

environmental activists and re-conceptualize 'environmentalism' to encompass workplace and environmental health, broaden the persistent anti-nuclear movement and challenge the basis of that industry.

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905 **The Conflict of the Aluminium in the region of Marquesado del Zenete (Spain, 1989)**

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The changes of the economic structure happened in Spain during the Twentieth Century, took a large number of regions to the ecomic and social depression. This problem was related to the relief of the agriculture from the main position in the ecomomic system . This activity was the first one in most of these regions, and they specially suffered the situation.

Since the middle of the Twentieth Century, a lot of projects related to the industrial development arrived to these places. Sometimes, they were goverment's projects, but since the last decades, quite a lot of them came from the private initiative or from other countries (something that was easier since the join of Spain to the CEE in 1986).

We are going to present a case study about one of these poor regions: the andalusian region of "Marquesado del Zenete", in the province of Granada (Spain). At the end of the 90s, a project that expected to locate a factory to recycle aluminium in one of the villages of te region, caused a very important environmental conflict. The conflict mobilized the people of the whole area.

We will analyze the indicident with the help of the study made by SOTO FERNÁNDEZ, HERRERA GONZÁLEZ DE MOLINA, GONZÁLEZ DE MOLINA Y ORTEGA SANTOS about Enviromental Conflicts.
We consider this conflict very interesting because it presents a lot of differents actors, with differentes motivations, social and economic positions, generations, etc. Although, they shared the same objetive: stopping the instalation of the Company.
We are also going to consider the concepts derivated from the Environmental Justice , because this conflict presentes features in common: basically, the fact that a very contaminant factory tries to be located in a poor region under the excuse of economic development.

We are going to follow the next steps in our research:

Firstly, we will present a brief description of the whole region: social, political, economic, historical and biological features.
Secondly, we will explain the conflict, mainly who the actors were, their motivations, objetives, ways of action, etc. To do that, we will study the information derivated from the official organisms (the town councils, the Andalusian Assembly...) and from the press, because this incident had an important impact. Furthermore, we can take information from the protagonists of the conflict, something that we will do making oral interviews.
Finnaly we will present our conclusions and we will try to compare this conflict to others with similar structure happened in the rest of Spain or in other countries .

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907 **From Corporate Threat to Brand Value. The re-framing of organic milk in the Swedish dairy industry 1988-1995.**

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In the past few years - in the wake of Goore and Stern - the environmental issue has climbed on the political agenda. This, in turn, has renewed the interest for organic food. However, most research on organic food has centered either on farming practices or on consumer behaviour; the industry in betweeen - processing, distributing and retailing - has mostly been neglected. As noted in the last special issue of Enterprise & Society (#8, 2007), the issue of business in the era of climate change has to be adressed.

The interplay between environmental NGOs, eco-labelling actors, conventional food industry actors and the political establishment need to be explored.

Based on archival sources, interviews, and newspaper articles, this paper examines the Swedish market for organic milk from the late 1980s to the mid 1990s. Drawing on Michael Callon's theoretical concepts of framing and overflowing, the historical narrative describes the re-positioning of the Swedish dairy industry. At the outset, the environmental issue was an externality, as it played no significant role for the behavior of producers, marketers and consumers of milk. However, during the period studied, this externality was exploited by certain actors within the environmental movement to challenge the prevailing framing of the Swedish market for milk. These challenges took the form of: the concept of organic milk, the recycling of packages and the use of sludge as plant nutrient. The paper shows how the dairy industry gave different responses to these challenges. When it was first launched in 1989, organic milk was considered a threat to the industry. By 1995 the frame had been altered, as several leading actors – such as the largest dairy (Arla) and the farmers' organizaton (LRF) – had incorporated the ideas of the ecological modernization discourse. Organic milk became a symbol for this re-positioning; what once had been perceived as a corporate threat was now officially part of the strategic branding.

Note: Erin Gill (University of Aberswyth, Wales) is submitting a proposal on Soil Association and the international organic movement. We believe that these two papers would benefit from being pooled together - possibly with other papers dealing with the organic movement.

908 **Health, Environment and Australian Organic Farming**

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Exploring the history of the first Australian organic farming and gardening societies in the 1940s and 1950s reveals that organic growing was founded on the belief that the wellbeing of the biophysical environment directly impacted on human health and disease. Soil erosion, loss of soil fertility, poisoning of plants and animals by agricultural fertilisers and pesticides and destruction of native vegetation were issues that preoccupied early Australian organic growers. Environmental damage, they believed, led to human disease. They championed organic farming and gardening as a way of protecting and even 'improving' the natural environment, and thereby enhancing human health. These early organic growers drew inspiration from ancient 'Hippocratic' ideas of health and disease and were an early (and at the time, unfashionable) manifestation of an ecological approach of health.

In exploring organic growers' beliefs about the connection between human health and the biophysical environment I have drawn upon the disciplines of both environmental history and health ecology. In this paper I will reflect upon the nexus between these two disciplines, both of which apply ecological thinking to understand people's relationship with the environment. Despite their common theoretical influence environmental history and health ecology are fields of study which are rarely used in conjunction. I will discuss the relevance of people's pursuit of health and wellbeing as a motivation for human interaction with the environment, and more specifically as a useful concept when studying environmental history. In turn, I will also reflect on the application of environmental history as a means of understanding the history of human health.

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909 **The international aspirations of the British organic food and farming movement**

Erin Gill, ejg04@aber.ac.uk, European Society for Environmental History

The British organic food and farming movement emerged after the Second World War, with the establishment of The Soil Association in 1946. Today, the Soil Association is the world's largest organization representing the organic movement and in recent years it has enjoyed increasing public support and greater participation in British and EU agricultural policymaking. In contrast, the early years of the Soil Association (1946-c.1980) are generally viewed as having been a period of extreme marginalization; a time when organic ideas were comprehensively rejected by the agricultural community and policymakers.

There is growing interest in the history of the British organic food and farming movement, with Philip Conford's work in particular focusing on its intellectual and organizational development. As agricultural historians such as John Martin and Paul Brassley raise questions about the implementation and ecological impacts of industrial agriculture in Britain after the Second World War, the existence of an organized resistance to intensive and chemical-based farming during the post-war period is increasingly relevant.

One aspect of the early Soil Association's work that has been largely unexamined is the way in which it sought

to build an international organic food and farming movement. From the outset, membership of the Soil Association was international and many of its leading figures promoted the organization and its principles through international travel. Chief among the Soil Association's 'ambassadors' was its founder Lady Eve Balfour, who spent much of the 1950s travelling overseas, promoting organic food and farming and encouraging those she met to establish organic bodies of their own. Eve Balfour's travels during the 1950s took in Scandinavia, France, Italy, several visits to the USA, Kenya, Israel, Australia and New Zealand. Other Soil Association figureheads promoted the organization in central Africa, India and China.

This paper uses a range of archival material – most of which has not been previously available for research - to examine the extent of the early Soil Association's efforts to build an international organic movement and it asks whether those efforts had any lasting effect. As the organic movement in Europe today seeks to influence global trends in agriculture and food production, it may be useful to reflect on past efforts to spread the organic message far and wide.

Note: Oskar Brogerg from Göteborg University has proposed a paper about the development of the organic milk industry in Sweden. If my proposal is accepted I would be pleased to placed in a panel that includes Oskar.

912 **Ideology and the Environmental Movement in Canada: An Analysis of Pollution Probe, 1969-1979**

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The Canadian environmental movement is commonly associated with the confrontational and anti-corporate tactics of Greenpeace. Despite Greenpeace's international renown, its brand of environmentalism does not reflect the broader movement within Canada. In an effort to expand our understanding of the ideological origins of the environmental movement in Canada, this paper will explore the activities of the country's most influential organization, the Toronto-based Pollution Probe.

Founded in 1969 by students and faculty at the University of Toronto, Pollution Probe rose to prominence with a series of impressive accomplishments, including the banning of DDT in Canada, the imposition of legislated limits for phosphates in detergents, and the adoption of curbside recycling programs in Toronto. Canada's oldest and most successful environmentalist organization, Pollution Probe also assumed an early leadership position insofar that it helped develop and support similar groups across the country. While Canadian historians typically depict environmentalism as a left-wing movement, the Pollution Probe example demonstrates that the movement was built on a wide spectrum of ideologies. While Pollution Probe's leadership maintained a centrist approach, internal factions maintained highly divergent ideological views. Most notable were the conflicting views of the teams responsible for urban and energy issues. The urban team focused on issues affecting the welfare of inner-city residents, such as tenants' rights and the opposition of development plans that negatively affected existing neighborhoods. Consisting of community-minded activists, the urban team maintained a solidly leftist belief that the welfare of people must prevail above market forces. This contrasted sharply with the team responsible for energy issues, which believed a strict adherence to free market principles was the only way to resolve the mounting environmental crisis. This tension ultimately resulted in the energy team splitting off to form a separate entity.

In addition to reassessing outdated and overly simplistic notions regarding the ideological underpinnings of Canada's environmental movement, this paper provides insight into the activities of Pollution Probe, the organization most closely associated with many of the country's early environmental victories. As such, this will enable a more accurate understanding of environmentalism in Canada.

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913 **The Rocky Road to A Red-Green Alliance**

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This paper seeks to examine the practical problems of forging alliances between environmental activists and Marxists, through an Indian experience. The Inquilabi Communist Sangathan, Indian Section of the Fourth International, grew in Western India as a combination of trade union work, Marxist propaganda, as well as involvement in social movements including environmental activism. Its major centre was in the city of Vadodara (Baroda) in Gujarat, where it played a dynamic role in the early stages of the Narmada Bachao Andolan. But a protracted battle against the owner of a company producing hexavalent chromium created major tensions. For those with a narrow definition of party loyalty, domination by the party over sectional struggles was a key issue. For trade unionists, looking after their base, in an age of economic down turn, could mean resisting demands for environmentalist action. Among environmentalists, legal activists saw the issue simply in terms of law and fighting cases. Health activists saw it purely in terms of a health and safety issue. Even those who perceived themselves as socialist-oriented environmentalists found themselves pulled in opposite directions. Rohit Prajapati, simultaneously a leader of the ICS, an executive committee member of the Vadodara Kamdar Union,

and a founder member of the Paryavaran Suraksha Samity [Environment protection society], found his role as the mediator between different currents collapse, and trade union leaders and a particular type of party leaders unite to fight the environmentalists. As a result, the ICS split, the VKU collapsed, and the PSS activists withdrew from many of their engagements with unions. Rebuilding this networking has been a slow and incomplete process. Prajapati, however, has been involved with the Jyoti Karmachari Mandal, another left trade union, and has been able to win over many VKU rank and file activists. The final section of the paper will deal with the attempts by Prajapati and some of his comrades to build a new kind of political, not merely union and environmentalist, orientation.

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914 **War over Whales: Radical Environmentalist Organizations and Scientific Knowledge in Whaling Controversies**

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The environmental movement is closely connected to and claims to be based on scientific evidence and expertise, and environmentalists use this in their struggle. At the same time many within the green movement are ambivalent and distrustful of scientific authority and technology (Yearley, 1992). This paper will look at controversies surrounding whaling as a way of observing how organizations use science to form their agendas and to have an impact on the public and various decision-makers.

Radical environmentalists have taken different positions on Norway's decision to take up the commercial catch of the Minke Whale in 1993. Greenpeace, for example, has chosen a hard-line stance against most whaling activities and has attempted to discredit scientific and social arguments favoring whale catches (Stewart, 1993). However, not all environmentalist organizations are anti-whaling (Grendstad, Selle, Bortne & Strømnes, 2006). The founders of the Norwegian organization Bellona believe that the catch is unproblematic as the whale species being caught are not threatened with extinction. The two organizations, although both pro-environment, have interpreted and deployed the science in different ways.

The focus point of my paper will therefore not be on spectacular actions and campaigns of some of these NGOs such as actions and sabotage, but rather it will focus on their less dramatic strategies involving mobilization of scientific knowledge. How do they relate the various scientific findings with their understanding of the nature and the natural? How are scientific facts translated and integrated, thus forming the organisations' scientific rhetoric in outlining their positions in the whaling issue? How is this rhetoric formulated to fit various public and political arenas?

By focusing on the mobilization of scientific knowledge in formulating and communicating a stance on whaling, this paper will address a little explored aspect of modern radical environmentalism.

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915 **Forests, Fields and Pasture: Environmental and Revenue Debates of land usage in Colonial Assam**

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The colonial period has been understood as a very transformative period, and recent environmental historians have accounted for many changes that have affected post-colonial India in this colonial watershed. The overwhelming thrust of environmental studies is to understand forest and its relation with communities and the state's role in defining that relationship. But the colonial state revenue, forest and agrarian policies were also intertwined and therefore to differentiate between the 'forest and the field' in an opposing dichotomy is misleading. The interface of agrarian and environmental histories is essential in understanding the relationship of people and the environment. This paper is an attempt to address such a history. The tea gardens, forestry, and extension of agricultural boundaries due to immigration changed Assam from a land surplus region in the

beginning of the 19th century to a province with unequal land men ratio. Pressure on land kept on increasing for various purposes and as a result of that pastureland suffered. Decreasing pastureland, immigrant professional graziers and taxation levied on grazing all affected the indigenous grazier and cultivator and influenced the policies of the government. This paper seeks to look into the various land usage by the colonial government in Assam and in the process how pastureland diminished in the face of expanding tea gardens, wasteland settlement rules, forestry, immigration and how the colonial state exercised political power to control the resources to maximize its revenue earnings. It also focuses on the changing British policies regarding patterns of land usage since their occupation of the province from 1826 and how it changed the landscape of the province. Stringent land management by the colonial government in the interest of the tea gardens also adversely affected the graziers and agriculturist. The land problem was compounded by immigration of ex-coolie labourers who settled down for agriculture, the Nepali graziers and the east Bengal peasantry.

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916 **Developing International Development: DDT and U.S. Environmental and Social Engineering in the Rapti Valley of Nepal, 1952-1965**

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Until the 1950s, the Chitwan Valley in Nepal was, like all of Nepal, closed off to the outside world because of politics and malaria. By 1975, twenty five years after Nepal's opening to the outside world, Chitwan had become Nepal's breadbasket and the site of Nepal's first national park. These changes transformed the historical trajectory of Nepal, but also the lives of the Tharu, the indigenous people who had lived for generations in Chitwan.

The key to Chitwan's transformation was an American malaria eradication and resettlement project during the 1950s, right after the revolution that opened Nepal to the outside world. The first of many U.S.-assisted malaria eradication and resettlement projects in the Tarai, the flatlands by the Indian border, the Rapti Valley (Chitwan) Development Project (RVDP) is especially interesting because it was both a massive environmental engineering project and a social engineering project. Devoting nearly two million dollars to the project, an enormous sum for those days, especially for Nepal, the U.S. built a 52-mile road and established a sawmill, several demonstration farms, and over 50 farmers cooperatives. These programs aimed to make Chitwan a model of modern farming techniques and modern health. Strikingly, the U.S. also tried—unsuccessfully it turned out—to make the Rapti Valley a site of relatively equitable land holdings.

Based on archival and recent field research (I'll be on a Fulbright fellowship in Nepal in spring 2009), this paper is an environmental, political, and cultural history of Chitwan in the 1950s. In the paper, I tease out the American ideas of nature, disease, frontiers, poverty, farmers, technology, and development that informed the RVDP. I contrast these American ideas with the experiences of variously situated Nepal actors—elite engineers who worked for the RVDP, migrants from the hills, and the Tharu.

This paper will interest environmental historians for several reasons. It sheds light on the complicated history of DDT internationally, especially for malaria control. It combines environmental history with international history by focusing on the role of "third world" economic development in the Cold War. And in doing so, it shows the overlap of material change, social change, and complicated cross cultural interactions.

The paper could work well on a number of different panels—on disease, indigenous peoples, international development, the developing world, the Cold War, or frontiers.

(Note: I gave some thought to presenting something from a book I'm about to publish, The Malthusian Moment: Population Growth and the Birth of the American Environmental Movement, 1940 to 1985, but decided you would like research at an earlier stage. If material on American Neo-Malthusian fits better with the needs of the conference, please let me know.)

918 **Natural Monopolies [Brazilwood, Whales, and Diamonds]: The Unintended Conservationism of Royal Greed in Colonial Brazil**

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My paper will approach the general question of the ecological impact Portuguese colonialism had on Brazil by specifically addressing the role of monopolies in creating an unintentional form of conservationism. To illustrate the consequences, I will examine the royal monopolies of brazilwood, diamonds, and whales, as well as the private monopolization of both land and sugar mills. American colonization has usually been characterized as

ecologically destructive, and I will not contest that reality entirely. Sugar and gold production, for example, left the obvious evidence of their destructive powers in deforestation, erosion, and tailings. However, the official limits placed on various economic activities and trade, that have been identified as important inhibitors to economic growth and even to immigration, also worked to reduce the human impact on the natural landscape. This can be most directly seen in royal monopolies. In whaling and brazilwood, monopolies created sustainable extractive activities that remained viable for more than three centuries.
We need a more nuanced view of Iberian colonialism's natural impacts. In many ways, the colonial era was a period of respite for nature. And it is arguable that the great destructions that we see on the landscape today have their origins in the 19th and 20th centuries rather than the colonial era.

920 **Atlantic Coastal Forest: a space where culture and ecology blend – a case study of a secondary urban forest, Rio de Janeiro (Brazil)**

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The Atlantic Coastal Forest is one of the world's most endangered biomes. Long before its discovery by western civilization, the forest had already been occupied and used by native populations. Later, with colonization by white man, many other groups of traditional populations used the forest, mainly for subsistence agriculture. The increasing occupation of this biome has generated landscapes composed of a mosaic of forests of different ages that resulted from its usage and that overlap in space and time. This study was conducted aiming at understanding the effects, on the vegetation structure and composition, of an abandoned banana plantation (50 years ago) in a tract of Atlantic Coastal Forest in the Pedra Branca State Park. This area has been occupied and used since mid 17th century. The first land use this area went through was a sugar cane plantation in conjunction with subsistence agriculture implemented by the slave workers. During the 20th century the main land uses were banana plantations and charcoal production and in many cases the charcoal producer also planted banana, leading to an overlap of uses in a small spatial and temporal scales. Currently the charcoal production has ended however there are still some clandestine banana crops within the State Park. The secondary forest, resulting from the abandonment of the banana plantation has a structure comparable to other forests in regeneration. Some remnant trees, like specimens of Tachigali paratyensis (Vell.) H.C.Lima, were found within the forest community with a very high diameter. These trees were "left for the earth", as the elder local inhabitants told us, because there were too large to remove and in some cases for religious beliefs. A very large specimen of Ficus insipida Willd. (108 cm of diameter), a local fig tree, was spared from cutting due to the cultural aspect behind these trees in witch in an excerpt from the Bible, Jesus curses a fig tree. So because of cultural-religious aspects the local population spares fig trees. This event has a direct effect on forest structure as remnant trees attract the local fauna, because of its shelter and resources (fig fruits) therefore acting as seed dispersal sites. This factor influences the successional dynamics of the forest, promoting a faster regenerative process of the structure and composition of the area. Therefore the environmental history of the study area shows that the distinct land uses have an influence in the forest composition and structure, and that at the same time, certain aspects of the local flora are directly influenced by the culture of the people that interact with the forest.
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921 **History of landscape and landscapes without history: brazilian atlantic coastal forest**

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The Brazilian Atlantic Coastal Forest has been occupied for thousands of years. Due to this, there is an extended history of human population interaction with the environment leading to landscape level transformations. Many forest remnants have a wide written documentation like administrative and post-mortem inventories and production reports that allow reconstruction of the history of activities and actions of many social groups and their influence on landscape transformation. However, many economic and spatial activities that occurred on the Atlantic Coastal Forest territory over the centuries do not all have the same effect. As the sugar cane and coffee production had a concentrating characteristic, some social groups and peripheral economies tended to a spatial dispersion throughout the Atlantic Coastal Forest. Therefore this territory has been in part inhabited by many of these groups, today generically called as traditional populations, such as the descendants of ethnic indigenous communities, fishermen and remnants of slave groups. Thus, most of the information that is available for each of these groups comes, when existing, from oral tradition of the elder population, therefore in process of disappearance. Groups that have persisted for hundreds of years within the same ecosystem have consolidated a vast repertoire of knowledge concerning slash-and-burning agriculture and forest management. The lack of information about landscape history can be minored by archaeological study of human evidences. Ecological research of forest structure and composition is another source of information about the processes of landscape transformation. Useful information about cultural uses of the ecosystem can be provided by analyzing the different medicinal and ritualistic uses of exotic species, spread out through the forest. Thus, the Atlantic Forest, as we know it today may be interpreted as a historical document that potentially shows and describes - in many of its attributes - the interaction of humans with the ecosystem. Within this framework, this paper

attempts to capture a historical view of the consequences of the use of the forest environment by traditional populations.

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922 **The history of Araucaria Forests in southern Brazil**

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The Araucaria Forest, also named Mixed Ombrophylous Forest, dominated the landscape in southern Brazil until the beginning of the 20th Century with an extension equivalent to 200 thousand square kilometers. Araucaria Forest has been present on the planet for a long time and it gets to the 21st Century with a percentage of only 1% or 2% of the original forest and 10% of the already exploited areas according to the most optimistic analysis.
The past one hundred years testified in southern Brazil a story of destruction not only of Araucaria augustifolia, predominant species in this kind of forest, but also of valuable Brazilian walnut, tecoma, cedar, guarea, several cassias among other arboreal species that together sheltered 10 billion cubic meters of timber, besides the impact on countless animal species that lived in these ecosystems, and yet, of the pressure suffered by native people such as the tribe of Kaingáng who originally occupied the region (KOCH & CORRÊA, 2002).
The process which configured the present scenery of Araucaria Forest began in the 18th Century when the first pasture farms and mules transport commerce coming from the State of Rio Grande do Sul heading to the State of Minas Gerais were installed in this part of the Brazilian territory, which was actually one of the most meaningful economic cycles and also of occupation in our history.
Until then the southern Brazil forests were practically untouched. The report of travelers and researchers who passed by the State of Paraná, which had 40% of its territory covered by Araucaria Forest, tell that it was common that they stayed some days without seeing the sun light because of the pines majestic crowns thickness.
From the second half of the 19th Century, when European immigrants arrived in Brazil, the gradual occupation of the pieces of land in the countryside started. As colonization went forward the countryside, the indigenous were expelled of their land and the forest was devastated more intensively to make room for urban nucleus. In a short time the installation of numberless extractive wood industry, which for their own characteristics did not integrate the region they occupied, became the main economic activity of these states. The increase of agricultural frontier would be one more element of huge pressure on the forest reserves in southern Brazil. The environmental damages the region suffered, obviously turned out to be an irreversible burden (MAACK, 1981).
The results of Araucaria Forest exploitation prove that it is a model that meets the interest of a few, gives short-lived profitability and leaves as a balance a wrecked land and impoverished population. It is unfortunately this pattern – mistaken, predatory and inefficient from economic, social and environmental point of view – that goes on being applied until today in other biomes from north to south of Brazil.

923 **Caring about nature: the role of the FBCN in Brazilian conservation**

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This paper examines the creation of the Brazilian Foundation for Nature Conservation (FBCN), in 1958, and the major strategies it employed until 1992 to influence policy-making and public awareness about nature protection in Brazil. As Brazil's first long-lasting and influential environmental NGO, its drive was strongest from the 1960s to the mid-1980s. In 1992, its importance had declined due to financial difficulties and to the emergence of more socially oriented environmental NGOs.
The following topics will be pursued to demonstrate FBCN's importance:
• Context its foundation
• The bases of its outlook on nature conservation
• Outlook on the relations between humans and nature
• Priorities and major obstacles
• Strategies to achieve conservation
• Related actors, sources of inspiration
• Political and institutional connections
• Alliances with or engagement against other organizations, ideals and proposals

These questions will allow the examination of how Brazilian nature was cared about in the period. Concerns about nature in Brazil go back to late colonial times. Nonetheless, only in the late 1800s and early 1900s do we find ideas quasi-conservationist ideas. Conservationist laws and policies appeared in the 1930s. The conservationist outlook gained a stronger foothold only in the 1950s, with the FBCN. In 1966, with a new

organizational structure and its Boletim FBCN (newsletter / scientific journal), it became the meeting point of conservationist ideas and actions. In the ensuing years, the FBCN participated widely in several domestic policies and in UICN commissions. Its Boletim was the sole outlet for texts about nature conservation. When the Rio-92 summit was convened, it was still a leading Brazilian environmental NGO, but it was at odds with and was later pushed aside by a new strand of "socioenvironmentalist" organizations.
Studying the FBCN will help recover the memory of a central thread of contemporary ideas and actions in favor of the conservation of Brazilian nature.

924 **Hydro-businesses: Shaping Communities in the São Francisco River Basin of Brazil and the National Identity as an Agro-exporter Country.**

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People construct the meaning of themselves and their surrounding environment differently, being influenced by internal and external variables. The significance of the São Francisco River has included spiritual, cultural, ecological and economic uses and meanings for local, regional and national populations. The 2,700 km long river begins in the mountains of Minas Gerais state and in its way to the Atlantic Ocean is joined by 168 tributaries, draining an area of 640,000 sq. km. mostly located under the influence of a semi-arid climatic region. The valley contains about eight percent of Brazilian territory and population. Beginning in the mid-1950s, the river became the place for large hydroelectric facilities, large-scale flooding, silting, and population resettlement. A decade later, the federal government began working on pilot irrigation projects that would lead to areas described today variously as the Brazilian California or Kansas. Hydropower for Brazilian state capital cities such as Recife and Salvador, and grapes and mangoes for the United States and Europe are among the goods and services provided for human use by this river. The São Francisco River, a "steady" (until when?) source of water for local populations, is now also the site for a major controversy, the inter-basin water transference projects (the Transposição), which attempts to divert water from the São Francisco to other parts of the Northeast. The valley has been the site where different rationalities meet and conflict: the technical, the political, and the ethical to name just three [Goulet, 1986]. Indeed, between 1877-79 drought and 1951, alternatives implemented for the Northeast followed the technical hydraulic approach: engineering solutions to provide access to water. The São Francisco River provided very obvious, close-by forms of sustenance, which in turn led to, or strengthened, a way of understanding the river such as captured in the phrase Velho Chico. People and river were one….a more "level" understanding. After the 1950s, the purpose of federal policies for the Northeast went beyond mitigation of the consequences of droughts and started to focus on other issues, such as development, following an economic approach, an extractive (exploitation-based) notion of the São Francisco River. River and user came to be so distant from one another. DISTANCE really affects how we conceive of, understand something (e.g., it cuts emotional attachments). I am interested in exploring how the environmental goods and services provided by the São Francisco River such as hydropower for large cities, water and electricity for irrigation, help shape the Brazilian historic identity as an agricultural exporter and, at the same time, how local communities have been transformed to supply national and international demands. The two major use of the river (electricity and irrigation) poses a conflict among them: until when will they be able to coexist?

925 **Debating the Great Hydraulic Transition: Changing Climates and Flooding in Nineteenth Century British India**

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The long nineteenth century marked a hydraulic epoch of sorts in British India. A collection of colonial interventions in land, water and forest management strategies had begun to initiate unprecedented environmental consequences. The introduction of perennial irrigation through barrages, weirs and other kinds of permanent river works, for example, while leading to high surpluses from mono-cropping and commercialisation were simultaneously dogging the productivity curve with environmental consequences such as waterlogging and salinization. Compounding these irrigation interventions, by defining property in strong exclusionary terms, the hitherto complex relationships between soil and water were often disconnected. One of the extreme consequences of this disconnect being the aggravation of floods in eastern India. Similarly, massive deforestation was perceived to be taking its toll on soil, water and climate regimes.

In effect, the environmental consequences that followed colonial changes in soil, water and forest management strategies had begun to cause the British to reconsider climatic changes and natural limits in the subcontinent. In a sense, a number of colonial scientists, medical doctors and levels of the administration had begun to draw connections between climate change and environmental consequences.

My paper will explore the late nineteenth century debate over flooding and climate change in eastern India. A perception, that soon consolidated as a considered opinion, had begun to emerge in this period amongst engineers and administrators in the eastern region that the increase in flooding was linked to climate change and deforestation. The belief was that the loss of large tracts of forests had begun to alter precipitation rates and thereby also caused the altering of the climate regime. Consequently, the British seem near convinced that eastern India was witnessing a radical transformation in its 'weather pattern'. This paper will hope to review these alarmist views alongside recovering some of the earliest documentations on climate sensibilities in the region.

926 **Connecting Arabic and European medieval documentary data for reconstructing climate**

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The given article is dealing with Arabic and Central European documentary data covering the period between AD 1000 and AD 1300, which is generally known as the medieval warm period (Lamb 1977). The regions, which are covered geographically comprise Iraq, Egypt, Syria and Palestine, SW-Arabia (Mecca and Medina) and Yemen. Due to political and cultural changes the centre of the sources shifted between 9 to 13 hundred from the Iraq via Syria and Palestine into Egypt. For Central Europe the data of the MGH (Monumenta Germania Historiae) and the CDS (Chronik Deutscher Städte) cover Germany but also the neighbouring countries likewise France and the Czech Republic.
A short discussion is focussing on the specific structures and scales of the documentary data. In both regions the type and structures are astonishing alike. Numerous annals and town chronicles provide direct and indirect climate-related information (Glaser, 2008; Alexandre 1987, Pfister, 1999, Grotzfeld 1991). The climatic information are more or less sporadic, describing single events especially catastrophic extremes likewise floods, droughts and severe winters as well as earthquakes, aurora borealis etc. But also the impacts of such events especially the effects on harvest results, problems with the food supply, economic and social crisis are described. The authors usually report events around there hometown and vicinity. Sometimes comparisons with remote events and/ or historical ones are given.

The climatic interpretation is based on well established methods of historical climatology likewise the derivation of indices and the derivation of time series of thermal and hygric extremes (Brazdil et al. 2005). Special attention is given on specific structure of this period and its most outstanding overall aspect: the medieval warm period. How can it be detected in both regions and can it be regarded as a historical case study within the modern greenhouse debate? Special focus is also given on the teleconnection between the two regions.

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927 **Atmospheric Research and Colonial Control in Canada's North, 1830-1900.**

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Many newcomers arriving in northern Canada after 1800 came with a meteorological interest in the North, evidenced in the thermometers that Oblate fathers carried to their mission posts as well as in formal atmospheric investigations, beginning with the Franklin expeditions in the early 19th century. Meteorology supplied tools to facilitate southern colonization of northern environments: most modern communities in northern Canada were born in the mid-19th century. British and European scientists saw subarctic and Arctic territories as ideal field settings to study climate. Thus local experiences of weather that were part of 19th century northern colonization had enduring global consequences. Current concern over the dramatic impacts of warming in the North demonstrate how understandings of changing climates remain closely tied to circumpolar science and environments.
This paper examines the local and global significance of experiences with changing weather in Canada's North between 1830 and 1900. Scientific interpretations that objectified northern environments and peoples conflicted with indigenous and folk ecological knowledge and control. This scientific knowledge was nevertheless highly influential amongst fur trade, religious, and state officials. The paper elicits these relationships as evidence of the impacts of atmospheric science on northern society between 1830 and 1900. The paper further demonstrates the role of scientific research in contributing new technologies to allow Arctic and subarctic colonization by permitting new adaptations to weather extremes at the same time that the climate itself moderated.
In the decades before and after the transfer of the Arctic islands to Canada (1870-80), British and European scientists were the foremost researchers interested in northern Canadian environments. This paper examines how northern fieldwork shaped questions, interpretations, apparatus, and instruments that came to guide the global study of weather and climate. Building upon Grove's seminal explorations of the colonial and tropical islands origins of 19th century concerns with climatic change, this paper examines how a very different colonial environment, characterized by weather extremes and socio-economic adaptations to such variation, influenced investigations of the atmosphere. I argue that northern atmospheric research, rather than focusing upon the origins of climatic variability, sought to understand the environmental impacts of a changing and extreme climate.

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928 **Colonial famine relief, development policies and climate: Towards an environmental history of Northern Ghana**

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and Jeff Grischow, jgrischo@wlu.ca, Wilfrid Laurier University

Our paper shall examine the intersection between colonial agricultural history and the doctrine of community development, and its implications for the ecological history of the Northern Territories of the Gold Coast. During the colonial period, food shortages were reported almost every second year. Before 1930 not much was done apart from reporting about the problems faced in various localities. However, with the emergence of a more welfare-oriented approach, which started with the Colonial Development Act of 1929, Britain attempted to enhance the welfare of its colonial peoples by developing agriculture. Though slow to begin in the Northern Territories, colonial agricultural development rested on two pillars, namely tsetse eradication and mixed farming. Furthermore, malnutrition was "discovered" during the 1930's and in 1936 the Colonial Office created a Nutrition Committee to examine the problem.

Throughout the colonial period the Northern Territories were more or less a 'sleeping beauty': untouched by Western - or Islamic - civilization, capitalism and all other forms of modern social evils. Colonial policies in the North were aimed at preserving this state of affairs: as in Northern Nigeria, where the Northern Nigerian Lands Committee (NNLC) had declared that no individual landownership existed, the West African Lands Committee, which was established after the example of the NNLC, came to similar conclusions for the Northern Territories. The policy to be pursued in both northern dependencies was to block the emergence of a private landholding class. Instead, all rights in tenure were transferred to the chiefs and ultimately to the colonial governor. The aim of such a policy in the Northern Territories was the emergence of a community-oriented approach, i.e., that the local entity (community) under the supervision and surveillance of the colonial government would be the driving force of development.

929 **Taking Microclimate into Consideration. Comapring ships' logbooks and fort journals at Cape Coast Castle 1750-1800**

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The aim of this paper is to compare different historical narrative sources and their potential usefulness when reconstructing climate. Focus is laid upon journals from Cape Coast Castle and logbooks from ships that moored near the fort. This is a part of my PhD-studies where I am trying to determine if it is possible to detect climatic anomalies in West Africa in the second part of the 18th century and if they possibly could have affected the British slave trade. Logbooks and journals from slave forts are used as they contain narrative descriptions of the daily weather.

By comparing weather narratives from journals within the fort, with logbooks obtained from British ships visiting the area, this paper will assess the impact of the microclimate when creating past climates. My investigations so far have shown that logbooks, when compared with journals kept on land, describe a different type of weather in many cases. This difference between two places close to each other can be constituted as an effect of the microclimate. Questions that are in need of answers are: If the quality of the observation is reliable, what does it mean for the reliability of the statistical analysis when we have two different descriptions? Is this a greater problem in Africa than elsewhere, taking into consideration the ITCZ? Is it a question of reliability or validity? The logbooks have proved to be useful when studying the wind at sea, but when in harbor there have been some concerns that the ships might be subjects to local turbulence. The logbooks used in this paper are not from ships anchored in a harbor, but merely close to land and not affected by turbulence. Logbooks contain a great deal of weather information, but can we create climate from this information, due to the impact of microclimates? How should a historian studying past climates take the microclimate in consideration? Can it be disregarded, should it be? Is it possible to only use narrative sources to reconstruct climate and what is the potential and limitations of logbooks as documentary data in general? Logbooks have been used to create wind patterns and for studying ice severity, but can they be used to study the weather or are they always affected by the microclimate, as a consequence of being at sea?

931 **Extrativism and legislation during the Empire – the Ilex forests in Southern Brazil**

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In the beginning of the American continent colonization, the European people found, in nature, a series of products that could be used, beyond survival needs, as lucrative extraction and/or production. The amount of actions that interests us in this paper is the extractive activities related, especially to "Erva Mate" (Ilex paraguariensis Saint Hilaire), which is used to make, in a peculiar way, the "Chimarrão" – a daily and traditional tea of the greatest part of southern population in Brazil.
In Rio Grande do Sul (southeast state of the Brazilian National Territory) of the 19th Century, the extractivism of the "Erva Mate" constituted a secondary economic activity compared to cattle breeding, which was the first to get developed. This subjects the occupation of the lands in the region, making use, preferentially, of plane lands

with abundant pasture - opposing to the location of the native "ervais", typical of the forest regions like "Serra Geral" and "Planalto Gaúcho".
Nevertheless, in spite of the fact that the extraction of Ilex paraguariensis has not represented the most important activity in economic terms, it meant the way of living of a considerable amount of people who inhabited these border areas. This activity, being in public or private properties, was regulated by legislation. Having these features in mind, we propose this paper, which intends to analyze the relationship between society, extractive practices, legislation and environment during the monarchical period in Brazil, in a way to identify how the official regularizations of this period interfered in the men relations with the natural resources and, specifically, in the extraction of Ilex paraguariensis for the production of "erva mate", taking as a case study the Rio Pardo Valley and adjacent productive areas in Rio Grande do Sul.

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932 **Human effects on landscapes of Bialowieza Primeval Forest in the 14th-18th centuries**

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The conceptual framework of McIntyre and Hobbs (1999) and Berglund (1991) and Antrop (1997) were used in my study on environmental history of Bialowieza Primeval Forest (BPF) to describe the status of forest landscapes of BPF in 14th-18th centuries. McIntyre and Hobbs (1999) described four landscape alteration states based on the degree of destruction and modification of the remaining habitat: intact (with more than 90% of natural habitats), variegated (preserving between 60 and 90% of natural habitats), fragmented (10-60%), and relictual (retaining less than 10% of original habitats). Berglund (1991) and Antrop (1997) proposed a classification of landscapes based on the visible anthropogenic influence: natural (without man-made changes), traditional (evolved during centuries of man-landscape interactions and harmoniously combined elements of both natural and human origin), and cultural (natural components replaced by anthropogenic ones).
Earlier palynological studies evidenced that the deforestation before the year 1800 did not exceed 10-15% of the contemporary area of BPF. My study has confirmed that estimate and, in addition, evidenced that the traditional, sustainable utilisation of the Forest, together with protection of the Forest as the royal game reserve of the Polish kings and Lithuanian dukes had led to differentiation of forest landscapes.
Two types of traditional landscapes were created: landscape of traditional access area (which was used, most probably, from 14th century, for hay-making on river-side meadows, traditional bee-keeping, fishing in forest rivers), and the landscape of the royal hunting enclosure (part of the forest fenced for the purposes of keeping game for royal hunts). In the end of 18th century also cultural landscapes were created with the erection of villages connected with tar and potash (introduced in 17th century), and charcoal production (started in the second half of 18th century). All these ways of exploitation were classified according to their impact on the forest: from undetectable or small impact (hunting, fishing), through moderate and strong impact on the forest (potash, wood tar and charcoal production, traditional beekeeping, hunting gardens), to complete deforestation (creating meadows in river valleys, erection of villages).
An attempt at assessment of the overall human pressure and the landscape alteration until the year 1800 suggested that at that time the forest landscape was variegated (according to McIntyre and Hobb's classification), with the deforestation level of 9.5% of BPF area. More than 90% of forest stands persisted until 1800, 37% of which were modified moderately or strongly. As much as 63% of the remaining forest were estimated to retain the pristine character.

933 **Silver above Forests: Silver Mining and Deforestation in the 16th Century Bohemia**

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The expansion of forest exploitation (esp. charcoal burning) in the Central Europe was connected to the discoveries of rich deposits of silver ores in the Kutná Hora district after 1280. From the last quarter of the 13th to the early 17th century Kutná Hora ranked among the world's major silver mining sites. The annual consumption of charcoal in Kutná Hora alone was between 6,000 and 11,000 tonnes in the 16th century (Rohlíček 1973) and the exploitation of wood floated to the Kutná Hora district led to pronounced devastation of the so-called reserve forests (royal or state forests under special management) in Krkonoše (Giant Mountains). At the latest in the 1590's committees in charge began to rate the Krkonoše forests as completely cleared or ruined disastrously (Nožička 1957), and wood started coming downriver to Kutná Hora from the Orlické Mountains. Subsequently an entirely new type of landscape was created in never more afforested Krkonoše – open plains with meadows and pastures. Later on, the deforestation of the Orlické Mountains was only avoided because the mining in Kutná Hora declined; but the fate was sealed for the Ore Mountains' forests, where the establishment of a new mining district centred around Jáchymov in the early 16th century resulted in the designation of reserve forests (Nožička 1962). However, after the sources of silver in the Ore Mountains were depleted rapidly during the latter half of the 16th century, a general decline of forest over-exploitation for silver

mining in Bohemia occurred.
The paper, which will be based on unpublished written sources from archives in the Czech Republic and Austria, will focus on the description and analysis of the evolution of theoretical and practical approaches and strategies in the forest management and forest exploitation in the 16th century Bohemia in the context of the development of silver mining industry. The essential questions (Rackham 2006; Radkau and Schäfer 1987; Metailie 1992) are: Why and till when destructive forest exploitation, whose effects were deeply discussed at the time, was substantiated by the importance of silver mining and processing? How was mining industry limited by the shortages of wood supplies and vice-versa? What kind of new forms of protection and forest management were improved in the relationship to the silver mining? How important were the environmental changes caused by deforestation and how were they perceived. Are there any similarities to this situation in the early-modern Europe?

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934 **Water and Environmental Sanitation in Early Modern Pisa**

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This paper discusses the relations between water, health and sanitation in a period prior to the modern knowledge of microbes and their influence from two viewpoints: 1) how these relations were perceived, and 2) what measures were taken on grounds of these perceptions. Philippe Descola maintains that "each specific form of cultural conceptualisation also introduces sets of rules governing the use and appropriation of nature, evaluations of technical systems, and (…) the hierarchy of being." (Descola 1992, 110. See also Ellen, 1996.) The latter question is analysed by means of the pair of concepts 'centralism/decentralization'. By 'centralism' I mean the atempts to gather all, or at least most of the water administration under the Florentine government's control, and 'decentralization' refers to a situation, in which decision-making and execution was decentralized to several actors of the local level.

The narrowing of the river Arno's southern branch brought about the birth of the marsh of Stagno south of Pisa: in the place of the river that had guaranteed the swift drainage of surrounding fields in the classical period, there emerged a great basin of stagnant water that made the whole area unhealthy and unproductive from the point of view of cultivation. The landscape of the Pisan Maremma father south consisted of alternation of bare fields, narrow cultivations, uncultivated land, meadows and thickets, infested by malaria and used mostly as pasture.

On the basis of the texts studied, it is possible to say that the practices of the management of the Pisan environment were partly based on health arguments — or at least they were presented so in the sixteenth century. In 1530s Florentine Francesco Guicciardini narrated a story about the siege of Pisa in August and September 1499 and stated explicitly that the reason for the epidemic ravaging among the Florentine troops was the unhealthy natural environment around Pisa: "Because the part of the Pisan countryside that remains between the port and the city is full of stagnant ponds and marshes and subject to unhealthy winds in that time of year, (…) the army encountered in two days an endless amount of illness..." (Guicciardini 1971, 412).

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935 **Roots of Empire: Forest Access in Early Modern Spain**

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Underneath an oak tree in Guernica, each new king of Spain promised to uphold the rights and traditional privileges of the people of the Basque country, an important shipbuilding region. For the Basques, the tree stood as a symbol for their semi-autonomous identity within the Spanish monarchy and a reminder of their control over their forests' management. However, beginning in the sixteenth century, the crown's need to defend and connect its imperial holdings, primarily with wooden ocean-going vessels such as the storied galleons of the treasure fleets, created a new demand for timber supplies and generated conflict with forest societies' traditional management practices.

I combine historical and geographical approaches to describe how Spain's forests became sites of conflict between traditional local use and new imperial interests of the early modern era. While crown access to quality

timber supplies provided a crucial material basis for Spain's vast empire, there have been no studies of the complicated process of gaining and maintaining royal forests for shipbuilding during this time. In order to trace these developments, I first examine reports generated by the bureaucracy of royal forest superintendents. These documents reveal conditions of Spain's forests in the early modern period and, over time, royal forest management policy with regard to controlling local populations and maintaining timber supplies. Evidence shows that a shortage of inspectors led to an increased lack of compliance to replant trees, which at times led to rapid deforestation.

I also present available evidence concerning the social and administrative structure of traditional forest stewardship practices. Many well-forested provinces defended their political liberties known as fueros to which the king's officials needed to remain sensitive. For many years, such liberties posed a legal limit to the crown's ability to pursue its agenda. Local communities favored conservation of forest resources, but they often resisted crown representatives telling them how to organize and conduct their efforts.

Finally, I examine legal documentation to argue Spain's local forest societies effectively voiced their claims to protect their resources from absolutist measures. The fueros eroded due to increasingly centralized reforms over time, but during the eighteenth century, authorities still found it difficult to institute enlightenment principles of scientific forestry. Tracing this history of forest management shows how challenges of imperial defense affected local forest livelihoods during this crucial period of state formation.

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936 **Controversial perceptions of Arctic warming in the 1930s in the context of Soviet polar exploration and resource use**

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The notion that climate could change started to appear in the scientific discourse only by the very end of the 19th c. (Sterh et al., 1995). The significant warming in the North Atlantic in the 1920s and especially the early 1930s provided a great deal of new evidence about the possibility of changing climate and its potential influence on navigation, scientific exploration, and fisheries in the Arctic. "Warming of the Arctic" was challenging for oceanographers: they documented it on the basis of hydrographical data and considerable shifts in fauna distribution and fish migrations, but they were not able to come to a consensus on how to interpret the situation.

Russian scientists, on the one hand, went ahead in these studies, in part because of the exceptional situation when fishery science had merged with oceanography much earlier than in other countries (Lajus, 2004). On the other hand, the general attitude of Soviet authorities, managers and a new generation of scientists towards nature and resource use was very unfavorable for studies of environmental variability. In their voluntaristic thrust to overcome physical constraints of nature by power of ideology and mobilization of people they were not interested in considering the variability of environment. Consequently, the unusually warm conditions during 1932-33, opening up new possibilities for navigation (particularly the first single-year passage along the Northern Marine Route) were masked by the rhetoric of heroism of new Soviet people (McCannon, 1998).

While it was possible to publish data and even hypotheses on the warming of the Arctic in academic journals (Berg, 1935), when it came to fisheries biology the acceptance of direct influence of warming on the distribution and the actual catches of commercial fish species, was more contradictory (Lajus, 2005). Communist managers of fisheries and part of the scientific community opposed the idea of the influence of climatic changes upon fish-stocks because it put serious limitations on their hope that nature could be controlled by human will.

Given this historical context, this paper provides a case study of the rapid development and failure of herring fisheries in the Barents Sea; a processes which was significantly influenced by climate. It analyses the varying perceptions of the situation put forth by different groups of scientists. Scientists pursued different individual strategies in relation to their perception of environmental variability. They often found themselves in-between two basic unpredictable factors: rapid variations of the environment and unpredictable and rapid changes in Soviet politics. Likewise, this paper also argues that inattention to environmental changes led to significant failures in the Arctic such as a navigation disaster in 1937-38 along the Siberian coast and groundless expectations towards the development of herring fisheries, for which scientists were blamed and punished by the authorities.

937 **Northern Light: Ernest Thompson Seton (1860-1946), the Euro-Canadian Arctic, and Post-Darwinian Perceptions of Environment**

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Environmental historians have identified post-Darwinian perspectives as a crucial factor shaping the widely influential "realistic" animal stories by the artist-naturalist Ernest Thompson Seton, author of the famous collection entitled Wild Animals I Have Known (1898). Seton's stories, they recognize, in turn inspired the environmental outlooks of several generations of scientists, conservationists, and other nature-lovers, including

the land ethic of Aldo Leopold. Yet, not unlike the literary scholars who studied Seton before them, environmental historians have not yet come fully to terms with the radical environmental message to which Seton devoted his career.
This paper offers a historical case study in the transition and transmission of environmental ideas and sensibilities. During the late 19th- and early 20th c., Seton's popular writings and paintings conveyed to generations of devoted admirers his post-Darwinian understanding of nature's survival ethic. Seton imbibed this view while growing up in Toronto, Canada under the mentorship of Dr. William Brodie (1831-1909), a remarkable local naturalist and entomological authority of international stature. Through nature walks along the local Don and Humber River Valleys, Brodie imparted to young Seton and his friends a precocious interest in flora and fauna as historic representatives of complex ecological communities living in dynamic interaction with their environment. After spending time in northern Manitoba and then observing migrations of reindeer herds in northern Scandinavia, Seton in turn extended his outlook to the Canadian far north, in a journey with Edward A. Preble of the US Biological Survey to observe caribou migrations in the notorious Barren Grounds west of Hudson Bay in 1907. In an outpouring of subsequent publications (including Life-Histories of Northern Animals (2 vols., 1909); Lives of Game Animals (4 vols., 1909); and The Arctic Prairies (1911), Seton blended science, art, fiction, and a passionate appreciation of local aboriginal knowledge to challenge conventional anthropomorphic stances with a radical zoomorphic understanding of humanity’s place in nature.

938 **Military Patronage and New Attitudes Towards the Arctic Environment After World War II**

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In 1947, the Pentagon became interested in global climate change. It did so not because of environmental concerns, as these became generally understood in the 1970s, but because of pragmatic defense issues: the prospect of climate change in high latitudes left military authorities worried about the United States’ ability to confront the Soviet Union in the high Arctic, where a hot conflict with its emerging Cold War adversary seemed increasingly possible. Pentagon officials also saw polar warming as a broader kind of threat: a warming Arctic climate meant that the Soviet Union might obtain new advantages in developing its agriculture and deploying its fleet from high-latitude ports. By the late 1940s the polar region had become, as never before, a potential theatre of war.

State concern with the Arctic environment helped to shape U.S. Army, Navy, and Air Force scientific planning and tactical studies through the 1950s. In parallel ways, military fascination with the Arctic helped to shape the earth sciences research community in post-World War II America, creating new institutions and new funding to address broad interdisciplinary problems. It shaped a distinct form of the environmental sciences in the United States before the environmental movement (which emphasized the biological environmental sciences including ecology, genetics, and natural history) gained ground in the 1960s and early 1970s. Pentagon officials sought knowledge about the upper atmosphere (missiles and long-range communications) and the oceans (submarine warfare) as well as about climate change, producing unprecedented volumes of data about Arctic conditions. Military patronage created a distinct form of the environmental sciences that stressed utilitarian and operational concerns. Yet the hope of military planners and civilian researchers to create comprehensive cross-disciplinary studies of this bounded geographic region—linking the biological and physical branches of the environmental sciences—initially proved difficult to achieve. This paper explores the importance of military patronage in shaping perceptions of the Arctic as the cold war deepened.

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939 **“Calm and Still as Death”: Survival and the Lady Franklin Bay Arctic Expedition, 1881-1884**

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This paper uses the records of a nineteenth-century American arctic expedition to explore issues of risk and survival in unfamiliar environments. More specifically, I look at the ways in which nineteenth-century Inughuit and Americans dealt with homesickness and starvation in the High Arctic environment of northern Ellesmere Island, during the Lady Franklin Bay expedition of 1881-1884.

The twenty-five members of the Lady Franklin Bay expedition, most of whom were enlisted servicemen in the US Army and two of whom were Inughuit from Greenland, travelled to Ellesmere Island primarily to conduct meteorological observations for the first International Polar Year. No one on the expedition had previously been this far north; none of the Americans had been to the Arctic at all. The party became stranded when, for two successive summers, the pack ice was too thick for a relief ship to reach them. In 1883, facing a desperate third winter at the station, the expedition commander ordered a retreat southward. Before an American ship rescued the party nearly a year later, all but seven of the men had died from starvation, malnutrition, drowning, hypothermia, and execution. I examine personal diaries, images, and expedition records to look at how these men (both Inughuit and American) described the High Arctic environment and tried, with varying degrees of effort and success, to adapt to it during their three years there. How did these men attempt to provide for their

basic needs, and to what degree did they ever feel at home in such an unfamiliar landscape? How did their actions and writings change when their lives were in danger, and when they began to starve to death? What factors influenced who survived and who did not? What can these answers tell us about ways humans can creatively adapt to nature, and about what inhibits them from doing so?

More broadly, I argue that the American insistence on travelling through High Arctic areas that were remote and uninviting even to Inuit shaped pervasive and consequential misconceptions of the Arctic as an inherently desolate and inhospitable place. I also use historical and contemporary environmental studies of Ellesmere Island to situate this paper in its specific and unique arctic site, stressing the fact that the Arctic is a vast and diverse region within which exist both forbidding areas and enduring homelands.

Note: Elizabeth Piper (University of Alberta) and I wanted to submit a panel in arctic environmental history, but we could not find a third person. We think that our two papers would fit well together.

941 **Losing our Sol? Elegies to the Sunlit Past in the Twentieth Century**

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Whether at work, at home, or at play, westerners over the last hundred years have spent ever more time indoors. The pace of this shift has been fastest in the United States, where earlier adoption of automobility and air conditioning served as potent accelerants. This paper will explore a number of concerns raised by health experts, social critics, and technologists over the course of the twentieth century as they noted urban and suburban residents spending less and less time "amid umbrageous freshness," in Progressive-Era health promoter John Harvey Kellogg's expression, "[their] skin … browned and disinfected by the sun." In contrast with much of my recent work on Americans' "migration" indoors over the last hundred fifty years, and as a needed complement to the dominant approach in recent environmental histories of the nexus of built environment and human health, this paper will focus less on the harms indoor life brought than on the presumed benefits outdoor life offered in terms of health, spirit, and the ancient connectedness to nature. Many health experts throughout the twentieth century, whether advocating open-air schools and vigorous outdoor activities for children, or sunbathing for the elderly, mixed concerns over ill-health arising from dark, "close" interiors with an enthusiasm verging on the religious for the many benefits of greater exposure to the brightly-lit outdoors. Most expressed a deep sense of loss for the naturally-invigorating lifestyles of earlier times.

942 **Contested Knowledge: Science, the Body, and the State in Agent Orange Exposure Cases**

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From 1961 to 1971, the United States sprayed more than seventy-two million liters of chemical agents, of which Agent Orange was the most prevalent and the most infamous, over central and southern Vietnam (Stellman et. al, 2001). As the war dragged on, these chemicals became the cornerstone a new global awareness about the effects of herbicides, dioxins, and other chemicals on humans and their environments. Despite recently renewed attention toward Agent Orange and the controversies its legacies have sparked in many nations, historical scholarship on the subject remains significantly limited by national, chronological, and disciplinary boundaries. In particular, a lack of qualitative case studies, grounded in the experiences of communities exposed to dioxin has left concerned parties without a basis for comparing exposure incidents over time and geographic regions.

Drawing on records from lawsuits, military and government sources, newspapers, and other first-hand accounts from several different localities, the larger study from which this paper draws (Martini, "Agent Orange: A History," 2011) focuses on the myriad ways in which various communities responded to the threat of Agent Orange and its associated dioxin. This paper describes the responses of three different communities faced with the threats—both real and imagined—of 2,3,7,8-TCDD, the deadliest form of dioxin and a contaminant present in Agent Orange.

The case studies collected here come from the records of villagers and soldiers exposed in Southern Vietnam in the mid 1960s; American citizens of Times Beach, Missouri, who were exposed in the late 1970s and 1980s; and Canadian citizens and soldiers possibly exposed in the 1960s and 70s, but whose exposure was not revealed until the early twenty-first century. Despite the very different circumstances under which these communities encountered Agent Orange and its associated dioxin, the case studies reveal a striking similarity in the manner in their responses. In each case, community members highlight the failures of state agents, independent scientists, other "experts," and the mass media to provide accurate and reliable information to various exposed constituencies.

In this tendency, these Agent Orange cases demonstrate similarities with other environmental disasters, including Bhopal and Chernobyl (Petryna, 2002; Fortun, 2001). Unlike in those cases, however, the evolution of "official" scientific knowledge on Agent Orange and dioxin continues to present conflicting information on the risks of exposure for these and other communities. In the face of new historical and scientific evidence, however, citizens of Vietnam, the United States, and Canada (as well as Korea, Australia, New Zealand and elsewhere) have offered personal memory, local experience, and local knowledge in a challenge to both historical evidence and scientific method.

945 **Environmental Claims Makers, Salt Marsh Diking, and the Risk of Sea Level Rise in the St. Lawrence Estuary: A Real or Perceptual Threat?**

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Recent analysis of sea level rise along a stretch of dikes at Kamouraska, Quebec, on the shores of the St. Lawrence Estuary of Canada, shows evidence of erosion and the risk of inundation to surrounding farmland. While the risk is disquieting, the threat is not nearly as exceptional as interpreted by engineers and environmentalists. Using archival data from the last 150 years (maps, seigniorial papers, biological and agronomic journals, and aerial photographs), this paper argues that the risk to farms is not solely the result of recent climate change, but must rather be interpreted in the light of environmental change in combination with the historic record of decisions made over the last three centuries by naturalists, agronomists, engineers and ecologists who, as environmental-claims makers, played an inordinate role in situating the dikes in zones that are now clearly at risk. Ironically, it is these same parties who now claim to have the environmental knowledge to manage risk and achieve sustainability. This paradoxal situation provides the hypothesis of this paper that any approach to environmental sustainability be informed not just by natural and socio-economic data about a given environment, but by an internal analysis that begins with questions about the veracity of knowledge itself, and how decisions and change are affected by the control of such knowledge.

947 **The development of fishery in the Northern Adriatic Sea from the end of the 19th century to present**

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The Adriatic region has been inhabited for millennia and has been characterized by a profound and enduring mingling of human action and natural ecology. The present status of the Northern Adriatic marine animal populations has been strongly influenced by complex and impressive actions carried out by the people inhabiting their coastal areas. Fishery is recognized to be the first anthropogenic driving force which historically altered marine ecosystems structure and function since thousand of years ago. The Northern Adriatic Sea is the most exploited Italian basin, due to the high primary and secondary production which sustain a high fishery productivity. Major anthropogenic changes are deemed to be happened in this ecosystem with the industrialization of fishery between the end of the 19th century and the beginning of the 20th century.
The aim of this study is to reconstruct the development of the exploitation of marine resources by fishery in the Northern Adriatic Sea from the second half of the 19th century up to now. We carried out surveys in archives and libraries of Trieste, Venice, Chioggia, Split and Rome considering historical, statistical and scientific sources with the aim of describing i) the evolution of fishing capacity and effort, ii) changes in fishing gear and technology, iii) the main target species and their ecological traits, iv) trends in landings statistics from different fishing ports, v) changes of exploited fish populations and communities due to fishing activities and other sources of anthropogenic disturbance (e.g. eutrophication, benthic anoxias).
The fishing capacity (number of vessels, fishermen and gross tonnage of ships) increased constantly until 1980 and technology became more advanced. It is possible to distinguish between three periods characterized by different anthropogenic pressure: a period comprised between the 2nd half of the 19th century and the 1st World War, when most of fishing activities were carried out by means of artisanal fishing gear, specialized to catch single target species; the period between the 1st and the 2nd World War, when a gradual introduction of new technologies occurred, including the adoption of engine propeller; the period from the end of the 2nd World War which was characterised by sharp changes in fishing technology, with the spread of engine propeller and other technological devices (e.g. freezers for preserving the catch, radar, GPS) and the introduction of more effective and highly impacting multi-target fishing gears.
Signals of over-exploitation were evident, in particular in the last period, and affected mainly vulnerable species (e.g. elasmobranches), whereas most abrupt changes in the marine resources were detected at the end of the 1980s, when landings reached their peak followed by a sharp decline.

950 **"Wasting" in the 1950s and 1960s: West German and French Cities in Comparison**

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The 20th century "consumer citizen" takes for granted his or her right to consume. While this consumer right is well researched, the accompanying right to "waste" has been largely underemphasized. In this talk, I will present the development of waste systems, i.e. the network of diverse agents and technical components enrolled in treating residential residues, as a mutual shaping of technology and the societies' respective wasting practices. Doing so, I aim to introduce into environmental history the insights of recent "user" histories on the agency of consumers.

The presentation will focus on wasting in the postwar decades for exemplary West German and French cities. It will question how, after the destructions of WW II and a time-span of frugality and exceptional recycling efforts, the waste systems were re-established and re-shaped in the context of the arising consumer society. Once both the "system builders" as well as the "system users" are focused upon, a transnational comparison will be able to analyze more thoroughly the regional socio-cultural characteristics of waste. Whilst disposal methods and knowledge were rather easily transferred between cities or nations, the wasting practices of citizens were yet locally embedded activities, even if the growing mass consumption offers tended to harmonize regional characteristics. Sources stem from municipal and trade archives, professional journals, and in particular, sources of everyday live, such as women's magazines or architectural guidebooks. Besides, documents from the

German "Collection Erhard" – a historical documentation center for hygiene and waste issues ¬– will be used.

Susan Strasser has traced, how new disposal possibilities made it easier for Americans to throw things out (Strasser 1999). Besides, some exemplary studies have analyzed European waste systems after World War II (e.g. Park 2004, Calice 2005, Payer 2006). My aim is to add to this a transnational comparison, which highlights the specific situation of the 1950s and 1960s, when critical decisions for the waste systems of European mass consumer societies were taken. Cultural differences between the cities, but also between a constructed "European" and "American" "waster", as well as power relations between system builders and system users will be highlighted.

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951 **Constructing waste in a Latin American city: Bogotá at the turn of the XIX century**

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This paper focuses on the beginning of the "modern" waste management in Bogotá at the end of 19th century. Circulation of North American and European technological models, the role of hygienists, the increased population in a static urban infrastructure, but also the progressive divorce between Bogotá and its surroundings will be evaluated in order to understand how waste consolidated as a health and environmental problem on one hand, and a fundamental signifier of social and class labeling on the other.

952 **Scrap and Refill: Antecedents to Irrational Municipal Recycling Policy in the Contemporary United States**

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In the contemporary US, comparable tonnages of waste glass and waste textiles are disposed of annually. Nearly all US municipalities target glass as part of the curbside recycling program, while close to none collect or market clothes, linens or carpets for reuse or recycling. This arrangement is counterintuitive. The ecosystemic burdens of wasting textiles are far greater than wasting glass at each stage of the lifecycle. Conversely, there are strong markets for used textiles, while secondary glass commands low prices and is a net drain on municipal recycling budgets. This paper examines the construction of glass as a material to be collected for recycling by the state, and the absence of parallel construction for textiles, by the contemporary recycling movement that emerged in the US after Earth Day, 1970. It argues that the visibility of glass as litter in the 1960's, and the prior existence of charity shops as an outlet for used clothing starting at the turn of the 19th century, only partially explain the disparate treatment. Essential as well was the relationship between the recycling movement and two distinct branches of the business community: scrap traders, and the beverage and bottling industry. While the metal and paper sectors of the nation's centuries old scrap trade were successful in aligning themselves with the ecological call to recycle, the weaker textile branch failed to make the case among environmental groups that reclamation of cloth was good for the environment. The beverage and bottling industry, whose economic model had shifted from refill to "one-way" containers in the 1960's, was instrumental in promoting the recycling of post-consumer glass as an alternative to state-mandated deposit and refill systems among these same groups. Glass, which had never been traded as scrap, thus joined paper and metal (and later plastics) as a pillar of the municipal recycling program, while textiles were excluded from recycling's scope.

954 **Craving Energy: The Evolutionary Origins of Ecological Destruction**

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Do molecules shape history? Exploring the biochemistry of sucrose and commercial sweeteners like high-fructose corn syrup, this paper seeks to add a new chapter to Sidney Mintz's monumental work Sweetness and Power. While Mintz has covered considerable ground in looking at the socio-cultural explanations for sugar's popularity in the world market, scholars have yet to examine the ways in which basic bioenergetic demands shaped consumer choices throughout history—to examine the biology behind what Richard Tucker would term humans' "insatiable appetite" for sweet foodstuffs, an appetite that has stimulated catastrophic ecological degradation across the globe. This paper seeks to expand on Mintz's work, to show how global ecological change is linked to a more distant past, one that is shaped, at least in part, within the world of cells.

As a chemical compound, sugar (sucrose) is a fascinating commodity. It is a dissacharide that provides the essential primers for cellular respiration. Because the basic components of sugar (glucose and fructose) are so essential to metabolic processes, humans have evolved mechanisms that reinforce the consumption of sweet foods. To understand why humans have sustained ecologically destructive commercial empires in the tropical world, then, scholars must investigate the basic biochemical pathways that influence consumer choices. A transnational work of the long-duree tradition, this paper offers a new model of analysis that looks at agency on

the molecular level, tracing the evolutionary origins of humans' destructive pursuit of sweet goods.

This is not simply a history of sugar and environmental degradation; rather it is a case study that provides a fresh perspective on the intersection of physiology and the growth of the international sugar market while offering a new model for historical analysis that focuses on bioenergetics and human and plant coevolution. The choices we make as consumers have been shaped by evolutionary processes that have taken years to unfold. It is time for scholars to broaden the temporal scope of their analysis and dig deeper to uncover the connections between biochemical processes and global ecological change.

955 **Anthropocene fishing, or what is the energy involved in herring fisheries past and present?**

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In literature on fisheries history it is a standard observation that because of the nature of the technology employed, pre-industrial fisheries did not have a decisive impact on the fishing resource. Also since they did only use man and wind power as well as the energy used for creating the vessel, it is likely, but not certain, that the calories spent in connection with a fishing operation, were gained through the calories stored in the catches of fish. With the most recent fisheries it is a trivial observation that modern fisheries have large and severe impacts on the World's marine resources, and that the whole operation is heavily reliant upon the use of oil consuming machines.
Beginning in Europe in the 1880s steam propulsion led to more efficient catches, and demand increased with the opening of new railroads into Russia. North Sea herring fisheries reached an all time peak by the 1910s. During the 20th century demand remained high, and sonar and large purse seines brought ruthless efficiency to the fishery, despite plummeting stocks.
But, what is actually the difference in CO2-emissons in between fishing with vessels of the pre-industrial and industrial era? Early 20th century fisheries scientist, Garstang claimed that the catching power of a steam vessel was four times that of a sailing vessel, which is more or less consistent with recent findings (Engelhard, 2007), but did steam vessels also start to use several times more energy?
This paper analyses logbooks and from fishing vessels using driftnets in the North Sea, account books of the associated fishing companies and export figures showing the approximate distance travelled for the end products. The logbooks contain daily information of position, hours fishing, amount of herring caught as well as the amount of coal and petrol was spent during the fishing operation. Knowing the size of the different types of vessels, gear and number of fishers aboard, the development in energy consumption can be measured from day to day basis as well the lifespan of the duration of the vessel.

956 **Small is tasteful. Consumption patterns of eel in Northwestern Europe, 1300-1800**

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Large fishes were food for the rich in the Middle Ages and Early Modern Period. A famous example is the menu at wedding banquets in Italy in the fourteenth century: large fishes in rich sauces were served in Lent. However, such fishes appeared more on banquets close to coasts then in inland areas (Montanari 1994, Hoffmann 2001, Sicking and Abreu-Ferreira 2008). Consumption patterns depended both on ecological and cultural determinants, the former including habitats of fish and their lifecycles, the latter comprising taste and trends, but also fishing and transport technology, and market structures.
This paper investigates the consumption of eel in North-Western Europe, while confronting a historical and an archaeological approach. Eel was an omnipresent fish in the wetlands along the North Sea coast. When the eel larvae arrived at the entrance of the rivers, after having crossed the ocean, they made a gender-related choice. The females entered the wetlands and stayed in the shallow warm water to grow and fatten, and remained virgin for at least 6 years. The male ones stayed in the estuarine waters and, consequently, remained much smaller (less than 50 cm). During a short period in autumn, a cohort of ripe females left the wetlands in great masses in order to swim to the Sargasso Sea for producing offspring, meeting their partners on the way.
For commercial fishermen this lifecycle provided great chances to harvest a large amount of proteins and fats in an easy manner using specific equipment. As a consequence, in written sources about eel trade, trade streams of big and small eels are easily discernable. Historical research has shown that large eels caught in the Western Netherlands were exported to big cities, such as London and Antwerp. Curiously, also archaeological excavations show specific distributions of size. In particular, in recent research in nine cities in the Western Netherlands, a strong dominance of small eels was found. First of all, this is an improvement as against older research when almost no remains of eels were found at all in such areas. It now turns out that the older excavation methods were not precise enough (related to the size of the sieves used). Thus the question arises if the current hypothesis about the increase of eel consumption in the Late Middle Ages as a result of environmental changes in the wetlands (more mires) can be dismissed. Other new questions will be treated in this paper too, in particular the preference for small fish in the cities. Is this a result of the abundant local availability of small (male) fish, i.e. ecological factors, or of a highly integrated trade system, i.e. economical factors? To what extent can this be related to status? So how is the distribution over social-economic classes and can we relate consumption patterns to cultural patterns, like big is prestigious, or rather, small is tasteful? For this paper historical and archaeological evidence of several regions will be presented in a comparative way, in order to contribute to a deeper understanding of the complex interactions of ecological and cultural patterns in wetland landscapes over time.

959 **The standard of living, consumption and the environment in Norway 1726-2006.**

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The paper offers new and revised estimates of the living standard in Norway, measured with real wages as indicator, 1726-2006. The new series presented in the paper makes it necessary to revise the conception of the development of the living standard in Norway for long time periods and for different occupations and industries.

The growth in real wages did not immediately change the pattern of consumption. Food remained the most important consumption item until the twentieth century, and manufacturing industry did not become important until the same century. However, more food was imported. At the same time Norwegian agriculture shifted its focus from crops to livestock production. Thus, the environmental stress did increase.

The introduction of large-scale hydro electricity prevented Norway from using very much coal, when it at the same time gave fuel to industrialization and growth of the standard of living.

During the 1920s Norwegian consumption patterns started to change more significantly, as luxury products and leisure became more important, when real wages continued to grow. Thus, Norway to a larger extent than previously were challenged by environmental pollution.

During the post-war period the focus was so heavily on economic growth and industrialization with large-scale heavy industry, that both the standard of living and externalities to the environment scaled dramatically. When the environmental wave first swept over the world from the 1960s and 1970s, Norway fast institutionalized the importance of protecting the environment. However, this view has always been challenged by the political aim of steadily and substantial economic growth. Hence, Norway is now in the midst of the conflict between increasing standards of living, increasing consumption, changed consumption patterns and a threatened environment both domestically and globally.

This problem has been highlighted with the fact that Norway has become a petroleum dependent economy, causing economic growth, increased standards of living and increased environmental problems.

960 **"Global Climate Change and the Past, Present, and Future of Wetland Protection in California's Great Central Valley"**

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At the time of California statehood in 1850, the 400-mile-long Great Central Valley contained an estimated four million acres of permanent and seasonal freshwater wetlands. A century later, over 90% of those wetlands had been lost, primarily due to conversion to agriculture. However, the early twentieth-century discovery of the tremendous importance of the Central Valley for wintering migratory waterfowl of the Pacific Flyway (the westernmost of four north-south migratory bird routes that span the Americas) engendered new attitudes and approaches toward the Valley's wetlands. During the past 60 years, myriad successful efforts—by at times unlikely coalitions of cattle ranchers, duck hunters, and conservationists—have been undertaken to protect remaining wetlands and to restore them where possible. Successes on both public and private lands have generated a spirit of guarded optimism for the future fate of the Valley's wetlands.
However, even as we celebrate these relatively recent gains, the effects of global climate change in California threaten to halt and possibly reverse this progress. Rising temperatures are projected to considerably reduce the snowpack in the mountains of the Sierra Nevada, upon which much of the state relies for its water supply. Precipitation that presently falls as snow will fall as rain, resulting in earlier seasonal runoff. The state's dual-purpose flood control and irrigation reservoirs will be less able to operate at full storage capacity, as storage space will need to be allotted for the capture of unpredictable rainfall runoff, rather than predictable and protracted snowmelt. Already, calls for additional dams and storage reservoirs on the Valley's rivers are arising. As warmer and drier conditions become normalized, increased evapotranspiration will reduce soil moisture and further reduce runoff. Water supplies for freshwater wetlands, including the Valley's vernal pools, will therefore be threatened, and rare endemic species may be lost. This diminishing water supply, predicted by global climate change models for California, will be increasingly contested by competing agricultural, municipal, and environmental interests. As we write the next generation of environmental histories, it will become increasingly necessary to factor such consequences of global climate change into narratives of wetland protection, not only in California, but also globally.

963 **What We Talk About When We Talk About Salmon and Global Warming: The Shifting Narrative of Salmon Restoration and Preservation in the U.S. Pacific Northwest**

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Global warming is already creating havoc for fishery populations around the world. The continuing collapse of cod fisheries is predicated partially on global warming, vast swarms of marauding jellyfish damaged a salmon farm in Northern Ireland, and worldwide, anadromous and cold and fresh water species are already experiencing difficulties. In the Pacific Northwest region of the United States (Washington, Oregon, Idaho and Northern California) salmon and trout are already suffering from the impacts of global warming.
The fundamental irony here is that in the last ten years environmental activists and fisheries experts in this

region have accomplished remarkable successes in forcing recent and impending removal of dams and restoration of rivers such as the Sandy, Little Sandy, White Salmon, Hood, and the Elwha in order to restore salmon populations.

Global warming will cause a series of new problems for salmon in the Pacific Northwest. Droughts will shrink streams and reduce their effectiveness for spawning and smolt transport to the ocean. Warmer water temperatures will kill smolts and cause eggs to hatch early, thereby increasing smolt mortality. Changing ocean water temperatures will affect the upflow of cold water in the Pacific Ocean and therefore the nutrients available to salmon as they wend their way through these waters. These are only some of the anticipated environmental threats presented by global warming.

Human threats are appearing as well and they are either in response to global warming are using climate change as justification for preserving and building dams. Opponents to dam removal and river and fisheries restoration will employ global warming as a strategy to block river restoration efforts. For example, the Transportation Research Board has already published a paper indicating that removal of the four lower Snake River dams in Washington State (a hotly contested issue in the late 1990s) would require more use of rail and trucks and thereby increase CO2 emissions and worsen global warming. This is an echo of the air pollution argument of dam advocates during the hearings over dam removal in the late 90s. Besides the efforts to preserve already existing dams in order to keep producing "green" energy, the rhetoric is already escalating in favor of new dams. Not only are dam advocates employing "green power" rhetoric in defense of dams but they are also employing this language and justification to support building new dams on healthy rivers.

At a time when salmon advocates had built remarkable momentum behind dam removal and river restoration, seemingly ushering in a new era of fisheries reconstruction, the rug is being pulled out from underneath their feet. What looked temporarily like a century of restoration, to paraphrase Edward O. Wilson, is now looking like an era of ever more complicated and manifold threats to salmon. This paper will examine the impacts of global warming on salmon preservation and restoration efforts in the Pacific Northwest of the United States. How does the language of salmon preservation and restoration efforts change even as the discourse of dam proponents and opponents of environmental efforts changes to reflect or take advantage of the new climatological situation? How will strategies change in the face of new threats and opposition? These are questions that are just now being raised and addressed and this paper will examine the changing nature of salmon preservation and restoration narratives on a warming planet.

964 **Farmland and crops as providers of climate information in Belgium and the Netherlands during the 17th and 18th centuries**

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This presentation looks into the following issue: how can different types of farmland and crops provide information about temperature and precipitation of the past? Not only different crops, but also different soil types respond differently to changing weather conditions. Throughout the centuries this gradually resulted in the abandonment of growing some crops on sandy soils, while others mainly thrived on clayey soil types. A set of unwritten boundary conditions came about in which climate and soil types played key roles. Analysis of harvest-related information (tithe records) of several crops grown during from 1600 to 1800 shows how these boundary conditions were determined. Because the properties of soil types did not changed that much over this long time period, a surpassing of boundary conditions of crop growth is therefore a clear evidence of weather extremes and climate change as well. As a result of this research temperature and precipitation-related data has been computerized into a model of annual temperature and precipitation over a time period of two centuries. From this not only a more accurate reconstruction of the impact of the Little Ice Age can been shown, but also a spatially more variable representation of weather during the past can be obtained.

965 **Political Impacts on the Establishment of National Parks in Taiwan**

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The first attempt to establish national parks in Taiwan was in 1920s, the Japanese colonial era, but it did not succeed due to World War II. Under the Nationalist government after 1950s, the work mostly remained static with only the passage of the National Parks Law in 1972. In the late 1970s, Taiwan's first National Park finally launched its planning under the command of the Premier of the Executive Yuan, Chiang Ching-Kuo. Before 1987, when the Martial Law was lifted, four national parks were established; however, local people started to oppose to new projects and led government to abandon two plans and suspend one since then. My paper tackles how politics influenced the establishment of national parks, especially before and after the lift of martial law, and how decisions were made under political and social interactions.

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966 **Taiwan's National Parks Development since World War II**

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This paper is an attempt to retrospect and examine the history of Taiwan's National Park system and its important role in Taiwan national nature conservation history after 1945. The seven national parks cover some nine per cent of Taiwan's land area, or more than 320,000 hectares. Like many the other countries in the world, Taiwan has modeled its national park system and its nature conservation system as a whole after that pioneered by the United States, with its establishment of Yellowstone National Park in 1872. Before WWII, the Japanese drafted plans for three parks at Alishan, Taroko, and Datun, but the war prevented putting those plans into action. Taiwan's national parks, like those elsewhere, serve as a microcosm of the island's topography, geology, climate, soils, river systems, scenery, animals and plants, cultural and historical landmarks. They are locations for both recreation and research. While they are designed first and foremost to preserve nature for future generations, they are not hands-off preserves forbidden to human use. Instead, that human use is carefully controlled and monitored to minimize change and damage to the environment. Initially, the government tried to use the Build/Operate/Transfer (BOT) system in the national parks, but that policy was stopped in 2004. Now the thinking is that facilities for visitors should all be outside the park boundaries (unlike the practice followed in the U.S.), and the parks themselves should be strictly preserves. Environmental NGOs support this newer philosophy of management. A summary of each park's history and unique features will be examined in the paper.

967 **The National Park Concept in Spain: Patriotism, Education, Romanticism and Tourism**

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Nowadays in Spain, the concept of a national park is much more closely linked to the field of tourism than to that of conservation or environmental education. However, tourism was not the only reason for the setting up of the first Spanish parks at the beginning of the twentieth century. At that time a number of social, cultural, educational and even personal circumstances came together to lead to some of the earliest conservationist legislation in Europe, based specifically on the creation of national parks.
At the end of the Nineteenth Century Spain was a country that was taking its first timid steps towards industrial development. In the culture of this period two different features may be noted. On the one hand there was the so-called 'Generation of '98', a literary movement that tried to overcome the end-of-century crisis into which the final loss of its last overseas colonies plunged Spain, by turning its gaze back towards the purest elements in the national character. Spain's glorious past, warlike exploits, landscapes that inspired patriotism. The setting up of national parks often implies a nationalist affirmation, aimed at signalling to the outside world sovereignty over territory, or directed towards one's own population as a factor for cohesion in overcoming a period of crisis in the values defining the homeland. The second case was the establishment and expansion of the Institución Libre de Enseñanza (ILE), a prestigious educational organization which promoted direct contact with nature, following the theories of the German philosopher Karl Krause, to improve educational systems and inspire the population with respect for natural landscapes.
In a socio-economic context like that, the philosophical and conceptual bases just sketched would not in themselves have been enough to bring about the momentum for the first declarations of national parks without the decisive participation of individuals such as Pedro Pidal y Bernaldo de Quirós, the Marquis of Villaviciosa de Asturias, called by some writers 'Spain's John Muir', or Eduardo Hernández Pacheco and his rigorous scientific management of the Spanish nature conservation system.

969 **Non- Timber Forest Products and Rural Livelihood An Empirical Study in the Districts of South West Bengal, India**

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Nearly 170 million people living in and around forests in India, more than half of them are tribal; depend on non-timber forest products (NTFPs). In general, forest fringe communities are more dependent for their livelihood on NTFPs due to a) earning cash income; b) satisfying household needs such as fodder, medicine, shelter, and other household goods; c) sourcing traditional agricultural inputs such as leaf litter, wild plants, small tools and water; and d) obtaining supplementary foods such as roots, tubers, vegetables, fruits and grains for the family. In parts of West Bengal, communities derive as much as 17 percent of their annual household income from NTFP collection and sale. Small-scale forest-based enterprises, many of which rely on NTFPs, provide up to 50 percent of the income for about 25 percent of India's rural labour force. Non-timber forest products which are sources of livelihood and food security for a large number of rural communities living in and around forests (Vedeld et al. 2004, Bhojvaid, P.P. 2002, Arnold and Perez, 2001, Byron, N. & Arnold, M.1999, Jodha, 1990, Cavendish, 2000). The primary players in the collection, processing, and marketing of NTFPs are women who gather the bulk of forest produce, including food and fuel-related forest products.

Given this backdrop, the objective of the paper is to examine the likely impacts of the non-timber forest products on the livelihood of forest dependent people. This paper is an empirical study based on data collected through field survey. The analytical framework underlined the study is based on the household decision making model in which household maximizes utility. The utility function of households depends on Consumption of non-collected goods with a price of unity, leisure time and consumption of goods collected from the commons (i.e; non timber forest product). The analytical model helps to locate household characteristics such as access to

labour and product markets that determine the opportunity cost of their time and hence the time spent on collection for sale. This study is based on field survey data consisting of 96 households covering three villages of Atabanda, Barabugpichla and Chandmura located in north Midnapur in 2000. This study also covers two other villages of Natungram and Murabari located in Joypur forest area of Bankura district consisted of 40 households in 2003 and another two villages of Kolaberia and Kalyanpur located in Sonamukhi forest area in the District of Bankura, the districts of South West Bengal, consisting of 70 households in 2007.

The study reveals that the West Bengal Forest Department (WBFD) is interested to maximize the revenue from the sale of timber for commercial purposes. The non-timber forest products such as mahua tamarind, kendu, mango, jackfruit, Sal leaves and seeds, vegetables and roots, food, fuelwood, fodder, medicinal herbs etc. are very important contributors to the well being of villagers, but these aspects are neglected by the WBFD. The Joint Forest Management of Government of India is not effective tool for improving the well-being of the poor people who are depending on NTFPs. This paper has important policy implications for poverty, livelihood vulnerability.

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970 **Livelihood, Sustenance and the Natural World in the Mountains: A Case Study of Darjeeling in the Eastern Himalayas**

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The present district of Darjeeling (West Bengal, India) is a creation of the 19th century. Darjeeling was ceded to the English East India Co. by the king of Sikkim for its cool climate in 1835, when it was almost an uninhabited mountain wholly covered by forests. In 1839, A.D. Campbell, first Superintendent of Darjeeling, took steps to attract settlers to the region. By 1849, the number of inhabitants rose to 10,000. The early settlers, mostly agriculturists, reclaimed forest lands. In 1856, the first tea plantation was established on a commercial basis. By 1866, there were no less than 39 gardens which, by 1874, rose to 113. The 1901 Census shows that the tea-garden laborers and their dependants accounted for more than two-thirds of the total population of the district. In 1931, the same category of laborers formed about 47.25% of the total working population. In 1951, there were 138 tea estates with 69,590 of tea workers, who formed about 50.60% of the total working population. General agriculture also encouraged large- scale immigration. Out of the total number of 1,55,207 workers in the district in 1901, agricultural workers numbered 56, 029 forming 36.10%.

A good portion of forest was cleared for general cultivation. Exploitation of forest began with the demand for firewood from the tea gardens and of sleepers from the railways as well as of timber for industrial and construction purposes. Large scale deforestation has had its consequences in soil erosion, reduction in rainfall, flooding, washing away of top soil and other disasters. Forest-disappearance coupled with increase in carbon dioxide content altered preci- pitation pattern and climatic condition. Soil-erosion mainly in the form of landslides came to be a regular but disastrous phenomenon in the hills.

Due to destruction of habitats through indiscriminate tree felling, use of pesticides and replacement of indigenous broad-leaved trees by the introduction of Cryptomeria japonica and other conifer species, a number of plant and animal species have already disappeared. About 97 plant species have become rare and endangered from the Himalayas including Darjeeling against 134 species in total from India. As the forest and grass stock become reduced to almost zero by 2041, an eco-catastrophe of worst magnitude is waiting for all of us. Darjeeling hills not being very far from Kanchenjungha and Mount Everest, an abrupt change in the ecosystem in many of its areas due to human factor is naturally to bring about a disastrous effect on these two ice-clad mountain-peaks, which would add to the already grave problem of global warming.

The paper makes an attempt to historicize the complex process of the interaction between the people of Darjeeling and the natural world and its impact on natural environment.

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972 **Authority and Order in the Forest : Colonial India**

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British India played a pioneering role in the history of governance and management of nature. The modern forestry ideals and methods were exported from India to other British colonies like South Africa, Australia, New Zealand or Canada. The present paper examines the complex process in colonial India through which nature came to be aggregated, exploited, managed and governed between 1864 and 1947.

The present researcher seeks to throw new light on the question of the inter-connectedness between the colonial state's establishment of complete governmental monopoly on the forest resources in India with its primary agenda of timber extraction, on the one hand, and the parallel endeavour of creating new categories like 'forest crimes' or 'poaching', on the other. The two projects were actually more inter-related or integrated in the broader strategy of dominating the natural world in South Asia than they actually appear at first sight. Recent research has unveiled the fact that forest resources provided subsistence to the adivasi/ tribal communities in pre-colonial period. Many of these communities lived on a hunter-gatherer economy. The forests or 'jungle' offered them necessary fuel, food, grazing facility and various other services and these were used as 'free goods'. The enterprise of state monopoly on the forest resources effectively deprived the rural folk and the adivasis/tribal communities (like the Santals, Bhils, Kols and the Mundas) throughout India, of their main source of livelihood. Being deprived of their main source of livelihood these communities had been contemplating resistance in diverse forms.
State reservation of forests sharply affected the subsistence activities of these communities. The food-gatherers and hunters, who continued to evade forest laws, were in their own self-image legitimate hunters attached to their traditional occupation, but the alien law treated them as 'poachers' or 'criminals'.

The main group of offences was that of hunting, wounding or stealing animals, and poaching or fishing. In this manner was created a whole new legal category of 'forest crimes'. The legislators, throughout the colonial period were constantly extending the boundaries of forest crimes, though the popular perception of what constituted crime still remained very fluid.
The colonial rulers' struggle for mastery over the forest was essentially a struggle to crush the law-breaking crowd of the hinterland. It became imperative to identify and discipline the 'dangerous' who remained unreconciled to forest laws and interfered with the changing pattern of resource mobilization initiated by the alien power. The governance of nature called for the systematic gathering of information about the forest and its dwellers. It necessitated the classification and quantification of both. It was not 'pure knowledge' but knowledge as a political weapon. Thus, the entire method of the governance of nature was interconnected with the levers of the economic and political regime of the colonial state.

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973 **Watering the Mega-City: Energy and Environment in Los Angeles, Mexico City, and Sao Paulo**

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In the late 19th century, Manchester, England, began a new era in big technology projects to engineer the environment when it built a hundred mile pipeline to a remote nature preserve in the Lake District. Surpassing the aqueducts of ancient Rome, Los Angeles opened the next century with a 233-mile artificial river to a mountain valley. It emptied a 100 square mile lake, sucked up its groundwater and turned the Owens Valley into a moonscape. That was just the beginning of the desert city's demand for more sources of water from great distances that today requires almost 20 percent of the state of California's electric consumption to keep the pumps running. Mexico City too has to pump huge amounts of water up a mountain and then out of the valley to prevent flooding at an energy cost of over ten percent of the entire country's electricity bill. Long-term mismanagement of the valley's hydrologic cycle has created an environmental crisis greater than this mile-high city's notorious reputation for air pollution. A century of pumping too much water from the underground aquifers has caused severe subsidence problems as well as jelly-like subsoils that amplify the shockwaves of earthquakes in the historic center. The mega-city of São Paulo faces the risk of environmental disaster to its water supply from a different direction: the urban sprawl of shantytowns spreading up its surrounding hills and down around its reservoirs. Self-constructed during Brazil's "lost decade" of the 1980s, these favelas contaminated the upland lakes because they lacked sewerage, piped water, and garbage pick-ups. But the subsequent rise of Louis da Silva Lula's democratic movement has brought the homebuilders into decision-making roles in planning a clean-up program for the watersheds. Grass-roots activism is also behind recent court rulings that are forcing Los Angeles to restore the mountain rivers, lakes, and valleys it had tapped dry. My paper will put these stories of water, energy, and environmental politics in a comparative context of global mega-cities.

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975 **Flows of capital and flows of water through the industrialists: water supply in the city of Sabadell, Barcelona (1949-1966)**

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Historical accounts of urban water supply may shed light on the processes that shape the nature and development of urban growth and also on the interests behind this growth. In this sense, and as Erik Swyngedouw argues, flows of water are also flows of power. In the case of water, a vital element for the continuous expansion of the urban fabric, commoditisation and privatisation strategies are usually entrenched within a scarcity discourse in an attempt by private interests of overcoming new frontiers of capital accumulation, in what David Harvey calls 'accumulation by dispossession'. How privatization processes arise and operate is geographically and historically contingent but may have elements in common. Case studies on municipal water privatisation are needed in order to identify the general as well as the specific trends by which the resource is taken away from the public sphere and incorporated within the circuits of urban capital.

In this paper we present the case of Sabadell, the third most important city of Catalonia (some 200,000 people in 2007) and, historically, perhaps the most important centre for the production of textiles in Spain. Sabadell constitutes an early and interesting example of water privatization and subsequent expansion of the water supply network. The origin of our historical narrative dates back to the mid 1940's, when a pronounced drought pushed the existing water supply system to its limits and consequently threatened the economic growth of the hegemonic and water-dependent wool textile sector. This crisis led the local authorities together with the Manufacture Guild to create a Study Commission to search for a 'definitive solution to the water needs'. The model adapted in Sabadell emulated that taken by the Societat General d'Aigües de Barcelona (currently the AGBAR group) in Barcelona 50 years before: to consolidate a private monopoly for the distribution of water in the city. Hence the Sabadell Water Company (CASSA) was born with the objective of greatly enhancing the water supply of Sabadell preferring water from distant sources (such as the Llobregat and alter the Ter river) rather than search for more local sources. Pursuing this strategy in the next years, CASSA would become the water supplier of other municipalities of the area, expanding continuously the scope of its business and overcoming physical frontiers, turning up water flows into flows of capital.

The case of Sabadell illustrates a process by which city with few local flows of water and a chronic water deficit during the first third of the 20th century becomes a larger water supplier from the 1940s onwards after the service is privatized under the influence of industrial interests. Thus, while the business based on the textile industry declined from the 1970s onwards, the water business remains one of the most reliable and profitable of Sabadell.

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976 **Lessons from the Superpipe: water infrastructures and consumption dynamics in modern Puerto Rico**

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Since the second half of XX Century onwards, Puerto Rico began to experience serious water supply problems. Those are the result of: 1) an inefficient water supply system, 2) a ratcheting of domestic per capita consumption, and 2) a reduction of the storage capacity of San Juan Metropolitan Area (SJMA) main reservoirs. Even though such problems were not new, the 1994 drought made more visible the vulnerability of the water supply system. During that period, the precipitation on the Island decreased considerably and Puerto Rico's Aqueduct and Sewage Authority (PRASA) had to set a mandatory water rationing plan that affected 1.4 millions Puerto Ricans. The rationing resulted in a social anxiety climate, triggered in part by constant media announcements presenting a countdown of the days of water left for the San Juan Metropolitan Area (SJMA). It also had a negative impact on the local economy that was calculated in 200 million dollar in losses (Maysonet, 2000).

As a response to the crisis, the government of Puerto Rico acted aggressively with the construction of various water supply infrastructure projects, such as the Superaqueduct. Nonetheless, those measures have proved to be insufficient in order to overcome the country's water situation. On the contrary, some experts within the water community ensure that unless drastic conservation measures are taken, "rationing may be commonplace in the future" (Larsen, 2000, p. 517).

This paper has three main aims. The first is to present the reader a socio-historical background by which to

understand the current water situation in Puerto Rico. The second is to examine the role of water infrastructures in mediating consumption dynamics (see for example Vliet, Chappells, & Shove, 2005). In order to do so, I will explore the Superaqueduct's case as a governmental strategy to overcome SJMA water unbalance. The third aim is to discuss some of the current challenges that the island phases in order to achieve the desired change in current water cultures.

The paper's main argument for is that the commodification of space that took place from the industrialization of Puerto Rico onwards --and the kind of suburban pattern that resulted from it-- have drastically changed the ontological meaning (materiality) of water. This new logic in the relationship between people and water brought by the development of big water infrastructures has promoted a service expectation that is well beyond the Island's possibilities, and help normalising a water demand which is highly unsustainable. The conclusion will be that in order to achieve a real change in present water cultures, it becomes crucial to deeply explore the particular socio-technical context by which water is experienced in the domestic sector.

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980 **The origins of EU environmental policy in the 1970s. How transnational networks shaped perceptions and advanced environmental action**

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The history of environmental policy is an important aspect of environmental history. By the 1970s, environmental damage had increasingly become a politically relevant issue in the industrialised countries in Europe and elsewhere. What is more puzzling is that environmental policy was not only an issue of national policy making, but it was also established at the supranational EC level in the 1970s. While other much-discussed policies such as energy policy could never be agreed upon, environmental policy successfully went ahead with the Environmental Action Programmes of 1973 and 1977. Rather than simply attributing the establishment of environmental policy at the EC level to rising environmental concerns in the member states at the time, this study focuses on the role the emerging transnational policy network in environmental policy– consisting of actors from the European Commission, from national governments and from environmental NGOs – played in establishing this issue on the European agenda. The paper presents how this policy network formed the necessary link between changing societal views on the environmental and the actual establishment and implementation of environmental policy. It assumes that the formation of an epistemic community (Haas) on environmental policy at the EC level may have worked as a conduit for turning perceptions into policy. Based on archival research of NGO, Commission and national government records, as well as interviews with officials and activists, the paper seeks to demonstrate how exactly actors from different backgrounds started to share ideas, cooperate and eventually made an impact on policy-making. This provides a new angle on the history of environmental awareness in the late 20th century, which has tended to focus rather on environmental protest.

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981 **From Modernization to Europeanization: Rhetoric & Reality in Spanish 20th c. Environmental Policy**

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Over the past century, Spain has undergone dramatic transformations. In a remarkably short period of time, it has shifted from pre-industrial quasi-feudalism, to right-wing pariah, to emerging democracy, and emerged at the end of the twentieth century as a thoroughly modern and industrialized nation with living standards on par with any other in the Western world. The natural environment, and the state's relation to it, is a crucial component to understanding the nature of these transformations: the nature of the state is influenced by the remaking of landscape, and vice versa.
This paper traces the rhetoric and reality of Spanish environmental policy in the twentieth century, from its roots in the progressive regeneracionista dream of land reform, through the massive hydraulic projects and agricultural modernization of the Franco years, to the enactment and implementation of European regulations in the 1980 and 90s. In particular, it focuses on the authoritarian regime of 1939-1975, and the ways in which autarchy, federalism, and "one world" political ideology have influenced the ways in which the landscape has been imagined and reshaped.
In the early 20th century, Spanish intellectuals promoted a policy of land redistribution and internal colonization made possible by the construction of immense waterworks, which would bring irrigation and electricity to the peasantry and enable them to gain independence from landowning elites. This dream was disrupted by the cultural devastation of the Spanish Civil War and its aftermath, which marked the beginning of a modernizing drive that adopted much of the regeneracionista rhetoric, but benefited almost entirely the landowning and urban elites. The most iconic image of Franco's 35-year dictatorship was that of the Generalissimo inaugurating

dams, canals, and hydroelectric plants. Simultaneously, the electrification of agriculture and industry enabled skyrocketing growth in the once-stagnant economy, aided by the opening of trade barriers with Cold War allies in the West.
This development went unchecked and unregulated well into the 1980s, with catastrophic consequences to the environment. Upon Spain's accession to the European Community in 1986, the nation was forced to come to terms with the destruction it had wrought, and to implement a fundamental shift in its conception of the environment as it struggled to apply the EC's laws. The internal fragmentation of Spanish politics, the non-cooperative and non-participatory nature of its bureaucracy, and the failure of EC regulations to take into account the particular environmental problems of southern European nations pose new problems to the legal regime. Spain continues, in the 21st century, to struggle to find its place in a unified Europe.

982 **The Evolving Legal Framewortk for Global Water Governance**

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The increasing recognition of the global crisis in water resources has made it relevant to ask how legal systems have evolved to address the management of the earth's water resources. Water governance today is the result of complex historical evolutionary processes. Together, the patchwork of local customs and rules, national legislation, regional agreements, and global treaties provide a framework for the current global legal governance of water resources management. This paper, based on my scholarly research, my experience as a water lawyer in the United States and internationally, and on my experience of collaborating with international water lawyers within the International Law Association, provides a broad-brush overview of historical trends covering all countries. The paper takes an ideal-typical approach and presents general trends as opposed to close analysis of specific details. This paper thus surveys the evolution of national water law systems and its key features, the co-evolution of international water law, and the new focus of the 21st century to develop global water law. In general, international law reflects social beliefs and state practice rather than shapes them. Developments within international and national water law now suggest that developments in international and national law are increasingly shaping state practice rather than merely reflecting it, influencing future court decisions rather than being to replicating past decisions. The question thus arises whether this historical experience, coupled with contemporary thinking, can make a useful contribution to water governance and water management.
Key words: international law; water law; water history; water governance

983 **Spatial frameworks of land use and development: the environmental history of the Kanto Plain, Japan**

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The Kanto Plain is the largest plain region of Japan. This paper uses the earliest complete, spatial depiction of the Kanto Plain, the Rapid Survey Maps (Sprague et al., 2007), to propose that the environmental history of the Kanto Plain can be modeled as the overlay of three spatial frameworks. The first framework is geomorphology. Kanto is a river valley with large alluvial lowlands formed by many rivers, diluvial uplands, and hills. A second framework is a concentric circle model, as zones of diminishing influence extending out from the population center of the capital city of Tokyo. A third framework is a spoke-and-wheel model defined by transportation networks.
Geomorphology defined the agro-ecological problems that early rural communities needed to solve as they took root in the Kanto Plain. The lowlands meant a perpetual struggle to survive flooding while presenting opportunities to cultivate rice. The uplands, only a few meters above lowland, were dry, had poor soils, and may have been woodlands or grasslands. Early rice producing communities chose strategic locations around the periphery of the Kanto Plain where water was controllable and readily available to flood the paddy field every spring. The multilayered spatial framework of the Kanto Plain started with the arrival of Tokugawa Ieyasu, the Shogun who unified Japan under his rule. This Shogun built his capital city of Edo in the center of the plain near the mouth of several major rivers. He started massive public works projects, that arguably continue to this day, to control the floodplains and waterways, establish highways, intensify agriculture, and feed Edo, one of the first cities in the world to reach a population of one million. The concentric circle framework imposed itself on the Kanto Plain as Edo sucked in people, food, and natural resources from surrounding regions. For example, rural woodlands supplied green fertilizer for farmers, fuel wood and charcoal to cities (Inui, 1992). The subsequent Shoguns laid out the hob-and-spoke framework as many communities developed along highways and waterways extending outwards from Edo. Development continued after the change of government in 1868 that renamed Edo as Tokyo. The Rapid Survey Maps provide the temporal baseline at this time in the 1880s just before Japan began industrialization, when Japanese farm communities still obtained most natural resources locally, and the nation as a whole from domestic sources.
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984 **Austro-Franciscean-Cadastre 1817-1861 - A unique source for environmental history in Central Europe**

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In 1817 the Austrian emperor Franz I introduced a revolutionary law on land taxes and land registration. For the first time in history of the empire all the land was not only classified and taxed but also measured and precisely mapped in a detailed manner in order to link the taxation to the quality as well as to the productivity of soil. The creation of a territorial state, the disciplination of society but also the foundation of a new idea of state administration and society building – which was later on completed by the "Grundbuch" (land register) – received an important impulse by the Franciscean cadastre.
Till 1861, when the project finally came to an end, a territory of about 30.000 cadastral units ("Katastralgemeinden"), 50 million parcels (30 million hectares), 160.000 maps (on a scale of about 1:2880) all over the (by then) Austro-Hungarian Monarchy were measured and mapped. During half a century a territory almost as big as Central Europe from the western most parts of today's Austria up to Western Ukraine, from northern Czech Republik towards southern Croatia (and even later on Bosnia-Herzegovina) was statistically recorded and depicted in detailed, small scaled cadastral maps using more or less one stringently observed method. A huge amount of data on agriculture, forestry and society was collected on a very large scale in a period just before this rural sector was approached by industrialisation, artificial manure and heavily changed through it.
The paper is based on a current research project, financed by the Austrian Science Foundation (FWF) dealing with a scientific edition of the Austrian cadastre by two preliminary field studies in Carinthia (Austria) and Bukowina (Ukraine/Romania). The author of this presentation tries to question for possibilities and limits of this utmost important historical source in investigating pre-industrialized agriculture and rural space in Central Europe in the mid 19th century as well as for understanding the processes of changes of cultural landscapes since then.

988 A Neo Europe in the making – New Zealand's societal Metabolism 1840-2000

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This contribution explores the changing quality and quantity of society's metabolic interchange with the biophysical environment (Fischer-Kowalski 1997) in New Zealand from 1840 to 2000. Utilizing an empirical time-series approach and the methods of Material and Energy flow analysis (Eurostat 2001) the development of physical exchange between society and nature and its effects on land use and environment will be discussed. Based on statistical data on a national level an attempt is made to contribute to a historical understanding of socio economically driven environmental change and changing natural relations, linked to socio economic activities.

The fast development as a colony under British sovereignty after 1840 reshaped the landscape of the islands and led to one of the most intensely modified environments in the world. This process consisted amongst other things in the replacement of primary forests with grassland, drainage of wetlands and the plantation of exotic forests. Foreign plant and animal species were introduced and native species extinct. European cultivation methods and animal husbandry were adopted on a large scale and allowed agricultural production to play a major role in New Zealand's economy and support a dramatic increase in population.

During this period New Zealand saw the establishment of a colonial agricultural system, actively controlling solar energy flows and the sprint into a modern economy with its utilisation of fossil fuel. The remote location, narrow economic base and lack of mineral resources as well as the late colonisation and fast development by mainly British settlers under the conditions of the industrial age made New Zealand transition unique.

To describe the changes associated with this socioecological transition in terms of the 'physical economy' or more precisely in terms of changes in the throughput of material and energy assessed in physical units and discussing the relevance of these changes for processes of interaction between society and its natural environment is the aim of this contribution.

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989 Historical and Geographical Peculiarities of Agricultural Development of Forest Zone within East European Plain

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Active agricultural development of the forest zone of East European Plain (EEP) started in the second half of the first millennium AC after the Great Migration of People as a result of forced migration here of tribes who previously had become familiar with ploughed arable agriculture in other natural conditions. Natural environment of the forest region is much more severe and complicated than those of the source area of migration (the south of EEP). These complications include: shorter vegetation period; lower temperatures for all seasons; less fertile soils; higher contrast and spatial variability of soil cover; urgent necessity for regular restoration of soil fertility; need for deforestation.
These severe nature conditions have placed very strict limitations on the agricultural land use and thus the population settlement pattern. It should be stressed that not a single nature factor but their specific

combinations determined the process. For example, in the east and north east of the region climatic limitations were the most important. They resulted in selectivity of geomorphologic units, when only river valleys were suitable for agriculture. So up to now we can see there specific agricultural landscapes (called porechi'e or near-river-area), which consist of very indented long tracts of arable lands stretching along within river valleys. At the same time the west of the region was characterized with milder climate and climatic limitations were less important but geological factor played greater role here. In fact different sectors of the forest zone of EEP are characterized with different geological conditions. The east and south east of the region belongs to periglacial area, which has been never covered with glacier during the Pleistocene Epoch, the middle of the region is covered with deposits of the middle Pleistocene Moscow glacier, which is corresponds to the Riss Ice Age, while the west sector of the region is formed under the last upper Pleistocene Valday glacier, corresponding to Würm. The area of Valday glacier is characterized with the most contrast and mosaic geological and geomorphologic conditions, young poor developed and usually bogged river valleys. Thus the spatial agricultural pattern there consists of rather small patches of arable lands scattered at hilly interfluvial plain rather than within river valleys. Our research showed that agricultural spatial pattern in the east (porechi'e) has remained since the begging of the agricultural development more than 1000 years ago. On the contrary, spatial agricultural pattern in the west of the forest zone changed after "Troubles" (1584-1613) due to change of the corresponding displacement of population and later changed repeatedly. It was found that the primary population settlement and agricultural landscape patterns were formed under nature conditions mainly while their changes resulted from social and economical reasons and often didn't conform to environmental demands.

991 **From capitalism to socialism and back again: a case study of Czech agriculture since 1918**

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This paper analyses Czech/Czechoslovak agricultural production and related topics within the period from the creation of the Czechoslovak Republic in 1918 to the present. We look at the agricultural sector within the conceptual framework of "socio-economic metabolism", respectively in biophysical terms. This concept understands economy as an analogy to a living organism in the sense of resources extraction and emission of wastes. Using the method of Material and Energy Flow Accounting (MEFA), we will calculate material and energy flows through the agricultural system. A number of indicators will be presented: Domestic extraction of agricultural biomass, imports and exports, land use changes, agricultural population, share of energy used by agricultural sector, domestic consumption of agricultural biomass and share of GDP produced by agriculture.
We will link the changes of these indicators to significant historical events. The period examined was typical of a large-scale and complex modernisation and "industrialisation" of agriculture. Most profound intensification occurred after WWII (1960s – 1980s). However, this modernisation was influenced by a number of political disruptions, often leading to fundamental changes of economic regime: e.g., the Second World War, expulsion of Czech Germans after it, communist coup in 1948, Soviet invasion in 1968, the Velvet Revolution in 1989, break-up of Czechoslovakia in 1992 and joining the European Union in 2004. These forces also resulted in the changes of agricultural "mode of production" – e.g., ownership and use of land (the Land Reform in the 1920s, collectivisation of agriculture in the 1950s, etc.), use and productivity of labour, application of fertilizers and chemicals, level of mechanisation, energy consumption, yields and production, use and type of keeping of livestock, imports and exports, and landscape and land use. And, in turn, all these changes had a large impact on environment (biodiversity, soil erosion, appropriation of primary production, nitrogen flows, carbon sink, etc.).
With the use of literature, we will also compare the changes of agricultural metabolism of Czechoslovakia to that of Austria and the United Kingdom in the same time period (ca 1920 – 2005). We will conclude our article with a series of remarks on possible future development of Czech "agricultural metabolism", reacting to current global challenges (growth of food prices, consumption of bio-fuels, etc.).

992 **Learning to Live with Water: Post-Katrina New Orleans and the Lessons of the Past**

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My paper considers what environmental historians can bring to the present-day discussion of post-Hurricane Katrina New Orleans, and in so doing asks the question and offers some answers on the relevance of environmental history to present-day environmental problems.
The short-term history, of the Army Corps of Engineers and their levees, for example, has provided ammunition for finger pointers of all sorts. But what of the more distant past? Beyond offering explanations for what went wrong, does is hold practical solutions to where the city goes from here? Or is the past, especially the distant past, largely irrelevant to our present-day problems?
What happened in New Orleans in late August 2005 was, in one respect, nothing new. Around the Gulf of Mexico, hurricanes and coastal flooding happen, regularly. But until the late nineteenth century, the residents of the Mississippi Valley saw their relationship to their natural environment differently. They lived with water. They didn't always like it, but they never forgot it was there and that it was a part of their lives.
My paper will consider several examples, including the flood of 1849, which stands as the worst of the nineteenth century. It lasted forty-eight days, during which time perhaps twelve thousand residents, nearly one in ten persons, temporarily left their homes. Those who remained lived in the upstairs of their houses. (Two-storey homes were built largely to provide refuge from floods.) And yet, were there television cameras to capture the moment, the images from 1849 would stand in stark contrast to those from New Orleans in 2005: gentlemen rowing ladies about on outings through city streets, people trudging to and from work in waterproof

"California" boots and outwear of India rubber, children racing and pushing each other into the deepest pools, and all the while, business in the city continuing as best a possible under the circumstances. If this was a disaster, it was one of rather different proportions than those of more recent history, not only in terms of material and physical consequence, but in the way it was received and perceived. There is no expression of fear or anger in the reports of the flood of 1849.
In their reaction to periodic flooding, the people of nineteenth-century New Orleans resembled the Native Americans, who picked up and moved to higher ground when the water rose, returning when the water receded, and who told Bienville, the founder of New Orleans, that a place only knee deep in water in late spring was a habitable place.
Earlier generations experienced floods and hurricanes differently. They did not fear water the way present-day city residents do, for reasons my paper will discuss. Present-day planners and policy makers are prone to "rebuilding the familiar." Environmental history can help them rebuild the unfamiliar, materially and mentally, from housing to attitudes toward water, by bringing a more distant past into the present.

994 **"Gone with the flow": Rebuilding a community after flooding in London, Canada**

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Although often seen as symbols of progress and power, cities are meek when compared to the awesome forces of nature. The histories of nearly all cities are peppered with accounts of the devastation left in the wake of disasters. Situated at the confluence of two rivers, London, Canada has had to deal with the threat and consequences of flooding throughout its development. One of the largest flood episodes happened in July of 1883 when the Thames River swelled after a severe summer storm, burying the suburb of London West beneath a torrent of flood waters. In order to study this event, newspapers, cartographic sources and nominal records have been spatially referenced in a Historical Geographic Information System (HGIS) which is used to analyze the rebuilding of the suburb, including both the physical structures and the lives of those who lived and worked there. The residential mobility of the area's inhabitants is examined using city directories which were geocoded in the HGIS. Of particular interest are the forced moves inflicted on the residents by the flood. Changes in residential tenure (owner/renter) and the spatial patterns of their lives are examined. Those who were forced to leave London West as a result of the flood are traced to see if and when they return. The extensive rebuilding that was required in the community following the flood demonstrates the potential consequences of ignoring the natural hazards of sites on which urban areas are developed.

998 **Food & architecture: methodological insights from the study of food paths in New France with reference to Montreal (1663-1760)**

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Architectural scholars have studied the origins, growth, and development of the New World's settlements and their work documents aspects such as land division, infrastructure, and the built environment. Often overlooked, however, are the physical effects that everyday activities had in shaping these places. This is especially so with food: its food production, processing, storage, consumption, marketing, waste management, and transportation.

This paper will highlight findings to date of a detailed exploration of the relationships that linked food to architecture in a cold-climate settlement, using qualitative data. In New France, both: food habits and construction techniques were first anchored in the old world's traditions; and were then adapted to respond to the challenges of a new environment. Focusing on Montréal under French rule (before 1760) as a case study, the paper seeks to reconstruct the spatial-temporal chains through which food made its way from field to table to wastes in a pre-industrial urban context. This research faces two main challenges: the first is that it deals with a perishable material: food; and the second is that for the selected timeframe, architecture left scarce physical evidence which raises the questions of sources and methodology.

This paper will first briefly define a new concept: food paths and then present a methodological approach to their study.

999 **Disease and Environment: Implications of Clonorchiasis Infection in Taiwan and Mainland China**

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Clonorchiasis is an infectious disease caused by Clonorchis sinensis and it is a food-borne zoonosis. The transmission of Clonorchis sinensis forms a cycle among the parasite, intermediate hosts and final hosts. Rivers, lakes and ponds provide the environment for this parasite to survive, but it is human action that makes the cycle of transmission to repeat again. Medical curing of Clonorchiasis has been proved quite effective. However, at some places in Mainland China, the infection rate is rising in recent years, because more people tend to eat raw fish after their livelihood has been improved. Increasing opportunities of traveling also add risks of infection. Thus, for breaking up the cycle of transmission, it is necessary to improve the living environment, to strengthen the health education, and to change the habit of the people.

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1001 **Estranged, Endangered, Extinct. Lessons from the Extinction of the Scandinavian Wolf**

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At some point in the late 1960s or early 1970s, the gray wolf (Canis lupus) in Scandinavia went extinct. A little more than a century earlier, in 1845, "Law on Extinction of Carnivores and Protection of other Wildlife" had been enforced in Norway. This presentation offers a view of the changing political and cultural perceptions and conceptions of wolves, and of land use, in Norway from 1845 to present times.

To be estranged can here be taken to signify something akin to being homeless – or, more precisely, to have problems making sense of the land you are given to inhabit. These hardships, we can assume, are bound to be reflected in the observable behavioural patterns of the animals. My work hypothesis is that in the animal kingdom, a sort of estrangement, on the perceptual level, typically precedes extinction – taken that the process of extinction is gradual, and not in the form of a singular event.

My theoretical perspective is that of zoosemiotics, as developed by Thomas Sebeok (1990; cf. Martinelli 2007), in other words applied Umwelt theory (developed by Jakob von Uexküll (1928)) – inspired by phenomenology as represented by David Abram (1997) and informed by recent literature on wolf research (Wabakken et.al. 2007). Such an approach includes studies of non-scientific literature, be it political or popular, since any language can be considered a canon of the senses (i.e., having a normative function for perception). In line with an Uexküllian interpretation of natural history, perception (involving a contextualization of sensation) should be considered a truly reflective enterprise – resounding with the living surroundings – rather than a (purely human) self-reflective activity.

After thousands of wolves had been shot, the Scandinavian wolf went extinct. But it reappeared – and in Norway it's had the status of a protected species since 1972. For many sheep farmers – widely regarded as the clearest antagonists of the wolves – the current wolf management remains a symbol of their modern estrangement. In what way does the estrangement of sheep farmers relate to the equally evident estrangement of the still endangered wolves?

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1002 **GLobal Whaling Politics in the North Atlantic and South Pacific**

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This paper examines the historic and current whaling practices in the North Atlantic by Norway and Iceland and in the South Pacific by Japan, and the Soviet Union/Russian Federation. In 1986, the International Whaling Commission (IWC) put into effect a moratorium (a zero-catch quota) on commercial whaling. These four countries lodged objections to the moratorium (as they were legally entitled to do under IWC regulations) and continued to catch whales for commercial consumption. This led to international protest by environmental protection organizations such as Greenpeace, which continue today, although the conditions of whaling have changed considerably since the 1980s. In 2006, the zero-catch quota came up for renewal at the IWC meeting and was kept in place by a narrow margin of votes.

Although Norway, Iceland, Japan, and the Russian Federation often vote in the same way at IWC meetings, and are often lumped into the same vilified category, of "blood-thirsty killers," by environmental organizations, in fact, each of these countries has a different history and practice of whaling, and is hunting different species of whales in different areas of the world. Furthermore, in three of these countries at present (and historically, in all four), there exist within the country different whaling traditions: an industrial and a "traditional" or indigenous hunt. As this second tradition is in some cases allowed by the IWC as an exception to the general moratorium imposed on the first, this makes the arguments of both whaling advocates and whaling opponents complicated. At international meetings such as the IWC, each of these countries can represent both commercial and traditional interests. The same is also true in international press discussions of the environment and environmental protection—that the term "Japanese whalers" can mean either industrial whaling ships which can catch and "process" hundreds of whales on board, or small-scale fishermen living on the coast of Hokkaido. These fishermen have in recent years become people whose livelihoods are threatened by industrial pollution from the mercury content of the dolphins and minke whales they eat.

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1003 **Economic Growth as a Cause of Environmental Change**

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A case study of Västerbotten County (Sweden) and adjacent areas in Norway (1850-2000).
In my paper I will discuss the impact of economic growth on environmental values from a local perspective: The cost of economic growth in an environmental context. Many historical studies of economic growth are concerned with the growth of the market sector, monetization and capitalization and the transfer away from a previous subsistence economy. Environmental factors get less weight. We know quite a lot about the value of production and investment in this development process. However, the relation between man and nature, or between society and natural environment in a growth perspective is less studied and more difficult to grip. The cost of labour, capital and knowledge may be available, and so is the cost of raw material derived from natural resources. But in what sense do these socially determined prices of raw material represent a "true" social value of these resources, and how do they compare to a more comprehensive concept of environmental impact?
In mainstream economic history Northern Sweden is regarded as a region of export oriented growth, based on forest resources, in the 20th century supplemented by mining and hydroelectric power. Particularly the forest trade was deeply intertwined with local and subsistence agriculture which formed the economic base well into the 1950s. There is some ambivalence in the interpretation of what export orientation implies to such a near-subsistence society - a marginal effort or a profound request for change. There are indications that the traditional patterns changed gradually and slowly, not abruptly. This is a starting point of this study of growth. Slow change, little environmental impact?
Methods to grip the basic environmental perspectives are e g the carrying capacity (of nature and society), and the nutritive substance theory (Emanuelsson) explaining aspects of land use.
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1006 **Environmental conflicts, collective goods and common welfare: Exploring links between environmental history and the social sciences**

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Notwithstanding its diversity, environmental history so far has frequently been investigated from a 'history of ideas' perspective. While ideological questions like aesthetical preferences or concepts of nature, as well as political aspects like environmental policies, have been researched in great detail, the concrete activities employed in environmental conflicts are still largely unexplored. From the three areas most relevant to determine collective actions – ideas, interests, and institutions (in the sense of formal and informal rules) –, the latter facet has received especially little attention. This is all the more surprising as, e.g., different types of goods often result in different modes of action and argumentative strategies. The proposed paper investigates this connection, taking into consideration the discursive use of 'common welfare' in selected environmental conflicts in post-war Bavaria (Germany).

In spite (or perhaps because) of its vagueness and normative charge, the claim to enhance the common welfare (instead of pursuing petty private interests) generally played a prominent part in the line of reasoning, as well as in the self-perception, of the protagonists involved (especially of civil societal ones). However, based on an analysis of different areas of conflicts (water power, tourism and recreation, air pollution, and nuclear energy), and therefore different types of goods, it is argued that actors' references to common welfare were indeed greatly influenced by the question of whether private or public goods are concerned. For example, protagonists tended to stress their commitment to common welfare more strongly if collective goods were affected, or if at least one opponent considered their demands for the respective good as competitive or even detrimental. Yet, this pledge was not merely used as a rhetorical strategy. In the absence of clearly defined and exclusive property rights it was often legally mandatory to substantiate interests of overriding importance while negotiating claims on the use of collective goods (e.g., public waterways), especially in case of conflicting uses or if external effects were to be expected. Therefore, the 'common welfare' can be considered as a set phrase in conflicts regarding collective goods.

The reciprocity between different types of goods and the discursive use of 'common welfare' is only one example highlighting the benefits in connecting environmental history with the social sciences. As exemplified by this paper, socio-scientific concepts like 'collective goods', 'civil society' or 'agency' can provide environmental history with fresh theoretical impulses. Similarly, social science research on environmental conflicts and social movements might profit from explicitly taking into account the respective historical context.

1007 **A transnational intellectual history of water culture in Japan**

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The Zola dam was built between 1847 and 1854 to provide the water supply for Aix-en-Provence, France. It was the first arch dam design based on a rational stress analysis (SCHNITTER, N.J. (1994). "A History of Dams: the Useful Pyramids." Balkema Publ., Rotterdam, The Netherlands). One of the oldest arch dams in Japan is the Hou-nen dam in Kagawa Prefecture. It is a multiple-arch masonry dam, which was constructed in Kagawa Prefecture between 1926 and 1930, much later than the Zola dam, by a total of 150,000 masons, farmers and laborers. Kagawa Prefecture had a long tradition of masonry (Murayama, A polluted island in the Inland Sea of Japan, presented at the Environmental Histories of Europe and Japan, the Kobe Institute, Kobe Japan, 12 – 14 September 2007). A civil engineering technician, Tojiro Sano (1869-1929), conducted the dam construction. He graduated from a leading university in Japan, the later Tokyo University (Furuichi Koi to sono Jidai (=Koi Furuichi and his times), Doboku-gakkai, 2004). After the Meiji Restoration, European technologies and laws were introduced into Japan along with original innovations.

A much bigger dam, the world's oldest concrete dam, was built in 1880 near Warwick in Australia, as a water supply for steam locomotives (CHANSON, H. (1999). "The 75-Miles Dam in Warwick: the World's Oldest Concrete Arch Dam." Royal Historical Society of Queensland Journal, Vol. 17, No. 2, pp. 65-75). The introduction of concrete as a construction material for arch dams marked a significant advance. Designers were able to consider complex curved shapes to minimize the amount of construction material used and the overall cost. These developments first took place in North America, and the new era of water construction began in the USA. This new technology and its affiliated culture were also introduced into Japan.

Another big turning point in the history of Japanese water culture was Typhoon Isewan (Vera) (Hideki Oda, "Typhoon Isewan (Vera) and its Lessons", Japan Water Forum, 2005), which occurred in 1959. The Typhoon hit central Japan and caused recordable damage to many localities due to high tides and floods. The Ise regions were especially severely damaged, and more than 5,000 lives were lost. Because the disaster highlighted the necessity of preparing for future attacks, a comprehensive disaster management system was formed, and in 1961, two years later, the Disaster Countermeasures Basic Act, which was proposed by the later Prime Minister Yasuhiro Nakasone as the committee chair of the disaster, was enacted. Typhoon Isewan (Vera) was a turning point not only for disaster prevention systems in Japan, but also for modern Japanese water culture, which has dramatically changed traditional dam construction.

In this paper I analyze the database of the minutes of the imperial and national Diet from 1938 to 2008 in order to clarify the transnational intellectual history that was shaped by technologically restricted human responses, especially to climate disasters and challenges.

1008 **Shifting perceptions. Water policies and environmental research in Northern Ghana.**

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The Savannah of Northern Ghana has been a target region for water conservation policies and water development projects since it was sub-ordinated under the British Northern Territories Protectorate in 1902 and part of the Northern Togoland under German colonial administration. The activities ranged from hydro-geological surveys to policy planning (some of which were debated but not implemented) and final interventions. Contents of such policies were, for example, the headwater protection of the Volta River, the establishment of forest reserves along the White and Red Volta, the creation of domestic water sources and small reservoirs, as well as the implementation of irrigation schemes. Most policies seem to have been informed by ideas of water resource degradation and an urgent need for conservation.
In colonial policies, the inhabitants of Northern Ghana and their activites were rather perceived as disturbing factors, which were planned to be removed, reduced or changed to conserve the environment. In the 1970s, the inhabitants became part of the policy focus. Improved health and the increase of agricultural productivity were major steps formulated in poverty alleviation policies.
Ideas an arguments of resource depletion and degradation faced a revival in the past decade and continue to justify contemporary research projects and environmental policies even though a paradigmatic shift has taken place from attempts to conserve resources to preserve ´nature´ to holistic approaches to manage resources for human development and environmental sustainability. The aspect of climate change has been added to the justification of environmental research and policy activities.
In the case of water in Ghana and Northern Ghana, the narrative of an alarming depletion of freshwater resources, as it is formulated by global actors, must be treated with caution. Looking at data from the GLOWA Volta research project and applying an analytical framework, which embraces the aspect of changing and continuous perceptions, may lead to a differentiated perspective on historical and contemporary policy trends. But research projects cannot easily shift perspectives because they run at risk to undermine their legitimacy or not to fulfill their initial objectives and mandate.
The paper will elaborate on the following questions: (1) What are significant shifts in perspective and historical

periods with regard to water policy in Northern Ghana? (2) Can critical historical perspectives be integrated in contemporary research projects, which are based on rather unhistoric perceptions and short term data sets?

1009 **Environmental Cost of a Hydraulic Society: Revisiting the Damodar Valley Corporation**

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The Damodar Valley Corporation, the first multi-purpose river valley project in independent India, has stepped into more than fifty years of its service to the nation. Understandably, the question is now being raised at many quarters whether the DVC has achieved its objectives. Apart from controlling of floods, the DVC has laid emphasis on power generation, and it is supplying this vital ingredient to such core sectors as the steel plants, railways and collieries. The other objectives of the DVC include supply of water for irrigation and taking steps to maintain ecological balance through soil conservation.

The DVC has an operating area of 25,000 sq. km. It has four major dams for flood control and has a gross command area of 5.69 lakh hectares. The 1500 km canal system and the Durgapur Barrage were handed over to the West Bengal Government in 1963-64.

Although the DVC has all these feathers in its cap, things are not as bright as they should be. Overemphasis on power generation has almost pushed other objectives to the grounds, and ecology has become its first casualty.

The proposed paper seeks to examine in historical context how a post-colonial South Asian state power views nature through its commodification. Expansion of irrigation and generation of hydraulic electricity have transformed water itself into a commodity. Not unlike its colonial masters, the present government also conceives of an environment as a mathematically modeled system in terms of kilowatt-hours. It seeks to develop irrigation works partly to encourage agriculture but largely to ensure political stability as also to stabilize state revenue. It will explicate how the politics of irrigation which tends to exhibit a new ideology of state power and its hegemonic control over environment itself, tends threaten the life, livelihood and ecology of the host population. It will show how the hydraulic society, contrary to what the DVC had conceived, is subjected to progressive destruction of eco-system and marine habitats, deforestation, dam diseases, and displacements.

1010 **Water shortages as consequences of the past history**

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Present environmental issues are consequences of the past history, in China as well. Water shortages are one of the important problems in western China, a vast arid and semi-arid region. It is of importance to examine the past history in a region, where people have faced water shortages, in order to get a clue for solving the present water issue. This is a report of the historical reconstruction, how the water environment has evolved in the last 2000 years, around the Heihe Basin, in western China, where water shortages have taken place intermittently. It was found that the water shortages in the history, have been mainly caused by agricultural development at respective eras, rather than by climate change, although climate change affected the water environment in some eras at some extent.

1011 **Local responses to rinderpest in the Orange Free State republic, 1896-1897**

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The introduction of rinderpest into north-eastern Africa in the late 1880s had a devastating impact on the Eastern and Southern parts of the continent. Killing between 75 and 95% of cattle as it travelled down southwards, the pest spread from Eritrea down to the Zambezi which it crossed early in 1896. Due to the extensive trade networks in Southern Africa, it soon spread throughout all the colonies, republics and charter territories. It arrived in the Orange Free State republic in late September 1896 where it killed around 50% of the herds in the main cattle regions over a 1 year period. Despite the massive cattle losses and the total disruption of the grain harvests in 1896/97, the pest has been a largely neglected topic in Free State historiography.(1) It has further not attracted much attention from African environmental historians, who has published extensively on the great African rinderpest pandemic of the late 19th century, especially in the Southern Africa region. (2) This paper seeks to address this imbalance and will focus on local responses to rinderpest in the republic. In particular it will address the way in which both white and black communities responded to the pest, how they attempted to cure disease ridden cattle with local remedies called boererate (i.e. farmers' remedies), and the adaptations they made to the inoculations developed by a number of European researchers that worked for the governments in the region. A central theme that runs throughout the paper is the way in which local knowledge is celebrated at the expense of imported scientific knowledge, and the distain showed for the latter despite its promotion by the Orange Free State government. The application of local knowledge in the fight against rinderpest had mixed results and the paper will highlight the varying success rates of the various methods developed to combat the disease in the different districts of the republic. The research forms part of a larger project which aims to produce a monograph on rinderpest in the Orange Free State republic. It is based on contemporary newspaper reports, archival research in South Africa and Britain and field work in the Free State.

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1015 **The delta of the Ebro: economic uses and changes in the ecosystems**

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At present in the delta of Ebro one finds an important nature reserve that coexists with agricultural activities and residential. In this paper it will try to show the existing relationships among the different economical activities in the Ebro delta from the very instant we have documentary evidence (12th century) up to nowadays and the connections between these activities, the ecosystem of the delta and the changes that these activities have caused.

Initially (12st-18st century) very extensive activities developed with scanty effect on the environment -fishing of lake, salt's production, shepherding or the exploitation of soda-, while the agriculture had an scanty importance and were no permanent settlements. All these activities were adapted to the rate of production of the delta ecosystem and the adopted measures to regulate them produced an increase of the biological productivity. The natural conditions of the delta were characterized for being an extremely salty environment –with the exception of the environment of the river–, with a strong contrast between humid zones and dry zones and between a warm station and dry in the summer and the humid and cool in the winter, by the existence of several types of soil according to his origin - sandy, muddily and peat-, and for small natural reliefs.

In the 18th century, while the traditional economic activities were kept, it started the agricultural colonization of the high lands and the first permanent settlements scattered appeared in the same locations where agriculture was introduced. In the 19th century there was a strengthening agricultural process of colonisation based on the growth of the irrigated land from fresh water obtained from the river or from the subsoil with waterwheels. Nevertheless the growth got cut down due to the high salt content of the delta lands and the technical difficulties to take the water far from the shore of the river, which made the transformation to only affect the 10 % of the delta whereas the rest remained with not significant changes.

The third period is the result of the cultivation of rice and the need of building a hydraulic system (1860 in the right-hand hemidelta; 1910 in the left-hand hemidelta) to make their growing possible. With contributions of 35 m3/s of fresh water fraught of the silts until the 1960's, allowed the growth of the rice fields and radically altered the ecological equilibrium. The final result has been an extremely humid delta, with contrast between a humid and warm station and another cold and less humid, an rise of his height on the level of the sea, and standardization of soil like result gives the silts of the water of irrigation. Furthermore there was a reduction of the area and depth of the permanent lagoon and a decrease of their ecological productivity. The outcome has been a delta no natural which absolutely depends on the human management of the irrigation system.

1016 **Human Interaction and Changing River Environment; Examples from the Damodar River, India**

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Construction of control structures alters the flow regime and the sediment supply of a river, irrevocably affecting river systems (Wolman, 1984, Petts, 1984). Direct consequences ofthe human interaction and changing fluvial system through engineering works have been long recognized (Marsh, 1864; Thomas, Jr. 1956). The Damodar river, a subsystem of the Ganga river in India is a controlled system with extensive system of embankments, weir, sluices, barrage and dams. Human intervention has contributed to a narrowing of the river, aggrading of the riverbed and increased sedimentation coupled with a reduction in the capacity of the river to transport this sediment. Due to extensive deforestation and unscientific mining, the Damodar transported a huge sand load during floods in the pre-dam period and formed sand bars. From 1947 onwards, after the partition of India and the former East Pakistan (Present Bangladesh), refugees from Bangladesh started to utilize the bars. These anthropogenic landforms have acquired their present shapes and can be identified after construction of the Durgapur barrage (1958) and the Maithon (1957) and Panchet (1959) reservoirs. The resulting channel deposits in the form of sandbars locally known as char or mana are not only agriculturally used but have also been settled thus imbuing their study with an added socio-economic significance. Charlands or sandbars of the Damodar are an example of optimum use of every inch of available space, the extent of which varies from year to year depending on the degree of floodability of the sandbars and irrigation facilities. The concept of flood zoning is applied here with the spatial extension of each zone, particularly on the bar margin, varying from year to year. Wherever horizontal extension of existing resource base is not possible, they use the land for multiple cropping thus expanding the resource base vertically (Bhattacharyya, 1998, 1999). Granting of ownership rights in recent years has played a crucial role in land use practices. Valuable long term data from multiple sources, some dating back to more than a century, has been used to track flow and sediment regime. Data from topographical maps, cadastral or mouza (A land-settlement division of an area) maps, and satellite images has been consolidated. Detailed field surveys of local land users

have been presented in order to assess human interaction with fluvial environment. In this research on the Damodar river, physical and human geographical research has been integrated, that lead to greater understanding how the forms and ecological status of the river is shaped from the interplay of natural and anthropogenic processes. We need to enrich our understanding of how humans modify rivers as well as to protect and improve the river as we study (James and Marcus (2006).

1017 **Dark waters: the role of environmental history in restoring 'industrial' rivers.**

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River restoration literature and case material have traditionally tended to focus on non-urban spaces – possibly because of the economic value of agricultural production but also reflecting the perception of greater potential for ecological improvement and landholder collaboration in rural areas (Adams et al. 2005). Restoration of heavily degraded rivers in urban (de)industrialised spaces confronts issues of fragmented planning jurisdictions and conflicting use-values, together with ambiguities over what exactly is being restored. Higgs (2003: 45) argues for restoration based on two key concepts: ecosystem integrity and historical fidelity. Such a combination is particularly challenging in brownfield river sites, where overlaying histories form part of important heritage values but may also have been the agent of environmental damage, meaning that full restoration of ecological integrity is beyond available resources.

Environmental history directly addresses issues of industrial development and river restoration by emphasising the mutual constitution of social values, management practices and environmental change whilst also acting as a catalyst for transdisciplinary collaboration. Historical awareness also reduces the temptation to privilege the 'now moment' in the face of perceived management failures and legacies of pollution and institutional mistrust, thereby abstracting contemporary environmental concerns from both historical and geographical contexts (Dovers 2000; Coombes 2003). Case material from industrial river basins of southeastern Australia and northwest England reveal the practical challenges in situations where tensions between scientific knowledge, economic imperatives and social perceptions have shaped, and in turn have been shaped by, biophysical conditions (Trimble 2003). The studies suggest that many of these tensions persist, but that open and transparent dialogue is essential if restoration efforts are to be biophysically and socially sustainable.

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1018 **Towards a methodology for the study of pre-modern rivers**

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The methodologies that environmental historians have de facto adopted contribute to an overwhelming emphasis within the discipline on modern history. This is at least partly because the discipline exists "positioned between 'objective' scientific history and a 'moral history' which is all cultural construction." (Simmons 2001). To study the natural world, especially changes in the natural world that are the result of human interaction with it and within it, environmental historians have come to rely on the quantified and the quantifiable data of Simmon's 'objective' scientific history. This emphasis on the quantifiable puts the ancient or medieval environmental historian at a distinct disadvantage. Pre-modern sources are notoriously difficult to quantify, and perhaps worse, contain irrational, even mythological elements that fly in the face of the hyper-rational scientist. Histories of man's relationship with rivers, for instance, almost always begin in the developed, industrial era (Cioc 2002) or deal with the history of man on the river's banks but not human interaction with the river itself. (Schneer 2005). Using the local example of Ireland's River Suir – but making every effort to be comparative and indeed global -- this paper proposes a strategy to interpret pre-modern sources such as saints' lives, miracle stories, tenurial documents, archaeological records and the documentary records of conquering peoples – and to integrate those interpretations in a way that can the story of man's interaction with the river in the ancient and medieval periods.

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1019 **Overbank sediments as a tool to reconstruct the pollution history of river catchments**

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During inundation of a floodplain, suspended sediments are disposed on land. Throughout time, a sequence of fine-grained sediment layers is accumulating on the riverbank, each layer representing a single flood event. In theory, the uppermost sediment layer consist of the most recently deposited sediment, while the bottom layer of an overbank sediment profile is composed of older sediments. As a consequence, the geochemical signature found in the sequence of these layers represents the evolution of geochemical characteristics of river sediments through time.
Sampling of overbank sediments at depth, in combination with information on sedimentological history and age of samples may even allow to reconstruct the pollution history of the river basin. Overbank sediment profiles taken downstream from mining or melting places in the Harz mountains (Germany, Matschullat et al. 1997) and along the Geul river (Belgium, Swennen et al., 1994) yielded detailed signatures of human activities in the respective drainage basins. Overbank sediments may also be interesting from an archaeological point of view. The geochemical and mineralogical analysis of sedimentary profiles of the Ouse River (UK) gave evidence that contamination by lead mining began in the Roman period (Hudson-Edwards et al., 1999). Analogously, dating of cores originating from the Rio Tinto alluvial plain indicated that mining of sulfide deposits go back to 3000 years BP (Davis et al., 2000). From an environmental point of view the use of overbank sediments is interesting because background concentrations found in overbank sediments are an essential reference point to evaluate the pollution status of soils and sediments.
In this paper possibilities and limitations of the use of overbank sediments to reconstruct the environmental history of river catchments are illustrated and discussed.

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1020 **Walking on Water: The Establishment of the Toronto Harbour Commissioners and the Production of Toronto's Port Industrial District, 1900-1912**

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The paper focuses on the environmental history of the eastern section of Toronto's waterfront during the early decades of the twentieth century. It looks back to a southern extension of the City by the transformation of a marsh and shallow bay on the shores of Lake Ontario. Informed by both an empirical study of archival documents and contemporary concepts from urban theory, it examines political and economic practices in the production of an industrial landscape. Using a political ecology approach for this historical analysis, the paper draws on the concept of socio-nature in conjunction with the dynamics suggested by theories of capital and spatial expansion. Within this framework, the Port Industrial District embodies capital-intensive and mechanized production processes and an ideology that regards the environment as a resource. As well, the district intertwines political practices that support, but simultaneously undermine, an economic system in which manufacturing commodities from socio-nature and labour guide social relations, and in which the logic of continually striving for profitability rules. The paper argues that the establishment of the Toronto Harbour Commissioners was necessary for the production of this district and the institutionalization of industrial forms of nature-society relationships. Established by an Act of Parliament, it was the lead local-state organization in the land-creation process—it obtained title to virtually all of the City's waterfront lands, extensive development authority and considerable financial autonomy. The Commission and its supporters envisioned the new district not only as the pivotal section of its 1912 waterfront development plan, but also as a strategic element in a general strategy for intensifying industrialization and growth in the city. This massive land-creation was more than a land-filling project, and as elaborated in the paper, is best understood as a "spatio-temporal fix" (Harvey, 1982) for productively absorbing capital through territorial expansion, an opening-up of a new economic spaces, and a temporal deferment of current expenditures in favor of long-term investment.

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1021 **From Ecotone to Edge: The Changing Nature of a Coastal Environment**

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Ecologists define humans as an edge species, exploiting ecotones, those resource-rich places where two ecosystems meet. Over centuries, one of the richest ecotones has been the coast. However, today's coasts have become sharp edges, separating rather than connecting the ecosystems of land and sea. This change has profound implications for both environments, for those who live on the sea no longer know how to live with it. This paper will concentrate on the experience of the coast of Maine (USA), exemplary of what is happening all around the North Atlantic rim. It will examine how coastal communities once engaged in fishing and maritiime activities have been altered by the colonization of the coast by populations interested more in consumption than production. It will document the shrinking of working waterfronts in Maine and will discuss the environmental as well as social/cultural effects of the transformation of the ecotone into separate realms of land and sea, resulting in decreasing biodiversity and social homogenizaton of the coast.

This paper is part of a larger project called "Back to the Sea: Coasts in Human History," where I explore the effects of the recent surge to the sea by populations around the world. History and geography have generally ignored coasts, but, as they become increasingly vulnerable to natural and human-iinduced disasters, it seems time to learn from the past, when there was a more sustainable relationship between land and sea.

1022 **The History of Taiwan's Fishing Ports and the Imagination of the Sea along the Number 2 Road of Taiwan**

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There is one famous and important road named “The Number 2 Road of Taiwan”. This road is along the northern coast of Taiwan from Taipei county to Yilan county. Along this road, there are some famous fishing ports, including Tamsui Fishing Port and Wushih Fishing Port.

These fishing ports are abundant with historical stories and rich environmental meaning. For example, Tamsui Port was once occupied by the Spanish, Dutch in the 17 century, and was occupied by the Japanese from 1895 to 1945. During these periods, Tamsui Port was once a bustling commercial port, and then became a fishing port. It has been a tourist port since 2000.

Another story was Wushih Fishing Port on the eastern coast of Taiwan. There was once whaling around the sea of Taiwan. Under the international conservators’ protest and the pressure of the American government, Taiwan government banned whaling in 1981. Since then, Wushih has gradually become a famous port for whale-watching.

The two stories reveal one thing in common that the fishing ports along The Number 2 Road of Taiwan are often internationally influenced. For many Taiwanese, the imagination of the sea gradually become ecological and conservational other than dominant or predatory. The experiences of other countries may change the ideas and behaviors of Taiwan people. On the other hand, the experiences of Taiwan may provide reference to other countries.

1023 **Towards an ecohistory of the Firth of Forth**

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The Firth of Forth has shared remarkable biodiversity with human use, and this study examines the history of this interaction.

A series of hunter-gatherer activities have continued since the Mesolithic, in some cases to the present day .Harvesting marine birds and mammals was done ‘sustainably’, but when it ceased populations greatly expanded. In recent times, over-fishing may have also have led to increases of birds and seals, the removal of large fish increasing the number of small fish on which they feed.

Sewage disposal before ca 1850 involved a high degree of recycling. Thereafter, there was disposal of raw sewage at sea, and in sewage farms on land. When the latter were discontinued in the 1920s, the sea became the only recipient of the raw sewage. This has basically changed since 1978 with new methods of treatment. Gross pollution damaged riverine fish populations but also greatly enhanced those of some duck, gulls and wading birds, effects which were later reversed.

Transport developments, military activity and industry have had less impact than might be expected, possibly due to relatively strict controls. Land-claim has probably had a more lasting disruptive effect than pollution; 50% of the former intertidal zone in the upper Forth has been lost. Modern recreation on the beach has effected natural populations, but the increase in sea-based recreation has not, and eco-tourism may prove to be a positive factor. Native biodiversity remains extremely rich, in some respects richer now than in the recent past.

Alien species arrived as early as the middle ages with the deliberate introduction of the rabbit and the accidental introduction of the black rat. Later centuries saw other damaging imports but more that have proved ephemeral

or of slight impact.

Biodiversity is always in a state of flux from natural and anthropogenic factors. Among the latter, technology and economy play a large part, as does changing sensibility – we still kill fish as a sport, but no-one now shoots seabirds on their nests. We are moving towards renewed recycling, but perhap few would yet willingly eat food raised on human manure, as everyone did before 1800.

Also important are changes in governance. Before 1850 there were few regulations, but then local authorities began to take control of sewage, and start nature reserves. In the twentieth century, the state extended effective environmental regulation, and after 1972, the European Union became the main driver, with oversight provided by national environment agencies. The area also has a history of citizen environmentalism that may help to explain the level and success of conservation.

This investigation will ask how unusual this story might be. Partly for geomorphological reasons human impact has been less than in some other European estuaries (for example in the Baltic), though estuaries globally tend to be fairly robust ecosystems.

1024 **Endeavouring to 'order' wild india during colonial times**

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The tropical forests of India mesmerized the English but this India was wild and lawless. It stood in complete juxtaposition to the western notions of discipline and 'order'. This could'nt be tolerated, the unruly and wild had to be tamed, 'ordered' and eventually controlled and for this a thorough knowledge of the wilderness was absolutely necessary. Hence, the primary task was to comprehend and classify flora and fauna. The animals and plants were classified according to their uses and relevance and were protected or exterminated in accordance to the sahib's perceptions of their value.

Some animals like the tiger, cheetah, wild dogs e.t.c. were 'evil' and hence their killing was justified. Exterminating them in shikar was seen as a victory of the cultivated, civilized landscape. This probably explains the steady depletion of wildlife till the 1860's when alarm bells about decline began to ring. The first initiative to save faunal ecology was taken by the Tent Clubs and Games Associations, albeit, to pursue unabated their favourite sport, shikar.

The anxieties about decline led to a quest for Conservation by the government. Forest Acts, Protected Areas, Reserved Forests, 'open' and 'close' seasons, 'bag' limits and other restrictions were introduced. But the Conservation Policy of the Raj was faulty, it was Conservation from 'above' and it excluded the forests-dwellers from its scheme. The tradition of co-existence practiced by them was ignored and hence the 'order' that the imperialists envisaged for the wild remained elusive.

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1027 **Towards an environmental typology of frontier violence, South Australia 1836-46**

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The British government invaded present-day Australia at the end of the eighteenth century, sparking generations of conflict between settlers and Indigenous people, including aggravated violence, massacres and open battle. This paper examines the earliest years (1836-1846) of one British colony in Australia – South Australia – and finds that many of the conflicts are political responses to an environmental factor, access to the limited available water. It scrutinizes contemporary government records, newspapers and explorers' journals asking the question: is it possible to analyse this conflict over water to develop a typology of settler-Indigenous dispute that will contribute to a more nuanced understanding of frontier relationships, both in South Australia and in the broader context?
The research finds that in the study period water was a site of three types of conflict. First, colonists established settlements such as Adelaide on freshwater streams, physically and politically forcing Indigenous people away from customary sources of life-giving waters. The second form of conflict occurred away from the Euro-settled areas where Indigenous people used river crossings as ideal ambush points for attacks on stock and European travellers, provoking retaliatory raids by both government officials and non-government vigilantes that killed many Aboriginal people. The third site of conflict over water occurred in even more remote areas where local Indigenous people helped desperate European explorers and pioneers to find water. Conflict often followed when the newcomers' greed with the limited water supply appalled the locals.

The paper argues that environmental factors, in this case the limited available water, controlled aspects of Indigenous-settler relations in South Australia's early colonial period. This was visible in two major political effects. First, Aboriginal people used violence as a political voice, as a means of communicating their environmental needs. Second, settlers retaliated both with more violence and with policies designed to contain

Indigenous violence. The answer to the question is not yet refined but the evidence indicates that continued research in this direction will produce a typology of frontier violence that might contribute insight and empathy to our understanding of frontier relations.

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1029 **The Human Face of Sustainable Development:Lessons from West Medinipur,India.**

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Majority of the Ecological Anthropologists pay little attention to the policy implications of their surveys and ethnographic reports. It is high time that they should. This paper makes an attempt to bring into focus the policy implications of some environment related contemporary case studies conducted by the author and his students of the Department of Anthropology at Vidyasagar University over a period of fifteen years. The case studies come from a variety of situations from a single district in the Western part of West Bengal. The common thread, which runs through all the case studies relates to the process of marginalization of the peasantry in the context of the development initiatives undertaken by the policy makers in the era of globalization. The case studies reveal that industrialization, joint forest management, social forestry, building up a university, creating new opportunities of employment in an urban environment may not always lead to the empowerment of the poor let alone sustainable development. The lesson which one may learn from this endeavour tells us to tailor our so-called pro-people policies really participatory. We are, after all, as narrated by one informant, riding on a difficult bullock; we must know how to twist it's tail.

1030 **Beer and Hops in late medieval and early modern Denmark**

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This paper deals with an aspect of local livelihood – the production, distribution and consumption of hops and hopped beer in late medieval and early modern Denmark. As part of the Hanseatic cultural transfer, which took place in the entire Baltic and North Sea region, hopped beer replaced beer brewed with sweet gale in Denmark from the 13th century onward and became an essential part of everyone's staple diet.
The aim of this paper is to show that there were marked regional differences within Denmark in terms of import of foreign beer, consumption and domestic production of hops and beer and some rather surprising changes over time. This can be attributed to various reasons such as varying degrees of accessibility to the main market in Northern Germany, geographical distance, difficulties of transport, wealth, but also to environmental conditions such as soil and wind, determining for instance whether the growing of hops was feasible or sweet gale was available instead.
One aspect of special interest treated in this paper is the emergence of trade networks based on the delivery of hops and beer in exchange for agricultural products much in need in the more urbanized regions of Northern Germany, thus facilitating the emergence of specialized economies.

This paper is a result of my studies conducted as part of my Ph.D. project "Coast, Culture and Identity c.1400-1650".

1033 **Landscape Transformations: Long-term Changes in the Woody Species Planted in Central Park, New York City and Fairmount Park, Philadelphia**

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Central Park in New York City and Fairmount Park in Philadelphia are benchmarks for American landscape design. Moving stone and soil does not create landscapes. Woody species plantings create visually appealing landscapes. Before park designs were envisioned, species reintroductions transformed the landscapes of these parks.

The predominance of native species in both landscapes prior to park planning is misleading in terms of plant origins. Slash and burn maintenance in the interest of a clear field of view during the American Revolution created tabula rasa landscapes. Estates on the land predating the parks were landscaped with native species, the primary species available from American nurseries and favored by early nineteenth century landscape architects.

Although the initial 1857 Central Park design embraced native species as dominant, only six years later, in 1863, alien species eclipsed native species–a major change in American landscape design. Taking the innovation in landscape design even further, the Centennial Fairgrounds of

Fairmount Park were planted with a wider variety of species in 1880, especially alien gymnosperm trees, than reported in any year for Central Park. Fairmount Park horticulturalists also created a new strategy to secure species—donations from private citizens and foreign agencies to complement purchases with government funds which was relied upon for Central Park.

By 1970, time had taken its toll on species diversity: Central Park lost over a third of the species reported in 1863 and Fairmount Park lost more than two-thirds of the species listed in 1880. Recognition of the species changes led to partnerships of government and private interest groups to replant both native and alien species representative of original park designs. Today, Central and Fairmount Parks planners use the historical knowledge of long-term woody species changes to be at the forefront of species diversity management for park planning and landscape design.

1034 **Environmental History of Watercourse Pollution: Kenya**

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This paper examines original timeline evidences documented in the national archives on the historical relationships between Kenyan people and the historical pollution of watercourse.

Before the coming of the European settlers, natives lived in scattered villages. The railway opened the interior and its stations became urban centers including the capita City Nairobi that the railway reached in 1899.

Pollution emerged with the establishment of agro-based industries and urban centres by the white settlers. By 1928, Coffee and sisal industries were the major water pollutants (Colony and Protectorate of Kenya, 1928). As more factories emerged (sugar, skin, cement, fluorspar and battery scrap smelting), the disposal of industrial effluent into the rivers became a major challenge (Christiansen, 1972).

Environmental deterioration was becoming evident in the 1940s as there was no particular institution responsible for control, monitoring or prosecution. The rate of pollution increased unabatedly leading to the formation of Water Pollution Research Committee in late 1940s, first major initiative to mitigate against environmental pollution (Brandon, 1949).

In response to ever increasing pollution, environmental consciousness could be seen to evolve as ministries of Agriculture and Health started to put in place legal and institutional measures. In 1969, the Ministry of Health proposed Natural Waters Pollution Control Act which was deemed deficient in the aspect of violation of law as far as pollution was concerned. The decision to establish the National Environmental Secretariat that attended the 1972 conference in Stockholm, persuaded the UNEP to set up Headquarters in Nairobi opened the opportunity to address the pollution issues.

The Establishment of Environmental Act of 1999, made provisions for the establishment of the National Environment Management Authority, which has the statutory mandate to supervise and co-ordinate all environmental activities. However, despite these measures, inadequately treated effluent continues being discharged into water courses.

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1035 **Water management in the Bahurutshe heartland in the context of shifting hydropolitical objectives in South Africa since the 1970s**

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This paper provides an historical perspective of changes that have occurred over the last forty years in the provision, use and management of water in the remote Lehurutshe region of South Africa, a semi-arid region in the North West Province and heartland of the Bahurutshe people.

Although Lehurutshe is drought-prone, water supply was not a major problem before 1970. During the 1970s and 1980s a programme of relocation of black people to the Bophuthatswana homeland in terms of the policies of the apartheid regime caused the rapid increase in the size of the population of Lehurutshe and in water demand. After the political transition of 1994 Bophuthatswana was reincorporated into South Africa. The pressure on water resources, especially groundwater resources, has not been relieved. Over-extraction of groundwater poses serious threats to the environment. Over the last twenty years the situation has deteriorated. Water shortages are a reality with which the local people have lived, especially in the dry winter months.

Sustainability problems in terms of water provision, use and management are highlighted in the paper in the context of shifting hydropolitical objectives during the apartheid and post-apartheid periods. In the late 1990s the introduction of new water policies and legislation caused a shift in approach with regard to water management. Adapting water management to the objectives of water policy and meeting international and national criteria with regard to the efficient, equitable and sustainable use of water are major challenges to the

communities of Lehurutshe. Different types of solutions to safeguard water resources and use them responsibly are being considered. In the final analysis sound water management will depend upon the acceptance of individual responsibility within the structures of the local communities.

1037 **The African Malaria Trials and the Global Eradication Campaign**

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This paper explores the histories of the early World Health Organization pilot projects in Africa. It is the story of the attempts to transfer techniques and knowledge about malaria control---that had been gained principally in the middle latitudes---to the African tropics. Through trial and error, and after negotiating unfamiliar cultural and environmental landscapes, the researchers uncovered what seemed to be intractable biophysical and cultural realities about malaria transmission in Africa. These findings challenged the feasibility of the WHO's project of global malaria eradication and the African pilot projects were shut down.

1038 **An assembly of insects: The historical creation and circulation of an Anopheline collection at the Institut Pasteur in Paris**

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This paper will focus on the historical collection, circulation, and the uses of west African mosquitoes transmitting malaria. Specifically, it will address the creation of a well-known mosquito collection at the Institut Pasteur in Paris. Over a century old, this collection contains thousands of specimens of malaria-transmitting mosquitoes; its creation occurred through the efforts of Pasteurian researchers working in Africa and African research assistants. A historical analysis of the creation of this collection can shed light on very different ways of understanding these insect vectors, their ecology, and their role in malaria transmission. Hence, I will examine these actors' diverse and changing perspectives on mosquito ecology and on Anophelines' contribution in transmitting malaria to people and animals. Of particular interest are the tensions and exchanges between African research assistants and field scientists. I also intend to explore the ways in which these collections were used, particularly as teaching tools for the Institut Pasteur's microbiology course, which trained several generations of leading public health officials in francophone Africa, who undertook a range of environmental and chemotherapeutic methods to treat and prevent malaria. Sources will include the collection itself, documentary evidence contained in the Institut Pasteur archives, and oral histories conducted among still-living Pasteurian scientists and former African research assistants in Senegal.

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1039 **Raving Kats and Dogs : An Environmental History of Meerkat and Canine Rabies in Southern Africa**

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This paper explores the environmental history of rabies in southern Africa during the nineteenth and twentieth century when the disease was first recorded and identified. It will make an original contribution to the historiography because to-date histories of rabies have largely focused on Europe and only two journal articles have dealt with Africa.* This study draws upon archival evidence, newspapers, government reports, scientific articles, as well as interviews with southern Africans who have had direct experience in dealing with rabies in humans and domestic animals and have studied the disease in wildlife.

The epidemiology of rabies in southern Africa is particularly exciting because dogs are only part of the problem. Rabies is also endemic in the yellow mongoose (meerkat) and has had a marked impact on population numbers of species like the African wild dog. Humans die every year of this dreadful disease, incurring bites from a range of animals, including dogs, mongooses, wild cats and bats. Southern Africa has an exceptionally rich variety of disease carriers compared with many parts of the world, raising questions as to how this situation arose. The distribution of rabid animals has been contingent upon a range of factors including topography, vegetation, climate and human activities. Colonial trade, the importation of foreign dogs, population movements, warfare and changing demographic and agricultural practices have all affected outbreaks. Exploring the history of rabies in southern Africa provides interesting insights into the inter-relationship between wild and domestic animals and between humans and the natural world.

The paper begins with an historical overview of the epidemiology and ecology of rabies in southern Africa and then focuses specifically on the prime carriers: canids and meerkats. It looks at how rabies spread between these species and how it came into contact with humans and domestic animals. The paper examines public responses to rabies and concentrates in particular on scientific efforts to stem the spread of infection, which has proved uncontrollable by vaccinating domestic dogs alone. The paper concludes by assessing the impact of science and technology on the disease and the environment.

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1043 **Sustainability and Swedish Household Consumption since the 1950s:**

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In the contemporary debate on sustainable consumption, private consumption of energy, transportation, housing and food is given special attention, not the least since it constitutes significant share of total expenses but also since the environmental impacts are believed to be particularly negative. The objective of this paper is to broaden our understanding of: (a) the different consumption patterns of various Swedish household groups since the 1950s; and (b) the interrelationship between households' consumption patterns and national policy decisions during the same time period. The focus lies on consumer expenditures with significant negative impacts on the natural environment, and on policy decisions resulting in socio-technological and path-dependent systems introducing major inertia in the consumption patterns of Swedish households.
The consumption patterns of over 2000 Swedish households have been examined and documented regularly since 1958 by Statistics Sweden. By studying these data we learn that although private consumption in total has increased extensively in all types of households since the post-war period, consumption patterns have varied substantially across the different groups. The shares of energy, transportation and housing expenses vary over time but also across different groups of households. A more detailed understanding of the different consumption patterns of various household groups since the 1950s may provide important lessons for contemporary environmental policy, for instance by illustrating how income changes, family size and geography affect the propensity to purchase goods and services with negative impacts on the environment.
In the paper we pay particular attention to the above consumption patterns in the context of a number of, for the Swedish post-war society central development paths, like those of the 'car society', the housing policy and the retail trade. A number of post-war policy decisions have influenced Swedish households' consumption of cars and transportation services, and housing areas have increased substantially since the 1950s. Simultaneously, the public room has constantly become more and more commercialized. The post-war housing policy, the far-reaching car-adaptation of Swedish society and the ever-developing retail trade (from counter service towards external shopping-centers) can in combination be looked upon as large socio-technological systems. These are strongly linked as well as path dependent, i.e. self-reinforcing. In this way the paper contributes with a broader understanding of the interrelationship between households' actual consumption expenditures and past policy-decisions resulting in socio-technological and path-dependent systems.

1044 **Cars, Consumer Psychology, and the Environment**

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The twentieth century US experience with the automobile raises troubling questions about successfully reducing the environmental impacts of a popular consumer product. The difficulty was less in recognizing problems than in addressing them. Only rarely—mainly when small cars were popular—did consumer tastes and producer offerings align in environmentally-friendly ways. Although auto executives and their companies occasionally took steps that helped the environment, US automakers collectively did little to offer environmentally-friendly vehicles. Nearly all the improvements came through tough federal laws passed between 1970 and 1975. While these laws may have been blunt instruments, they were effective where reliance on consumers or producers alone was not. Significantly, regulation aimed at producers worked, whereas the section of the Clean Air Act of 1970 directed at consumers was rendered moot by a firestorm of local protest. More disappointing, the 1983-2004 SUV boom, coming on the heels of the environmental and fuel economy consciousness of the late 1960s and 1970s, proved that the awareness-leads-to-changed-behavior model was false or insufficient.

This historical experience is generally consistent with insights stemming from the revolution that is taking place in our understanding of human decision-making. Thanks to a pioneering group of psychologists that includes Timothy D. Wilson, Daniel Gilbert, Amos Tversky, and Daniel Kahneman, it is clear that a "rational" decision is rare. Powerful motives, often beyond our consciousness, strongly influence our behavior. These motives are very difficult for us to discern directly and are largely outside our conscious control. Emotions—conscious and unconscious—often stimulated by external factors such as the behavior of others, play an important role in human decisions. So do promotional efforts of companies trying to sell products, but only in a general way, an influence that paradoxically is strongest when people are not paying close attention. Although powerful influences are at work, most of us do not really know why we do what we do. When asked why we bought a product, we make up plausible stories that seem true to us. Thus, we are less the captains of our own ships than we imagine.

Together, the US historical experience with the automobile and insights from behavioral economics cast doubt on humanity's ability to take substantive steps to mitigate, even adapt to, global warming, and raise troubling questions about whether democratic free market capitalist societies—as presently oriented—are up to the challenge of ensuring the long-term health of the planet.

Note: This paper goes beyond the presenter's book Auto Mania: Cars, Consumers, and the Environment (Yale, 2007) to explicitly examine the implications of research in behavioral economics for understanding consumer behavior that affects the environment.

1045 **Environment, consumption and citizens' responsibility since 1970**

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During the 1960s and well into the 1970s experts and politicians approached environmental problems from a natural scientific point of view. Key words in the debate were plundering, poisoning and crisis – all of them part of the apocalyptic discourse of the time. To solve the problems state intervention through legislation and administrative control systems were the core means. However a parallel discussion took place within political parties arguing that economic growth and increased material consumption were causing serious environmental problems. And politicians, scientists and grass root people were concerned about Sweden having become a consumers' society. Environmental degradation and consumption were gradually seen in a lifestyle context. In 1986 former Minister of Environment claimed that traditional mechanisms were not enough and he stressed the role of citizens' responsibility. He claimed that citizens, as consumers, were parts of the environmental problematique. All citizens influenced the environment through everyday routines and everyday consumption. Citizens, as consumers, had to take personal responsibility and change lifestyle. And what could the individual do? Carlsson pointed at for instance using more public transport, reduce the use of energy and increase recycling of waste. Environment and consumption issues were of political concern, but when the Swedish Social Democrats highlighted this in the late 1980s groups of citizens had already "walked the talk" for more sustainable consumption. There had been green wavers that moved to the countryside, but less known are groups who deliberately set out to live more environmental friendly within an urban setting. One effort was done already in 1974 when a group of researchers from the University of Gothenburg presented a model village in Karlstad based on human ecological principles. Their premise was rooted in a civilization critique of modern society and particularly the unsustainable use of energy. For different reasons the project never materialized. The visions did, however, not die and a new group gathered in order to discuss the possibility for alternative living based on low energy consumption. In 1984 they moved into the first eco-village in Sweden, also in the municipality of Karlstad. The eco-village serves as a case study for analyzing possibilities and barriers for citizens to behave environmental friendly.

The paper draws on theories in the emerging field of "responsibilisation" that expand the notion of citizenship to include consumer identity and community action. Focus is on the role that consumers and citizens individually and jointly play in sustainable development processes

1047 **Environment: A resource or a problem for the indigenous peoples movement?**

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Both in the self-imagery and in the imageries produced by the "western" majorities, the representation of indigenous peoples is very often one of people sustaining their warm and ecologically sound relation to nature and to their environment (and/or that this relationship has been broken by the western industrialization). I aim to study the use of the imagery of environmental sustainability as a cultural marker in the resource management conflicts between states and the indigenous peoples. The use of the marker was extensive in the indigenous struggle for their land rights in the 1970s, when the public sphere was mostly positive to such imagery. Lately, in the conditions of the global "backlash" experienced by the indigenous peoples movements, the imagery of the indigenous peoples as agents of warm and spiritual relation of nature has in some state-indigenous minority conflicts, as in the case of Finland, disappeared and lost credibility. The paper discusses the internal (strategic choices made by the indigenous movement) and external (government's adoption of the global environmentalist discourse) reasons for this. The consequences in the agency of the indigenous peoples in the conflicts over the natural resource use are also studied. Has the continuous flow of new, environmentally "progressive" actors, which, however, have multiple interests, further marginalised the indigenous ecologies and their possibilities to control the resource use? The period of inquiry is roughly between 1970-2000. The time-limits for the presentations in the Congress does not allow me to discuss the actual environmental consequences of the "greening" of the governments, but this is a matter for further research. The case to be studied is chosen from a new research project (at the University of Tromsø, Norway, funding applied) comparing the state-indigenous peoples movement relationship in Nordic countries and in Australia. Preliminary results of the comparative approach can be presented in the Congress.

1048 **Globalization, Deforestation and the Disappeared Islanders: Historical perspective on today's challenges in Andaman and Nicobar Islands (An Indian Archipelago)**

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Globalization – has been one of the highly-debated topics in international arena over the past few years. Rapid economic growth and poverty reduction in developing countries has been a positive aspect of globalization. But globalization has also generated significant opposition over concerns that it has increased inequality and environmental degradation. The Andaman & Nicobar Islands are situated in the Bay of Bengal. Today, the archipelago is facing multifaceted challenges of globalization in the form of deforestation, degradation of biodiversity, soil erosion, scarce water resources and the extinction of indigenous people.

The Problem of Nature covers a whole cycle of environmental history and its proper interpretation can play a crucial role in shaping our understanding and guiding our decisions. Indian history only says that the archipelago was once a glorious chapter of Indian freedom struggle. The history is silent on the past, present and future of original inhabitants and their environment. However while tracing the references of the processes of globalization on the Andaman and Nicobar Islands in a historical perspective it is found that the history of these islands is the history of deforestation and marginalization of aborigines. The first wave of globalization reached at Andaman coast in the form of Malay pirates which started the slave trade of Andamanese. Second wave of globalization reached in the form of British. They set up a Forest Department here in 1883 with the sole purpose of to fulfill the increasing need of timber. The purpose of the forests management continues to be same today even after the 60 years of independence. The recent and third wave of globalization is looking it exotic paradise as the target of massive tourism promotion. And the increasing numbers of visitors to the islands are posing several challenges to the fragile ecology of the cluster.

In this way the islands are now demographically, socially, politically and economically dominated by the outsider population brought by the different waves of globalization .The dominant population is all -pervasive in its hunger for resources, without a thought for the immediate or distant future of the islands.

This paper is a small attempt to reconstruct the environmental history of islands. The study would also take a comprehensive look at the way the indigenous people and their environment have been subjected to alienation in the wake of the exploitation of natural resources during the different phase of history. In the particular context of islands the paper will also try to present the history as an important reference tool for understanding the scope of present environmental degradation and also assess the present attempts to control it.

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1049 **"Sickness that Walks": Epidemiology, Indigenous Peoples, and the Ranching Frontier in Western North America.**

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The relationship between the outbreak of tuberculosis, poverty, malnutrition and dislocation among Native North Americans is well documented. Yet, the true nature of the transmission of tuberculosis to aboriginal communities in western North America remains misunderstood. The primacy of human to human transmission of M. Tuberculosis is undisputable. This paper argues that an unrecognized source of infection was M. Bovis, a zoonotic disease responsible for spreading tuberculosis through the consumption of diseased meat.

The diffusion of this new pathogen, M. Bovis, across the northern Great Plains was an unintended consequence of the introduction of cattle. Five million Texas cattle were driven north in the two decades after the U.S. Civil War has been called the "largest short-term geographical shift of domestic herd animals in the world." In the wake of the collapse of the bison economy, a significant portion of early beef production was directed to Indian reserves as rations. The consumption of infected beef by aboriginal communities using traditional food sharing practices, including the eating of raw cuts and organs, facilitated the spread of infection.

A reinterpretation of the zoonotic nature of tuberculosis infection will lead to a greater understanding of historic epidemiology of western North America. The spread of M. Bovis in the historical context has parallels with the current situation in the developing world. Greater recognition of the historical and ongoing threat of M. Bovis to human populations by health care providers can only assist in the continuing battle against contagious diseases.

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1050 **Impact of environmental change on indigenous people in the nilgiris**

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The Nilgiris hills are situated in south-western India, mostly between 1000 and 2670 metres above sea level. They are the home of rich fauna and flora and the origin of major rivers. The western slopes receive the full brunt of the south-west monsoon, while the eastern rain-shadow area is scrub jungle.

There is evidence of human settlement here since 10,000 B.C., with ash mounds, rock paintings and undeciphered rock-cut inscriptions. The indigenous Todas, Kotas, Kurumbas, Irulas, Paniyas and Badagas lived for millennia in harmony with nature, linked in a ritual, social symbiosis in a barter economy. Todas bred buffaloes, Kotas were potters, blacksmiths and carpenters, Kurumbas were magico-ritualistic honey collectors, Irulas were medicine men and Badagas produced rice. Through the aboriginal, colonial and post-independence periods, the Nilgiris constituted a distinctive region with unique natural and human characteristics. The urbanizing sociological factors following the migration of people from the lowlands make the environmental history of the Nilgiris a remarkable anthropological quest.

Following British colonization, forest lands were converted into tea and coffee estates, vegetable and fruit farms and eucalyptus, wattle and cinchona plantations, while wildlife was hunted to near-extinction. Land under agriculture was expanded, and marginal lands converted to shifting cultivation. The local economy was geared to commercial activities. Large populations migrated from the plains to provide services. Post-independence, several thousand Tamil workers from Sri Lanka expanded the land under tea. By 2001, less than one-third of the population were original tribes.

Market forces resulted in an unprecedented exploitation of natural resources. Shola (indigenous) forests and wildlife were restricted to designated national parks and sanctuaries. The extinction of species adversely affected the biodiversity, indicated by time series maps that mark ecological change. The result has been landslides and paleoscars. Rivers producing hydroelectricity are no longer available for drinking water. The clean cool air has been replaced by high levels of pollution and a warmer climate.

The fragile ecology has had adverse consequences on the social, economic and cultural lives of the indigenous communities. Marginalized, restricted from collecting forest produce and deprived of their traditional economy, culture and lifestyle, they were reduced to penury, working as unskilled labour in their own lands. The Badagas alone elevated themselves by better livelihood strategies, adapting new technologies and educating themselves.

The four original tribes remain backward in the skills required to survive in a modern society, torn between a desire to continue their traditional lives and the inability to do so in the changed circumstances. This paper studies the environmental history caused by changing priorities and ecological sustenance, and its impact on indigenous people, as their traditional knowledge was marginalized and replaced by modern developmental values, leaving them in a biological and cultural crisis.

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1051 **Hydraulic utopias. Overall plan projects for french rivers development in the nineteenth century.**

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In France, throughout the nineteenth century, a number of authors proposed projects of total reorganization of the hydraulic network (rivers). They wanted to put into effect the scientific and technical hydraulic knowledge of their time; but the large management systems they proposed were difficult to achieve because of the huge sums to invest and legal difficulties. Nevertheless, we consider that some of these proposals are important because they will influence later concrete realisations in France. For example the Compagnie Nationale du Rhone created in 1921 will apply the principle of integrated water resources management, and the drainage area (“basin versant”) model will be used by Financial Basin Agencies created in 1964 and will become the territorial model for integrated water management in France.
The object of this communication is to analyse the most significant hydraulic utopias appeared in France in the nineteenth century, placing them in their socio-economic and ideological context. We will in particular study the perceptions and conceptions of nature of the authors of these projects and we will show into what philosophical and political framework these utopias fit. We will try to determine what was the subsequent influence of these "overall plans" on water policy in France and throughout the world.
We will review the utopias which are associated with the French Revolution (Dupain-Triel and Daviel), with the economical development of the 1840’s (Andrieu) and especially the saint simonien Thomé de Gamond through his book " Mémoire sur le régime général des eaux courantes. Plan d'ensemble pour la transformation de l'appareil hydraulique de la France "(1871).

1052 **"The Maximum of Wilderness": American Naturalists & the Image of the Jungle, 1880-1960**

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Most of us, I think, have felt the fascination of the Amazon region. So much have we heard of its rivers, its tropical beauty, its luxuriant forests, the wild life and wilder Indians that lurk in its depths, that the pictures drawn by our imagination are vivid and unique. This vision of the unspoiled wilderness drew me irresistibly…
- Ynes Mexia, "Three Thousand Miles up the Amazon" (1928)

For first was the Jungle. Always will be the Jungle. From the beginning until the end of Time it stretches….the Unconquered….the Unconquerable!
- Merian C. Cooper, Chang: A Drama of Wilderness (1927)

Many scholars have argued that the idea of wilderness was a driving force in the formation of American identity. Environmental historians have outlined how the definition of "wilderness" has changed throughout the nation's history, but few scholars have considered the role of non-American landscapes in shifting notions of "the wild." As both "unspoiled" and "unconquerable," tropical forests have long figured into the American imagination. "Maximum of Wilderness," a phrase film-makers Martin and Osa Johnson use to describe Borneo's Rain Forest, traces the representation of tropical landscapes (along with their animal and human inhabitants) seeking to understand their place in both the history of the idea of nature and the globalization of the environmental movement.

As a cultural construction, "the Jungle" is a dynamic mixture of myth and reality. At the beginning of the twentieth century, the Jungle was a popular theme in American culture; books and films such as Edgar Rice Burrough's Tarzan (1914) and Merian C. Cooper's King Kong (1933) created an image of adventure in tropical forests with mass appeal. While the popular image of the Jungle masked many of the real experiences in it, American naturalists sought to represent an "authentic" view of tropical nature in museums, zoological and botanical gardens, literature, and film. Through the lives and works of naturalists Theodore Roosevelt, John Muir, William Beebe, Martin and Osa Johnson, and David Fairchild my work examines the relationship between popular and scientific representations of tropical nature—and the resonance of these images. My central concern is how and why this imagery shifts at mid-century from the Jungle as a place that endangered human lives to the Rain Forest, a place itself endangered.

Still present in the American imagination, both images speak to the central place of tropical forests within constructions of adventure and wilderness, as well as to the American role in, and responsibility for, these landscapes. Though the character of the allure has changed, despite increased understanding of the natural world, tropical forests seemingly preserve Mexia's "vision of the unspoiled wilderness." "The unsolved mysteries of the rain forest are formless and seductive," suggests contemporary naturalist Edward O. Wilson, "In our hearts we hope we will never discover everything. We pray there will always be a world like this one at whose edge I sat in darkness. The rain forest in its richness is one of the last repositories on earth of that timeless dream."

1053 **Archival Currents: Rivers, Representation, and Landscapes**

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This paper is part of a project that analyzes state formation and modernity in northern Canada through the late-19th and early-20th centuries. During this period the North was mapped and given the territorial boundaries and government it mainly follows today; the Dene and Inuit people living in the region were coerced into permanent settlements or reserves; and some of the largest resource-extraction processes in North America were undertaken, including the Athabasca Oil Sands. Using the context of northern Canada, this paper will focus on the relationship between peoples, knowledges, and environments. In 'peoples' it examines Native-newcomer relations under the conditions of colonialism. Knowledges are broadly conceived of as systems of organizing and 'making sense' of landscapes, from the Hudson's Bay Company's economic vision through the Geological Survey of Canada's efforts to map the aggregate resources of the North, and up to the current disputes over environmental change and global warming. Environments, rather than the many ecosystems that constitute and overlay the North, are considered here much like cultural landscapes and may be interpreted as the interstitial product of peoples, knowledges and nature. The 'environment' is the archival landscape of the Athabasca-Mackenzie River - the cartographic, photographic and textual documents representing the cumulative interrelationships between different ways of recording, visualizing, and encoding the North to the rest of Canada. While this topic may seem conventional to environmental histories of nature and its imagination, the question I wish to ask dislodges the 'representation' of environment from its easy status as the afterimage of a real landscape. This means not only reading representation as a practice that enters into the constitution of the world, but means that the establishment of real landscapes rests on the conquest of what Timothy Mitchell calls 'the world as picture' – in this case, the power of the archive to denote place and space. The main question this paper asks is what credit can be given to the actual landscape that was transcribed at the same time it was traversed - to what extent did the territory itself determine the formulation of 'knowledge' of the north and the organizing principles through which it is constituted archivally? I present the Athabasca-Mackenzie river system as the subject of this question. What reciprocity exists between the river and the documentary archive that aspires to represent it; and how has this relationship been established by the peoples and ways of knowing the river and archive have carried? By far the primary and most expedient means of transportation, rivers could

pose for some travelers and residents of northern Canada an impassable barrier to their journeys or livelihoods. For some they could be the source of life, for others a terrifying menace. Rivers appear on maps as lines and boundaries, in photographs as subject and, of course, in their physical manifestation as water. When likened to what John Tagg says of photography, rivers also bear the burden of representation: their dual status as objective reality and its reproduction is located at the heart of 19th century social change, "turning on a social division between the power and privilege of producing and possessing and the burden of being meaning.". In representation then, rivers are indivisible from the archive of knowledge they structure and are structured by.

1054 **Europeans 'Picturesque' Gaze: Landscape, Climate and Vegetations of the Himalayas: 1800-1900**

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Present paper attempts to explore within the wide canon of the travel writings and personal accounts of the Europeans in which they represent the Himalayas as a source of classified scientific knowledge and the unique place of the universe that offered them most exciting and wonderful scenery. It also offered them its wide spread landscape, variety of vegetation and the pleasant weather though some of the places were also extremely hot. Throughout the 19 th century the inaccessible areas of the Himalayas were opened up to the European observation and travel. Thus the 'mystic' mountains of the Orient turned into a site where naturalists were finding its flora and fauna, botanists were studying plants, surveyors were seriously measuring elevation, travelers were enjoying its wonderful scenery and geographers were observing the climate and landscape – all such things that the vegetation, landscape, climate as well as its pastoral land, glacier, terrain, flora and fauna and so on – were thoroughly investigated by the travelers.

Indeed, the European naturalists had divided the Himalayas into three climatic zones – the tropical, temperate and arctic (alpine). This classification was completely European construction of the Nature of the Orient. Temperate Himalayas, however, now became 'Neo Europe' to the colonizers where they established new settlement, summer resort and hill station and the tropical Himalayas became a site where the naturalists, particularly the botanists visited to collect the plants for their experiment.
The paper also seeks to answer a number of questions – how, why and to what extent the Himalayas became tropical. Was the 'Tropicalization of the Himalayas' a colonial or a scientific project?

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1055 **For a sustainable development: the rice growing in Lombardy and Northern Italy between public health and private interest (XVII-XVIII centuries).**

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In Northern Italy, rice growing started during the XVI century, but only in the Seventeenth century it largely spread, particularly in low plains. The diffusion of rice was allowed by both the great abundance of water and previous changes in socio-economical structure of proprieties. Originally, rice was introduced for farmers' alimentation, but it soon conquered new areas of employment, thanks to its high yield and the request for international trade.

The diffusion of rice growing caused big troubles to workers and locals populations, because of the spreading of malaria, associated with rice method of cultivation. The problem was investigated by various authors (E. Sereni, P. Bevilacqua, L. Faccini, A. Ventura, S. Ciriacono, and others), whose studies were concerned with debates, answer and action particularly in central governments. This paper aims and deepening issues related to these contributions, focusing on the analysis of Lombardy, a region in the Northern part of Italy included in the State of Milan; the goal is to obtain a micro-analytical study of the actions and discussions taken in rural communities, consequently to central government's policy. Besides, a comparison among the State of Milan case and the others independent states of Northern Italy (i.e. Republic of Venice and the Savoia's Dukedom), will be conducted, in order to understand cross border influences and differences.

Particularly, which debates took place in local institutions and societies? Which was the evolution of local communities' decisions, also considering central governments' acts? Were local decisions more effective than government ones in obtaining a better balance between public health and private interests? Which idea of environment and nature lied beyond local decisions?

This paper is based on a new and original research, brought about documents' analysis in public archives of Milan, Venice and Turin. Rice growing is studied in a new perspective, focusing on the perception of environmental and economic growth in local societies. In this direction, rice growing can be considered an insightful field of research.

1056 **Landscape Consequences of Agrarian Modernisation: The Example of Limpach in the Swiss Lowlands (1750-2000)**

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Western European agriculture faced a profound change during recent 250 years. Soil meliorations, imported plants, an improved management of the nitrogen cycle, and new technologies based on fossil energy resulted in a striking yield increase. This modernisation process deeply shaped the landscape and had massive ecological consequences (Ditt et al. 2003, Antrop 2005). In this paper, we analyse the landscape change in the Swiss Lowland village Limpach, situated 20 kilometers north of Berne. We assess the effects of early soil melioration and rivulet corrections in the 18th and 19th century and we examine the impact of the big joint melioration in the 1940s. In a multi-source approach, we include written documents, old maps, land registers, and statistical data in our analysis. The excellent source availability for Limpach enables us to generate land use maps for different points in time and to make quantitative statements. It can be shown that considerable landscape change occurred already from 1750 to 1940. In 1771, the common pasture of the village was privatized. In the 1880s, the local rivulet was straightened and deepened in the 1880s to drain the land and to trigger the conversion of the wet pastures into arable land. The local clergyman stated in 1804 that grain yield had increased by two-thirds in the last decades and he explained this with the introduction of clover, the feeding of cattle indoors all the year round, the more thoroughly ploughing and partly giving up of the fallow land. In the aftermath of the construction of a cheese dairy in Limpach in 1845, the area of grassland increased. In the 1940s, the joint melioration reshaped the landscape of Limpach in a fundamental way. 75% of the cultivated area in the village were drained with modern methods so that the arable land was massively expanded. In the second half of the 20th century, we again observe a slight shift from grassland to arable land. The design of the study allows to reconstruct land use over 250 years and to identify both continuous and sudden changes (Schneeberger et al., Muir 2003). The sequel of drainage projects reflects the historical development in the technology to improve the farmland. For a more comprehensive understanding of the observed landscape changes in the Limpach valley they have to be interpreted in a national and international socioeconomic and political context.

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1057 **Silviculture in Denmark during 1700-2000: the influence of social context, legislation and forest policy strategies on silvicultural practices**

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By the mid 1700s several hundred years of unregulated exploitation and grazing by domestic animals had left only scarce remnants of Denmark's original forest resource. In the 1760s a major forestry reform was initiated, introducing planned forestry, sustained yield principles, forest plantations, the normal forest concept, the regular high forest system, and a forestry education. A new Forest Reserve Act was introduced in 1805. It prescribed fencing of all forests, agrarian grazing practices were forbidden, the high forest system was made a mandatory forestry principle, and all forest ground was assigned to forest use for ever. These principles still remain in current legislation.
As a result of afforestation efforts the forest area has increased considerably since the mid 1800s, and comprised more than 11% of the total land area by 2000. The forests of Denmark are scattered throughout the country, on an international scale they are small, a great number of native and exotic species are used, and forest stands are small1. According to the Danish Forest Act of 2004, forests should be managed for wood production as well as for recreation, ecological, cultural and amenity values, biodiversity, soil and groundwater protection. It is envisaged that these different types of production can take place at the same time in the same location. At present, the most common silvicultural systems are different forms of the shelterwood uniform system and clear cutting.
Throughout three centuries, the development in silvicultural practices in Denmark has been strongly influenced by Central European traditions. However specific Danish viewpoints and traditions have also developed2,3.
In this paper, we analyse major trends in silvicultural practices during 1700-2000. We specifically highlight the social context that triggered significant changes and the relationship between central authorities, forest owners and professional silviculturists. We also consider influential interactions from legislation, law enforcement, forest policy strategies and timber market conditions. Based on this, we identify and characterize the development of paradigms in silviculture in terms of silvicultural systems (from clearcutting to selection practices), species preferences (conifers vs. hardwoods) and methods of establishment (natural regeneration vs. planting). Finally, we discuss our results in relation to the contemporary state of forests in Denmark, professional perceptions and public attitudes towards silviculture.

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1058 **Africa and the seventh cholera pandemic, 1971-2006: The dangers of a new pathogenic strain**

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Cholera has long ceased to be a dreaded affliction in the more affluent parts of the globe. Yet, as climate change and environmental degradation accelerate at the beginning of the twenty-first century, Vibrio cholerae remains a highly adaptive reemerging pathogen, and a grave concern for global public health.
Cholera is now primarily an African disease. World Health Organization (WHO) statistics for 2006 show that fully 99 percent, or 234,000 cholera cases, were reported for Africa, compared with only 2,000 in all of Asia. The cholera vibrio is now free-standing in such major water sources as Lakes Chad, Victoria, and Tanganyika, and endemic cholera persists in the many states bordering on these significant water systems. Cholera is now capable of exploding in almost any African region in a given year.

The cholera pathogen has changed its nature in the past thirty years and so has scientific thinking and practice towards it. For the seventh pandemic, the agent is Vibrio cholerae 01 El Tor, a new strain of the classic cholera pathogen. El Tor holds lower virulence for humans, enabling less severely ill patients to have more mobility, and the capacity to infect others over a longer period of time. Compared to cholera pandemics of the nineteenth century, the seventh pandemic has the greatest geographic span, makes use of the fastest new technology, air travel, yet has moved more slowly while lasting longer than any earlier pandemic, now counting forty-six years and showing no signs of abating.
Africa's deficient public health infrastructure is usually blamed for its cholera problems. Medical intervention against cholera often comes too late for sick people arriving at remote treatment centers after long travel. African towns and cities have become more crowded, and have strained water and sanitation facilities. Political instability and warfare in have provoked large population movements, leading to the emergence of large peri-urban areas or refugee camps that favored cholera.

Yet it is not sufficiently realized that environmental factors are playing a major role in cholera's expansion in Africa. Adverse climate changes producing irregular rainfall patterns continue to be a factor in West Africa even after a modest political recovery has occurred at the beginning of the twenty-first century. In Dakar, Senegal, unusually heavy rains brought no less than 23,000 cholera cases in the first three months of 2005.

Too often, control measures have reflected older nineteenth century approaches and have been slow to adapt to the newly emerging understandings of the disease. Largely unsuccessful measures have included mass vaccination, and especially the quarantine of goods and travelers from infected places. Ironically, effective and inexpensive treatment for cholera patients has existed for over thirty years. It involves oral rehydration therapy or ORT, developed by multinational teams in Calcutta and Dhaka in the mid 1960s, needing only sugar and salt, ingredients available throughout the world, and capable of being administered by immediate family care-givers. Sadly, for a variety of reasons, thousands of Africans continue to die from cholera despite the existence of an inexpensive, and effective protocol such as ORT.

1059 **Environment and Health in West Ham, 1895-1910**

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In the middle of the twentieth century Aldo Leopold argued for new attention to the health of the land and the biotic community it supports. More recently, environmental historians, including Linda Nash and Gregg Mitman, examined the interconnections between the health of the land (or the local environment) and the health of people. This focus on health provides a useful approach for the study of urban spaces, where the local environment and the health of the population were damaged by overpopulation and pollution. Health in West Ham, an eastern suburb of London, suffered from rapid industrial and population growth during the late nineteenth century. The once green marshy lowlands were degraded into an impoverished industrial landscape. There was a clear correlation between the declining health of the land and the problems of ill-health amongst the population who lived and worked in the dirty environment.

The paper examines the multiple meanings of health in the social reform and public health literature concerning West Ham between 1895 and 1910. These include the Annual Reports of the Medical Officer of Health (MOH) and the final report of the Outer London Inquiry Committee (OLIC) published in 1907. The annual reports of the MOH record the expanded role of the public health officers in West Ham as they began addressing the wider environmental causes of disease through activities such as work place and homes inspections and air quality monitoring. The MOH was increasingly charged with doing all he could to manage and improve the human ecology in West Ham. The OLIC report, West Ham: A Study of Social and Industrial Problems, documents the significant social instability of West Ham during the early years of the twentieth century. Poor quality housing

and chronic casual employment were the major problems identified by the report. There was a clear correlation between health and the social problems of slum housing and poverty. The impoverished neighbourhoods were identified by the MOH for having much higher illness and death rates than the wealthier sections of town. West Ham is an interesting case study of a place where environmental and social problems combined to cause degradation in the health of the land and the population. Linking the social and environmental history of West Ham reminds us that environmental problems brought on by industrial urban landscapes were tied with increased problems in maintaining human health.

1060 **Filthy Cities, Filthy Swamps: Cholera and the Transformation of Toronto's Waterfront in the Late Nineteenth Century**

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At the turn of the 20th century, two opposing representations of Toronto's eastern waterfront converged: the contagious and the sanitized. Public officials represented Ashbridge's Bay and marsh as major sources for a contagious water-born disease and supported the removal of the threat by an urgent sanitization of the area. During the end of the 19th century and beginning of the 20th, the marsh and bay had been a dumping ground for human, industrial and agriculture waste. Health authorities in the city issued dire warnings that the marsh had to be cleaned up to avoid unleashing a cholera epidemic. This paper investigates the environmental history of the marsh from a public health perspective, focusing on changing concepts of disease from a miasma to bacteria origin. In addition, recent critical geography literature on urban metabolism informs an analysis of how flows of nature, in the form of bacteria, and sewage infrastructure intermingle. From this analysis, the notion of 'spaces of infection' is developed. These spaces materialize as bacteria spread along transmission networks, which emerge from interchanges between nature, transportation routes, and urban spaces. For example, cholera was transmitted from India to Toronto along shipping routes established by British colonial interests, demonstrating how spaces of infection are inherently political and economic. Urban reformers and health officials in Toronto supported efforts to sanitize the marsh in Ashbridge's Bay by publicizing the possibility of a cholera outbreak in the summers of 1892-1894. These warnings gave rise to considerable public fear from a disease dreaded because it was easily spread and deadly infectious. The urgency to sanitize the marsh became a central aspect in defining Toronto’s multi-dimensional waterfront problem. Eventually, a new waterfront development agency was established and an industrial district produced to solve this problem. The paper concludes that the case of sanitizing Ashbridge's Bay is an example of what Gandy has called "antibiotic urbanism." This array of practices was an essential dimension in political struggles that irrevocably altered the ecology and economy of Toronto’s waterfront.

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1061 **Slavery and deforestation: Brazilian perceptions during the eighteenth and nineteenth centuries**

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Of the approximately 10,000,000 Africans who survived the crossing of the Atlantic Ocean in the slave ships, around 4,000,000 came to Brazil. The massive scale of this introduction, which began in the middle of the sixteenth century and was only interrupted in 1850, deeply marked Brazilian colonial and post colonial society. It became one of the few social formations in human history which, in the analysis of Moses Finley, deserves the title of 'slave societies'. This definition does not refer to the simple existence of slaves, something very common in the ancient agricultural states, but rather to the fact that slavery became the essential institution for the definition of economic production and, to a large extent, social and political relations. It is not possible to understand the making of Brazilian society without evaluating the effects of this heavy inheritance of slavery. Nowadays there are numerous discussions of areas where this inheritance is still being felt in the present. But the link between slavery and deforestation is rarely perceived by contemporary historiography as a component of this inheritance. However, during the slavery period, some observers and authors, especially the intellectual leaders of the abolitionist campaign, were able to make a clear connection between the dominance of slavery work and the reality of deforestation and soil degradation. The paper discuss the evolution of these perceptions in Brazilian social thought from the end of the Eighteenth century until the end of the Nineteenth century, specially along the 20 years before abolition (that finally happened in 1888). It will analyze critically the four basic theoretical arguments that were used to establish the link between deforestation and the deleterious features of slave work: 1) The African slave as a “bad agricultural worker”, 2) Slavery as a damaging factor for the productive and technological capacity of the landowners, 3) The abundance of cheap slave labour, together with the abundant availability of free land, as an incentive for the pushing of the agricultural frontier towards the tropical forests and an disincentive for the recovering of the exhausted soils already deforested and 4) Slavery as a system (the “legacy” of slavery) that was called by abolitionist author Joaquim Nabuco as “a poisoned air which contaminates everyone and everything” with a general mentality of short-sightedness and lack of care for the health of society and the territory.

1063 **Developmental Modernity: Governmental Reasons of Separating 'Man' and 'Nature' under Colonial Conditions**

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The accusation of the 'natives' for their lack of industry, enterprise, capital and capability to labour is a textual strategy that is frequently encountered in the colonial administrative narratives legitimising the large-scale state interventions in the colonies. The luxuriant nature and weather said to have seduced 'man' and rendered him non-enterprising and non-industrious. However, we find that it is not nature that is accused, but it is 'man' who is blamed for succumbing to seductions of nature. 'Man' said to have succumbed to the seductions of 'nature', and failed to harness the potentials of nature to convert its endowments into resources. In these narratives not only the 'man' and 'nature' was distinguished, but also they were separated from one another. This separation of 'man' from 'nature' in a particular manner has been an integral feature of the modernities thus formed under the colonial conditions. This paper attempts to characterise and highlight this particularity by terming it Developmental Modernity (Raju 2003). Developmental modernity has not only separated 'man' from the 'nature' but also provided modalities of turning the nature to resources by creating definite structural and discursive fields in colonies. These strategies were intended to fashion subjectivities and creating subjects of developmental modernity in the colonies (Agarwal 2006). Refashioning of the 'native natures' was aided also by new discursively formed knowledge disciplines such as scientific forestry, colonial ethnography, tropical plantation and agricultural sciences etc. (Philip 2003). Recasting of nature was also accompanied by invention of new categories such as wild, game, forest, agrarian field etc. and associated values that formed the legitimising tool for creation of new micro-geography of governmental practices in the colonies (Sivaramakrishnan 1999). Developmental modernity provided the larger discursive realm where the political-economic truth production of the colonial process became meaningful. By illustrating the cases of colonial forestry ideals in Travancore, this paper attempts to bridge a major gap in the standard environmental narrative in the South Asian Environmental Histories. Cases of emergence of legal frameworks, legitimising discourses and differential treatment of the tribal and non-tribal shifting cultivators are provided as illustrations of the overarching discourse of Developmental Modernity and separation of 'man' from 'nature'.

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1065 **Environmental ideals and the contested productive spaces of Australian cities, 1890-1960**

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This paper takes a bird's eye view of urbanisation in Australia from the 1890s to the 1960s. Unconventionally, the bird in question is a flightless one - Gallus gallus domesticus, the domestic fowl. Fowls were once commonly found in Australian cities, where many families relied on backyard poultry for eggs and chicken meat to serve on special occasions, and small-scale poultry farms were relatively common. However, over the course of the twentieth century, poultry were progressively deprived of their economic, cultural and spatial niche in urban Australia. This resulted primarily from changing ideas of the 'good city' and their embodiment in local by-laws, but also involved shifts in household economic organisation, and a range of other factors. In tracing and accounting for the changing prevalence and husbandry of urban fowls, I will suggest that the changes were not a consensual or 'natural' outcome of urbanisation, but occurred within specific sets of power relations, and were frequently contested. Broadly, however, the decline in poultry-keeping among urban households may be seen as emblematic of the triumph of one vision of what cities are for, and how they should look, sound and function. That vision may best be characterised as capitalist and modern, and it carried with it a set of environmental ideals. The pursuit of these ideals promoted changes in the urban metabolism which not only shaped the experience of our urban fowls, but also reverberated in ecosystems around the world.

The late twentieth century saw a resurgence of interest in urban food production, based on concerns over the sustainability of a globalised, energy-intensive commercial food system. For some, the vision of a sustainable city included a return to local poultry-keeping, but the reintroduction of poultry was not unproblematic in an urban setting shaped by decades in which modern, capitalist environmental ideals were dominant. These issues will be examined firstly through an account of the changing urban niches occupied by fowls; changes that will then be explicated in terms of the visions and struggles of the cities' human inhabitants.

1066 **Nine Ways of Seeing Nature in Early Sydney**

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The environmental stories told in most histories, exhibitions, novels and popular books about early Sydney are depressing ones. Despite the temperate climate, lush vegetation, and beautiful waterways, the European settlers are said to have found the Sydney environment hostile and barren, a hated place. Their experience was

blighted by terrible deprivation and starvation, they were ill-at-ease and homesick in an 'alien landscape'. Worse, some say they failed to put down roots, develop any sympathy or affection for the land, and thus committed acts of environmental vandalism by clearing, planting, building and polluting. They became the original environmental sinners, first perpetrators of Australia's appalling despoliation. In short, they were ignorant, clumsy-footed and they did not belong; at least not in the way the Aborigines belonged.

Yet, even the most fleeting look at what the first Europeans actually wrote and painted of the Sydney environment reveals their admiration, enjoyment, fascination and sometimes awe of the place. Governors issued orders to protect streams and conserve forests and birds, settlers gazed upon the land with covetous eyes, some convicts wrote of their environmental encounters in deeply spiritual terms. Clearly there was not one environmental response, but a range of responses; neither is there one Sydney environment, but many. Taking some cues from Jenny Price's '13 Ways of seeing nature in LA', this paper will explore nine ways the settlers saw nature in early Sydney: through the lenses of aesthetics; utilitarianism; legislation; political thought; liberty and escape; natural science; remaking and transformation; visceral/emotional experience (wellbeing, health, belonging); and finally as the source of renown and legend. So the environmental stories of early Sydney resemble less a fixed template of exploitation, hatred and alienation, but a complex, often contradictory, process, mediated by rank, gender, civil condition, expectations and experiences over time.

We may observe, then, that while present debates about sustainability in Australia still tend to consider 'cities' and 'nature' as mutually exclusive, the roots of settler environmental experience were entangled with urban development. They were inseparable, too, from culture, economic activity and political thought. Thus a holistic approach, embracing the humanities as well as the sciences, is necessary to better grasp environmental responses, as well as the environmental impacts of human behaviour.

1067 **The Nature Scenery Act and the protection of nature in the Netherlands (1928- 1950)**

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In (Western) Europe and the south of the United States, where wilderness is rare, (former) country estates play a significant role in nature conservation . Alhough there are many studies about the aesthetic, historic and natural values of cultural landscapes and many more on the history of estates and great landholdings, the environmental history of private estates as a distinctive category is rarely the subject of investigation .

In the Netherlands, a small, densely populated country with virtually no undisturbed nature, private landowners were, at least until the mid-20th century, indispensable in the development of nature conservation. The introduction of the Nature Scenery Act of 1928 eased the taxation pressures on estates, and many endangered estates were saved. The law obliged owners to keep their estates intact and open them up to the public if they wanted to reap the full benefits of the law. Until the early 1950s, at a time when the green movement was still in its infancy, some 1.000 larger and smaller landed estates and privately owned forests became strong pillars of nature conservation in the Netherlands.

In this paper I will track the origins of the Dutch Nature Scenery Act. It will consider the public and political debate about the conservation of landed estates in the inter-war years. The role of the instigators of this law, a lobby of nature-conservationists, large (often noble) landowners, forest managers and tourist organisations, is taken into account. It will also describe what kind of landscapes were protected and why: were they protected for ecological, economic or for purely aesthetic reasons? Furthermore, the aims and results of the law will be considered.

Fiscal data and descriptions in government archives about the estates in question are used for analysis why the law became such a success and what was protected. The hypothesis is that Dutch fiscal policy in the first half of the 20th century caused as well as solved the financial problems of the estate owners. Heavy taxation on property, due to the financial troubles of the Dutch government after World War I and World War II, drained the resources of estate owners. The Nature Scenery Act proved the best way to undo the unwanted results of fiscal policies.

Finally, as the Dutch government was looking abroad for examples, especially to France, Germandy, Italy and the United States, comparisons will be made with legislation concerning the preservation of nature, esthetic landscapes and landed estates in other Western countries in the first half of the 20th century.

1069 **Toronto's Lower Don River Valley: A Social History of a Marginalized Environment**

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Once a rich deltaic ecosystem, Toronto's Lower Don River Valley by the turn of the twentieth century had been relegated to a "waste space": a dumping ground for sewage and industrial waste, and a home for noxious industry and hazardous materials. Forming the eastern boundary of the city until the 1880s, the valley, like the waterfront below it, came to be used as the city's "back yard"—a place to put things best unseen. Increasingly through the twentieth century, the degraded environments of the Lower Don River also became a repository for human "undesirables." Encampments of Roma families lived in the valley in the 1920s; gangsters hid out in its woods in the 1950s; prisoners of war were incarcerated on the river flats during World War II; and a long line of homeless people sought refuge there. Some were pushed to the area by forces outside of their control; others, it seems, were drawn to the remaining natural areas of the valley as a refuge from authorities. This paper draws

from the historical literature on urban waste disposal and environmental justice to explore connections between degraded environments and marginalized populations. Situated within the environmental history of rivers, this paper presents new insights on a small but important urban river and the changing human relationships it engendered over time. By documenting the experiences of marginalized populations along the river, it applies methods from social history to emerging themes in the field of urban environmental history and contributes to a nascent dialogue on fruitful intersections between social and environmental history.

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1070 **Access to Environmental Amenities in Baltimore, Maryland: Patterns and Processes, 1900 - 2000**

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Environmental justice studies are generally divided into two distinct categories - those which concentrate on identifying and examining distribution patterns of environmental amenities and disamenities fall into the "outcome" camp, while those which explore the processes that create and drive the patterns we see on the map are known as "process" studies. To date, most environmental justice research has emphasized the former over the latter. The reasons are clear enough. Because historical data sets are always scattered and incomplete, working with them is often tedious and time consuming. Their value should not be underestimated, however. Social scientists conducting research in support of the Long-term Ecological Research – Baltimore Ecosystem Study use a variety of historical sources to cast light on contemporary societal attitudes and shifting patterns of access to critical amenities, such as playgrounds and parks. Several excellent data sets are available to account for why Baltimore's African American population was long underserved by the city's system of playgrounds and parks. Particularly valuable are studies carried out for the city by the National Recreation Association and the Baltimore Urban League; City Board of Park Commissioners reports; newspaper accounts from the Baltimore News, Sun, and Afro-American; and meeting minutes and promotional documents generated by the Municipal Art Society, the Women's Civic League, and various neighborhood improvement and protection associations. Taken together, these records tell us much about the conflicting priorities of groups that exerted a great deal of influence in the municipal decision-making process. We argue that the current distribution of parks in Baltimore, which favors blacks over whites in terms of walking access, is in spite of a long history of neglect of the recreational needs of African Americans. A historical approach to environmental justice analysis is critical for uncovering the unjust processes that sometimes result in unintended consequences. The current distribution of parks in Baltimore does not meet the equity criterion of just distribution justly achieved.

1071 **Rushing to Market: Commodifcation, Marginality and the Place of the Stikine in the Klondike Gold Rush**

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Like many places at the margins, the Stikine has always been identified with the romance of places left behind. The allure of an authentic 'wilderness,' the pristine beauty of a rugged, unforgiving landscape, the possibilities of untapped resources and the habits of residents have drawn adventurers, prospectors, ethnographers and settlers to the region. The vast plateau surrounding the river has hosted numerous interlopers searching for a particular experience they felt was embodied in the river and its landscapes. In this way, the Stikine has always been a place-in-the-making, constructed by the various discourses and practices brought to it from outside its shifting boundaries. But how, exactly, was the Stikine 'made' in relation to other places? How did the exploitation of resources shape the way the Stikine was developed and the intimate ways it was connected to 'elsewheres' across other scales? What was the character of individual, corporate, bureaucratic and state actors in forming the unique relationship between abstract notions of nature and environment and the practical work of mining, conservation, hydro-power development and road-building. How, in short, did the Stikine come to be?
This paper will address this question by examining the place of the Stikine in the Klondike gold rush. The area was advertised with a certain imperial bombast as the beginning of an 'All-Canadian route' to the gold fields of the Yukon. It was hyped as a simpler avenue, longer but far less taxing. Promoters trumpeted the transportation infrastructure being developed. Steamboats began transporting people and goods up the Stikine from Wrangell, Alaska. An English engineering firm was contracted to build a railway between Glenora and Teslin to facilitate the voyage through the Stikine Plateau. Railway construction was soon abandoned when the Canadian senate abruptly cancelled the contract. In its stead, a sodden, muddy 'wagon road' was cut. The promises of easy access to the gold fields rang hollow. Many of the men who came through Glenora turned back without attempting the run to Dawson City; many others died on the ice of the river or on the exposed plateau that hemmed the Teslin Trail.
Close to 10000 miners wintered at Glenora in 1898-99, waiting for the opportunity to head north. This massive

influx of ambitious men and goods from southern cities changed how nature was used and perceived. New markets developed for meat, timber, knowledge and assistance of varying stripes. There were myriad new opportunities for both natives and neophyte miners open to(or forced out of economic necessity to) working in a trade or trading. Furthermore, the need to order and codify this new landscape allowed the state institutions to press their imprint on land and resource that had formerly been managed by area indigenous peoples. These forces 'remade' the Stikine according to a new hybrid arithmetic that merged biophysical nature and the curious culture of the gold rush into a unique place.

1072 **Environmental Justice: Process and Inequality**

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Environmental justice theory demonstrates that disadvantaged groups, especially low-income and racial/ethnic minorities, bear a disproportionate burden of environmental disamenities, enjoy fewer environmental amenities than advantaged populations, and are often excluded or marginalized from decisions that generate such patterns.

This project provides a ground breaking method for illustrating the role of legal and political systems in creating the present day distribution of environmental disamenities. Most environmental justice studies focus on outcome equity with only a cursory treatment of the processes that create those patterns. In contrast, this paper presents a process equity analysis of zoning and nuisance law for the period 1880 to the present. The paper evaluates whether zoning and nuisance decisions illustrate a pattern over time of approving or allowing certain noxious uses in certain neighborhoods as compared to others and whether the approval patterns correlate to race or income. In particular, the paper explores whether neighborhoods dominated by African-Americans, recent immigrants, and low-income groups have been more negatively affected by zoning decisions and nuisance law than the white majority. In order to test this theory, the paper looks at two sets of land use decisions: zoning variances and nuisance decisions.

Baltimore passed a comprehensive zoning code in 1931. The development of Baltimore's City Zoning Code is divided into two major eras: 1931 to 1971, and 1971 to the present. Under both regimes, the Mayor, City Council and/or Zoning Board of Appeals had the power under the code to approve or to deny applications for certain land uses in districts where such uses were not allowed as of right (Zoning Code of Baltimore, Sec. 3). The paper reviews these conditional use decisions under both the 1931 and 1871 schemes for certain uses that have an environmental impact, such as solid waste transfer, hazardous waste use and storage and automobile storage and repair. By overlaying the approval and denial decisions over time with demographic data, the paper evaluates whether any decisional patterns emerge that correlate to race or income. The paper also evaluates the decisional record in some subset of the cases to identify whether there is operative decisional language that indicates racial bias.

The paper also evaluates land use decisions for the period prior to the adoption of the zoning code. Specifically, the paper examines nuisance decisions in Baltimore between 1880 and 1931 to assess whether there is any pattern for where noxious uses were allowed or prohibited in the pre-zoning era.

The environmental justice literature establishes significant distributional inequity nationwide in exposure to environmental hazards. Several studies have proposed that such inequities could be the result of economic forces and not systemic racial bias (Been, What's Fairness Got to Do With It? Environmental Justice and the Siting of Locally Undesirable Land Uses, 78 Cornell L. Rev 1001, 1016 (1993)). This paper will be the first to examine local government decisions to determine whether racial bias in local government decision making contributed to distributional inequities of environmental hazards.

1073 **Towards Climate Responsive Urban Groundwater Management Policy**

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During the last five decades there has been a sharp increase in urban groundwater consumption owing to the population explosion, unprecedented rise in standard of living, and enormous economic development. Climate change and associated enhanced climate variability have emerged as important factors to consider in water resource planning. There is a need to understand the nature of the city's water sources and the role the urban area plays on those sources particularly the groundwater systems. The key area of research is to explore links between flooding and groundwater for potential recharge from periodic floods. These issues will be explored in a groundwater dependent city of Lahore, Pakistan to help formulate a policy which takes into account climate change and population growth for sustainable groundwater development. The present study is based on the following two key hypotheses:
• Present climate change & development trends will render urban groundwater systems non-useful for human and urban industrial use under a do nothing scenario.
• Incorporation of global climate change impacts into urban water management will result in sustainable groundwater development

This paper provides an overview of Pakistan's water-related problems in an urban context and how environmental policies have failed to address water quality degradation. The urban water problems include droughts, floods, water pollution and deterioration of water-related ecosystems. The evolution of water law and policy to protect environment and its links with the urban water quality are explored. Environmental policies

which link urban, agricultural and industrial water cycle are important to help with the sustainable management of Lahore's water supplies. A possible improvement of city's sustainable water resources development plan is introduced which can cope with the groundwater degradation issues.

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1074 **Shadow analysis: employing landscape- and planning history in order to curb sprawl**

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This paper argues for the need to employ landscape- and planning history when searching for alternative strategies for how to handle peri-urban landscapes and sprawl within spatial planning. A method, called shadow analysis, is presented, followed by a case-study (in southernmost Sweden) illustrating the use of the method.

Aiming for an understanding of landscape as a process rather than as mere scenery, we have to acknowledge history as a source of knowledge about the future. Due to the inertia of the landscape, former decisions materialise in the landscape long after they have been approved. Hence, a landscape analysis need to include an examination of planning decisions which could have been out of date for decades, but still affect the landscape. Furthermore, Walker & Fortmann (2003) illustrate the imprints of the urban and rural ideals on the peri-urban landscape, as well as the fruitfulness of the humanistic landscape research tradition in which this paper is set. Rural and urban ideals become materialised through planning legislation and planning practice, which enables a continuing impact on the landscape for decades. In sum, the paper argues for a combined analysis of the legacies of planning as well as of the footprints of former landscape ideals in order to understand the contemporary character of peri-urban landscapes, defined as "superficially rural districts within the sphere of influence of adjacent urban centres … generally understood to comprise the zone of transition between the edge of the newest suburbs and the outer limits of the commuter belt" (Houston 2005, p 209).

The case study is performed in the region of Skåne, which is one of the most pertinent examples in Sweden of a landscape where rural-urban land-use conflicts and contested ideas of the future shape the land. National, regional and local planning decisions and discourses are analysed using documents and plans from the past 70 years. Regional green-structure planning (and green-structure development) is put in focus, which facilitates an analysis of the importance of the ideals of Rural and Urban, since green planning and nature protection has often been regarded as an antipode to urbanisation.

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1076 **Environmental Impact of Industrialization and Urban Growth in Puerto Rico since the 1950s**

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In the late 1940s the Puerto Rican economy changed significantly, transforming the Island from a rural, agrarian society to an urban, manufactured-based one. Operation Bootstraps industrialization strategy was developed as a tax holiday program aimed to attaining rapid economic growth and job creation through inward investment, mostly U.S, in export manufacturing. Much has been written about this development strategy and the economic and social gains it generated. Although analyses of the mixed results of this experience have pointed to the social and environmental costs of the progress achieved, little work has been conducted to document these effects.

Initially based on light manufacturing, Operation Bootstraps shifted to capital intensive, heavy industries (such as petrochemical, chemical especially pharmaceutical, electronics and electrical firms) in the early 1960s. This is the kind of manufacturing activity that imposes high demands on the use of energy, water and land. The location of industry adds to the intense use of natural resources, with clusters of contamination delineated by industrial agglomeration (JCA). Inadequate physical infrastructure and industrial waste disposal practices have aggravated pollution problems (Hunter and Arbona).

The economic drive of industrialization induced a process of accelerated urban growth. Between 1960 and 1980 urban population doubled due to heavy migration from rural areas, and most of the growth concentrated in the San Juan metropolitan area. Over 75% of the population now lives in urban areas. Urban development was

rapidly transformed into suburban sprawl. Massive expansion of subdivisions composed of single-housing units significantly changed patterns of land use especially in the coastal zone (Valdés-Pizzini), and the Island's landscape as well. What are the implications of this process of rapid urbanization and industrial development for a small tropical island of 8960 square kilometers and 4 million inhabitants?

This paper will explore the environmental impact of this process of economic and urban development. It will examine the nature and evolution of industrial pollution, especially water and hazardous waste problems, and review the consequences of urban sprawl. It will also discuss the role of planning and environmental regulation in this process.

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1077 **Urban infrastructure and environment in question: the different paradigms concerning sanitation that oriented the historical evolution of urban water management in Brazilian cities**

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The aim of contribution of this paper is discuss the different paradigms related to the notion of sanitation that oriented the historical evolution of water resources management and water supply and sanitation in Brazilian cities, and its consequences for environmental quality.
In most Brazilian cities the first water supply and sanitation systems were developed in the 19th century through concessions to private initiatives. The embryonic character of the State at that time and the limited technical development stage in Brazil explains the call for a foreign company. The development of water supply and sanitation systems were a reply to the adverse environmental conditions and to a catastrophic health situation, which struck various towns. Outbreaks of yellow fever, cholera and small pox were frequent, threatening the whole population irrespective of social class.
At this time, the notion of sanitation was comprehensive covering two different meanings: the first one, dominant through the medical knowledge, was associated with the control of diseases resulting from environmental conditions within a public health conception; a second meaning of sanitation was generalized by engineers, and corresponded to the idea of improve water and sanitation services and, at the same time, prepare the space for the urban expansion, through filling up flood areas, channeling rivers and swells control, elimination of risk areas like wetlands and ponds, which environmental conditions made potential sources to epidemics.
By the mid 1950's, in the field of engineering, the very concept of sanitation as the preparation of areas for urban occupation, built by sanitary engineers, begins to disappear. These actions become objects of observation and study of urban planning, involving other sectors and languages, such as of the architects, the sociologists, economists and urban planners. The engineers began dealing more directly with the planning and projecting of the infrastructure networks and equipments related to water supply and sanitary sewage, which yet become even more complex and sophisticated. A new concept of sanitation is built in the sphere of engineering, which can now be designated "basic sanitation". This concept refers exclusively to water supply services and to the collection and treatment of wastewater, unlike the broader concept of the previous period, when sanitation was associated with wider sanitary conditions for urban development and the integration of urban infrastructure.
In the 1990's, a new concept of sanitation linked to the idea of environmental quality has arisen: the concept of environmental sanitation, which now embraces the services of water supply, of sanitary sewerage, of rainwater drainage, garbage collection and disposal. The adoption of this concept is a fundamental step for the integration of different sectors concerning urban water management and for environment quality of cities.

1078 **Mediating Nature and Commerce on Toronto's Waterfront, 1833-1912**

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The establishment of permanent European settlement in Toronto was greatly influenced by the military significance of its protected harbour, a body of water sheltered from Lake Ontario by a sandbar that formed where the Don River met sediment-laden westerly lake currents. By the early 19th century, however, socio-economic benefits of the harbour superseded its military importance, as the settlement depended upon its harbour for clean water, waste disposal, and connections with regional markets of produce, fuel, and manufactured goods. As Sandford Fleming remarked, "To the unequalled excellence of this harbour … is principally due the rapid and uninterrupted progress in commerce and wealth of the western capital" (Fleming, 1853, p. 105). Port facilities and related land uses supported wealth accumulation and these required a static landform. But Toronto's waterfront was constantly changing due to interactions between the river and lake. Sediment deposited by the Don after heavy storms blocked navigation to several wharves, and westerly lake currents threatened to close the harbour's only entrance. As early as 1834, local officials called for "a permanent and scientific commission to prosecute works in their opinion so urgently called for to secure to the country the best yet most perishable harbour on Lake Ontario" (Canada, 1881, p. 3). This paper examines the

work of the harbour commission formed in 1850 to undertake such works. In particular, it explores the role of civil engineers as experts who advocated the large-scale manipulation of nature through dredging, dock wall construction, and the reclamation of a 'valueless' marsh to create property in response to a vision for the city that championed wealth creation often with unintended results. Stephen Bocking has demonstrated the rise of engineering expertise in Toronto after 1940, and the consequences of its close involvement with public agencies in the manipulation of the urban environment to achieve public goods largely defined by the private sector (Bocking, 2006). This paper discusses relationships between experts, political authorities, and economic interests during the 19th century through efforts to manage and 'improve' an increasingly unnatural harbour that culminated in the Waterfront Plan of 1912.

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1079 **From Air Fields to Green Fields: Reclaiming Airports for Urban Ecology in Toronto and Berlin**

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Air traffic contributes considerably to air pollution, and as a consequence the daily press and other news media have been warning of excessive carbon footprints and have been promoting carbon offsetting for some years. However, even the harshest criticism of our mobile and jet setting life styles has not prevented new airports from being constructed, old airports from being modernized and enlarged, and charter airlines from offering ever cheaper airfares, especially in Europe. At the same time, and as the result of new technologies and economies, changing political power structures, land use patterns and urban growth, as well as rising environmental awareness, many former military and commercial airports have been decommissioned. My paper will deal with this ubiquitous phenomenon in North America and Europe. Analyzing and discussing the reuse of decommissioned airports - and the cases of Downsview Park, Toronto, and Adlershof, Berlin in particular - I will pose the question of how aviation has influenced our use of the land and sparked environmental consciousness throughout the twentieth and into the twenty-first century.
First, I will examine the parallels between today's projects for decommissioned airports and the reclamation since the 1970s of a variety of brownfield sites including landfills, former industrial plants and military bases, undertaken by artists, engaged citizens and by professionals in the environmental planning, engineering and design disciplines. It seems that decommissioned airports can be added to the list of brownfield sites as a new category. Using the sites named above as examples, I will discuss whether redeveloped and re-imagined airports can be interpreted as a new park type. Can such parks be claimed as municipal, metropolitan, or even regional parks, and what are their functions? I will then investigate how increasing environmental awareness, new ecological and scientific research have influenced the design forms and strategies for the parks. Finally, I will show what ideas of nature and the environment have influenced the development of these areas and how far they differ from or resemble the ideas behind the first urban and regional parks in Europe and North America. By placing the two exemplary park undertakings with their individual planning and design ideas into their respective historical and contemporary social and political contexts, I will explore in how far they might appear as examples of a further global phenomenon caused by aviation.

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1082 **The Political Manipulation of the Iraqi 'Marsh Arab' Narrative**

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The Iraqis living in and on the edge of the Mesopotamian Marshlands in southern Iraq, the 'Marsh Arabs', have a unique culture closely adapted to their environment. They build reed structures on artificial islands built out of compressed reeds and earth with construction techniques that have remained consistent for thousands of years. The marshes, once the largest wetlands system in the Middle East and western Eurasia, began rapidly disappearing during the 1970s and 80s because of water competition and agricultural land reclamation. The Marsh Arab lifestyle was correspondingly vanishing, which was considered a normal, though generally undesirable, course of events in the international community. However, when the Marsh Arabs took part in the Shi'i rebellion against Saddam Hussein's regime in the aftermath of the 1991 Gulf War, Hussein retaliated by brutally crushing the rebels, nearly completing the destruction of the marshes, and displacing many Marsh Arabs into refugee camps. His actions transformed acceptable environmental destruction into a war crime with environmental victims. Prior to 1991 and Hussein's retaliation, the Marsh Arabs were simply a picturesque but primitive people, and their environment was just another swamp to drain. After 1991 the marsh dwellers developed a new relationship with their environment which altered the status of the issue. They became the marsh's anthropocentric anchor, a human aspect that changed otherwise acceptable actions into environmental

crimes with human victims. Without the marsh and the actions taken against it the Marsh Arabs were just another persecuted refugee population. Without the Marsh Arabs the marsh was just another at-risk wetlands or another battlefield unfortunately ruined by war. Put them together and you have what ecologist Robert Lawrence France terms 'ecocide:' "the purposeful destruction of an environment to bring about a deliberate genocide against a targeted people," and what many have described as the environmental crime of the century. As a result, Hussein's alleged ecocide in the Iraqi marshes was one of the reasons used to push for political and military action throughout the 1990s and to remove him from power in 2003. Similarly, the Marsh Arabs' post-war situation was also politicized. Their return to their marshes and marsh restoration are reasons used to justify the invasion and continued occupation, while those who opposed the invasion contend that the Marsh Arabs in particular and the Iraqis in general would not need this type of 'good news' story if it had not occurred. Complicating the issue, many marsh dwellers see the status quo as positive; a large part of the drained land is now cultivable, and farmers do not want their fields flooded for romantic ideals westerners are projecting onto their society. As the politicians debate what's good for them, not much concern is being given to what the Marsh Arabs would like to see happen to their own environment.

1083 **Changing With the Tide: Two Centuries of Water Diversion, Landscape Change, and Environmental Activism in California**

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California's water future faces a pair of contradictory realities: the pressures of increasing demand for water on the one hand, and the illusion of perpetual supply on the other. How has this dichotomy worked in the past, how does that history play itself out in the present, and to what can we expect it to lead in the future?

Northern California's San Francisco Bay has gained fame as a tourist's Arcadia, for its graceful bridges, Mediterranean climate and landscapes, and dramatic Wild West history. By contrast, Southern California has been mythologized for its transformation by Gilded-Age industrial capitalism from a water-starved desert into an urban jungle. Between the extremes of crooked water politics and the promises of Eden, California water history also tells an environmental story. This paper will examine two centuries of water diversion, landscape change, and legal activism within the major watersheds of the California water system. 75% of the state's surface water exists in the extreme northern part of the state, yet 80% of water needs originate in the state's explosively developing southern region. The resulting water system comprises more than 1,000 water conveyance structures—dams, reservoirs, canals, aqueducts, pipelines and power houses—operated by an equally large-scale maze of federal, state, local and conservation agencies. The whole creates a compact but complex system of water needs, conflicts, and solutions.

Dichotomies inherent in California's water system history derive from an uneasy combination of development, agriculture, and environmental concerns. San Francisco's powerful early twentieth century water lobby enabled the city to build a dam and aqueduct within protected Yosemite National Park. Today, lawmakers, politicians, and the public battle over the question of whether to tear the dam down, returning the watershed to its protected state. Farther north, as much as 80% of the Trinity River is diverted away from its own watershed into the Sacramento River drainage, destroying a once-famous salmon run. In 2008, state agencies refused to open salmon fishing season on several major rivers in California because of catastrophic fish deficits like those on the Trinity. Last year, the State was court-ordered to close its keystone pumping station on the California Aqueduct until pumping damage to eco-balancing smelt populations can be reversed. In reaction, farmers have begun a ground-pumping frenzy that threatens California's aquifers. In the south, recent efforts have required the City of Los Angeles to begin rewatering the Owens dry lakebed, a vast desert lake depleted by 100% diversion of its water into the Los Angeles Aqueduct in the early 20th century.

This paper will address two centuries of complex issues like these that have been debated throughout California water history. It offers a case study relevant not only to the American West but to all arid regions facing water crises in the new millennium.

1085 **Environmental History is "His Story" – A Case Study from the Southern Western Ghats**

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The Western Ghats in Peninsular India is one of the global hotspots of biodiversity (Myres et.al. 2000). Landscape based studies on environmental history and localized impact of man on the Western Ghats are scanty. The present paper is the result on an investigation on the environmental history of a Grama Panchayat (which is the basic unit of the Local Self Government Institutions- LSGI, in India) namely Keerampara Grama Panchayat (KGP) at the foothills of the Southern Western Ghats in Kerala. The extent of the area is only 35. 46 sq.km, its population >15000 and it harbours both man made and natural vegetation. The methodology employed, satellite imagery with ground truth verification, face to face interaction with elders in the area, followed by validation of the oral history (Gadgil, 1996).The study is limited from, the later half of the 19th century to the present. The KGP area experienced severe human interferences and resultant ecological modifications over the period. It underwent several phases of shifting cultivation during the 18th and 19th centuries (Bourdillon 1892). In 1895, the Malayattur forest division comprising 345 sq.miles, including KGP, was declared as the first forest reserve in the Travancore State, under the provisions of the 'Travancore Forest Act'. This area, at that time, consisted of Deciduous, Semi-deciduous, Dense ever green, Open evergreen and Secondary evergreen forests, had 10 villages with a population ranging from 5000-6000 people. There was daily rain from June to August (Velu Pillai, 1919), which is in contrast to, today's rain fall pattern. The Forest

Department initiated teak planting at KGP in 1942. According to their records, the area was a typical moist deciduous forest at that time. But we came across families, who had settled in KGP area before 1925. The old settlers conducted "Viruppu cultivation" (slash and burn agriculture), hunted animals and utilized the forest resources for their livelihood. The animals which underwent local extinction are Elephant, Tiger, Leopard, Sambar, Barking Deer, Nilgiri Lanugar, Common Languar, Giant Squirrel, Great Indian Hornbill, Crocodile and several species of fishes and Plants. Another interesting observation is that, several of the landscapes have names, which owes its origin either to biological or to cultural background linked with human observation or activity. The commissioning of the Periyar Valley Irrigation Project (PVIP) at Bhoothathankettu, west of KGP in 1963 caused the submergence of all low lying lands, and altered the landscape dynamics of the area. (Thomas et al. 2003). Environmental history combined with monitoring of the biota in any area help develop long term conservation strategies to over come the present extinction crisis.

1086 **Post-colonial Indian State and Indigenous Knowledge system in Arunachal Pradesh: A Case study of the Built Environment**

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Arunachal Pradesh, formerly known as North-East Frontier Agency [NEFA] is situated in the extreme northeastern part of India. It lies roughly between 26 0 28' to 290 30'N latitudes and 910 30' to 970 30'E longitudes with the total area of 83,743 Sq. kms. It is bounded by Bhutan in the west, China in the North and North-East [Tibet], and Myanmar in the East. There are as many as 26 major tribes and about 110 minor tribes that inhabit in this area. During 1950's the policy makers of the Indian State had to grapple with the question of national integration of NEFA with the 'mainstream' One of the most effective method of performing this task was by establishing cultural hegemony. One of the most prominent strategies adopted for exercising cultural hegemony was through 'appropriation' of tribal cultural practices. The development of the tribes along the lines of their 'tradition and genius' formed part of this appropriation. It was decided to 'protect' the indigenous knowledge system of the tribes of Arunachal Pradesh. The long association of the people of Arunachal Pradesh to their natural surroundings had given them an understanding of the value and use of the various natural resources. 'Local knowledge' was perceived to be significant from Conservation and sustainable development perspective. The protection of 'Built environment' formed an important agenda of this policy. 'Built environment' includes most aspects of the physical environment and especially the spheres of building, architecture and planning. Important social and religious elements in tribal life are reflected in a community's domestic buildings and usually symbolically expressed in their design and decoration. The indigenous construction technology and materials of the house take care of the predominant physical features of the land including seismic factor. The rituals performed in different stages of construction, the seasons of collecting raw materials, direction of house, etc. are significant from the point of the maintenance of ecosystem. Therefore, the policy makers agreed to adapt 'some of the attractive features of the local tribal construction"' in the designs of the public buildings. It was accepted in principle that building should "grow out of the landscape". The use of "brick and mortar" buildings was cautioned against. However, after the Indian debacle in Sino-Indian border conflict in 1962, and the demise of Nehru and Elwin in 1964, the 'protectionist' policy was gradually abandoned. The exercise of cultural hegemony now took a different direction. Now onwards less attention was paid to the 'appropriation' of tribal culture and more on exercising the 'mainstream' cultural hegemony. This led to the influx of 'alien' cultural practices, thereby to the erosion of indigenous knowledge systems leading to environmental degradation.

1087 **Forest, community and hyderabad state: A study in environmental history**

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Hyderabad state had 9361 square miles of reserved and protected forest. It had another 8387 sq .miles of unprotected forest. 29.1% in Telangana and 3.4% of territory in Maratwada region was under forests. However the best forests in the state were in the hands of Jagirdars and Banjardars on long leases or occupation. Administrative and Forest department reports of the Nizams Dominions mention that 36% of reserved forest was under jagirs, agrahars, maktas, ijaras banjars shows the nature of forest occupation converting government forests into private forests.

Gonds, Kolams, Chenchus, Konda Reddys, Raja Gonds, Bhils, Koyas were the important tribes living in the forests. They speak their own language. They were taking to timber and bamboo felling besides their traditional professions like podu cultivation, toddy tapping and collection of forest products .The forest based tribal communities, mostly in Telangana, their ethnic and socio-economic conditions and their inter-face with the modern society can be better understood if the forest policy and changes in the management practices are examined.

Though forest department was created in 1867 but protection and disposal of valuable timber was its major concern till 1890. Between 1911 and 1948 systematic development of the forests was on the priority of the state. But organized exploitation and demarcation of forest areas displaced or affected the tribal communities and people of the neighborhood.

Feudal and timber merchants had only commercial interests. The corrupt practices of the forest staff, illicit felling, paramount power's interest in the forests of the native states, affected the local population and denied access to the forest products. Therefore the tribals groaned when their traditional rights have been snatched away by the corrupt system by stating:

"Forest department is the biggest enemy, Entire forest was shelter and a source of income to people, They cut the forests in the unjustified manner …by killing people, is it the way to earn money?"

Traditionally the control of the tribal communities over forests has been recognized as unquestionable right. There was no commercial attitude and rulers tried to make friendship with tribal chieftains and encouraged pastoralism in the forests. In fact the state recognized the moral legitimacy and claims of the local people. Friction between forest department and peasants and tribals for control of forests for grazing, fuel, timber increased in the modern period.

Construction of the irrigation projects, extension of cultivation and colonization scheme to invite private enterprise created a new situation in the rural social and cultural life. Clash between the commercial and irrigational needs of the state and the customary rights of the local communities created new tensions. Under the new situation tribals provided shelter to the smugglers initially and later to the extremists.

Commercial outlook of the State towards forests had far reaching implications on the tribal communities and environmental concerns. This paper will examine the changing scenario vis-à-vis the forests, environment, communities and the state in the management of forests and their implications in Hyderabad state.

1088 **Women, environment and the construction of past: Oral histories from rural Western India**

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To understand the dialogue between the past and present it is essential to study how various sections of the society construct their own past. The perception of the rural women of their own past will be crucial in understanding the environmental landscape histories. It will play an important role in making the position of environmental history more political than it was. Using the framework of experience as text the present paper seeks to explore the sense of past of the rural women in Western India.

The paper comments on the role of the established history in shaping the women's idea of history, the contribution of day to day interaction with the environment in the making of their memories. The paper also investigates how in the historical context class and caste categories have influenced their relation with the environment. Operating in the caste, class and gendered realities of Indian society it is important to understand how public and private spheres of the rural women are constructed and the way they perceive it. The paper will emphasize the role of environmental factors in constituting these life spheres. This construction of landscape histories through the orality of the rural women and situating them in the socio-historical context will be crucial to the understanding of environmental history and the politics of modernity in India.

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1089 **Floods, local economy and the state in bengal c. 1770-1820**

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The early colonial state under the East India Company in Bengal (1758-1820) had an awareness regarding flooding of rivers, but only in relation to its immediate revenue position. This awareness was translated into more comprehensive policies after 1840, as authors of the book "Nature and the Orient" (1) have noted, but till then the state sought to minimize its risk and maximize its gains through an annual cycle of resource mobilization that involved deployment of labour, periodic financial assistance and periodic maintenance of embankments.

I will try to probe as to how the state addressed the issue of regulation of the 'desirable' flow of water in an area that was highly profitable for commercial investment and productive of food crops. This was in a part of central Bengal, where the principal north Indian river - the Ganga - makes a bend in the south eastern direction and flows into eastern Bengal. Here a number of rivers originate – to name a few: Bhagirathi, Jalangi and Baral. These rivers had considerable navigational importance for internal and external trade, and flooded the adjoining plains which grew mulberry and grain.

I have selected this area because of its specific importance in the decisions of the early colonial state regarding embankment management. With regard to the Baral river embankments (1773)(2) that we had noticed a serious divergence in perspective and approach towards river channel management noting that the final decision makers had put their weight behind embankment maintenance in a rather traditional way, ignoring other methods suggested by local engineers that could have been experimented fruitfully. But by 1819 the Baral embankments were given up (3), followed by a trail of events in government decisions and policies and by 1846 embankments were marked out as the major evil in Bengal’s history of floods and a committee recommended their total abolition (4).

Flooding of the plains was an annual possibility, caused by a combination of non-local and local events – heavy rainfall in the catchments or in the middle course, a consequent rise in water levels, combined with greater velocity of the current or water flow caused by change in gradient due to silting of parts of the river. A smaller breach at an inopportune moment would mean floods after monsoon, interrupting and injuring the cultivation process seriously – an annual apprehension of the early colonial state. But the consequent flood could also carry at the head of it quantities of silt beneficial for cultivation. Therefore there was an attempt to reckon with pros and the cons of flooding in terms of when and where exactly it would take place (5).

This was the approach of the state till the permanent settlement (1793) and in the next few decades the state decisions veered around the idea that embankments were the major cause behind disastrous floods. Still, it is difficult to ascertain, as to what extent such floods were triggered by non-local phenomena that could have been described as "spontaneous" (as in Ayutthya in central Thailand) (5).

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1090 **Domesticating the hill stations of colonial India; prospects and predicaments**

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The highland sanatoria or the hill stations of colonial India remained subject to a different sort of intervention. The British endeavor to confine these hill stations within the aesthetic preferences of British landscape traditions created conditions for a large-scale transformation of the natural world in accordance with a British image of romantic nature. This zeal to redesign the hill stations not only caused a quick degradation of the existing environment but also threatened the ecological balance there. Though in the natural world of the hills, colonial scheme of invention, alteration and conservation was premeditated in a close resemblance with the cultural expectations of the British but commercial sentiments and an ever increasing pressure on the environment particularly after the entry of a numbers of European sojourners gradually spoiled the very impulse of an aesthetic world they wished it to be. As soon as the entire world of forestry, vegetation and the flora and fauna of the hill stations became open to colonial experiments, the existing environment of the hills came under a crisis of identifying itself with the exclusive changes it never had accustomed with. This paper is an attempt to investigate that to a) what extent the British imposition of aesthetic preferences misbalanced the environmental norms in the colonial hill stations, b) how did the changes influence the colonial policy making process in later years and c) in what way these new developments changed the very fate of the renowned hill stations like Darjeeling, Simla, Shillong, Ootacamund etc.

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1091 **A Sociological exploration of Energy Resources in Early Modern Rajasthan**

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A Sociological exploration of Energy Resources in Early Modern Rajasthan
'Between the fifteenth and eighteenth centuries, man had at his disposal his own strength and that of his domestic animals; he also had the wind, running water, wood, charcoal and coal – varied but still only modest sources of energy.'
Present paper will explore the complex processes of appropriation and consumption of energy in the semi-arid and arid regions of Rajasthan during the early modern period. More specifically it shall examine the inter-linkages between the socio-political structure and the consumption pattern of energy resources. By focusing upon human, animal, water, forest, agriculture, etc. as sources of energy to explore the nature of consumption, paper proposes to examine complex web of politico-economic setup blended in the larger social structure. An exploration of social stratification shall be attempted to identify the patterns of energy consumption among various strata of the society mediated by ecological niches.

It shall also interrogate socio-religious considerations influencing the consumption pattern. As the temporal boundaries of the proposed paper also witnessed growth of money economy, a preliminary investigation on the impact on the consumption patterns shall also be attempt. Though changes in the demand for energy resource can be deciphered during early modern times, there seems to continuity in the larger socio-political set-up. A system where social stratification ensured greater access and demand on the part of ruling elite and lower sections of society were left with or could access only bare minimum amenities of life. For the Mughal Empire it has been calculated, 'that the 445 of the higher mansabdars controlled over 61 per cent of the revenue income of the empire', obviously greater consumption. Where as describing the conditions of peasantry, Francisco Pelsaert writes that, 'their houses were built of mud with thatched roofs. Furniture there is little or none except some earthen pots to hold water and for cooking and two beds... Their bed clothes are scanty, merely a sheet or perhaps two, serving both as under and over sheet; this is sufficient in the hot weather, but the bitter cold nights are miserable indeed, and they try to keep warm over little cow-dung fires which are lit outside the doors.' In agrarian economies of early modern India, the socio-political subordination and economic exploitation particularly at the lower levels left them often between a state of survival and extinction shall be examined to comment on the nature of polity which manipulated access to resources.

1093 **Environmental Colonialism?: Environmental Protest and Logging in Clayoquot Sound, British Columbia**

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During the summer of 1993 through to the fall of 1994 one of the most popular and sustained environmental protests in Canadian history took place the Pacific Northwest Coast. Clayoquot Sound gained its fame when the provincial government granted a logging company the right to clear-cut much of the area in the 1980s. (Dorst and Young, 1990) Yet while protesters captivated audiences from around the globe, the local Indigenous Population – the Nuu-chah-nulth – received fairly limited attention. The Nuu-chah-nulth did, indeed, play an important role in the protests, and, as residents of the Sound for millennia, had, arguably, much more at stake. Nonetheless, media sources placed environmentalists at the newsroom's centre stage, and non-Aboriginal protestors were content to speak for their Aboriginal allies.
Nonetheless, the Nuu-chah-nulth successfully negotiated with the government to receive limited control over the Sound. While environmentalists proclaimed to support and respect the Nuu-chah-nulth's claims to sovereignty over their traditional territories during the Clayoquot protests, environmentalist support quickly turned to condemnation when the Nuu-chah-nulth exercised their right to conduct limited logging activities. Even more interesting is the fact that the Nuu-chah-nuulth partnered with industrial lumber giant MacMillan-Bloedel. Environmentalists believed an important ally had betrayed them. Despite the large body of literature surrounding Clayoquot, the issues briefly outlined above have been overshadowed by discourses of environmentalism.(See, for examples of this, Berman et. al, 1994; Magnusson and Shaw, 2003) Nor, it needs to be stressed, is this trend of ignoring environmentalist-Aboriginal conflict one limited to the Pacific Northwest Coast; it is rife among works in environmental history and other fields. (Krech, 1999; Zarsky, 2002)
Thus, my presentation will explore the complex and yet untold history of the relationships among environmentalists, the Nuu-chah-nulth, and industry at Clayoquot. The environmental movement has, in many cases, provided much needed support for Aboriginal Peoples whose land is often exploited by governments still working within a colonial mindset that often favours industrial development, and that this environmentalist-Aboriginal relationship existed during and even for some time prior to the Clayoquot Sound controversy of the early 1990s. At the same time, however, some environmentalist discourse has appeared frighteningly similar to neo-colonialism. If environmentalists truly respect Aboriginal Peoples' claims to their lands, then the historic relationships between them need to be critically reappraised; Clayoquot Sound, as a nexus for the relationships and historiography alluded to above, provides a vital starting point for such an endeavor.

1094 **Indigeneity meets Industrialism: Contrasting and Colliding Views of a Canadian northern territory, 1870-1930**

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Using the rivers in northern Ontario, as the point of focus, this paper will examine the roles played by federal and provincial government surveyors as agents of industrial capitalism in transforming Cree and Anishnabe homelands into natural resource hinterlands. This paper will also examine the resistance offered by these First Nations to this process of transformation.
Canada's river systems are fundamental to its national development, politically, economically and culturally, as demonstrated by the early work of historians in Canada such as Donald Creighton in his The Commercial Empire of the St. Lawrence (1937) and H.A. Innis's work on the Canadian fur trade (1962). While the federal and provincial governments viewed northern rivers as access routes to industrial wealth, for Canada's First Nations, rivers represented the "veins of Mother Earth;" they were her circulatory system and source of life. As a result, as demonstrated by James Waldram's As Long as the Rivers Run, (1988) and others, rivers and their associated values to local Native and metropolitan settler governments became contested terrains, particularly during the latter half of the twentieth century. Rivers are pivotal to this particular study as it was the rivers which gave surveyors initial access to the northlands, for they travelled through the country in canoes. These individuals then mapped and plotted, reported on and imaged the rivers. In so doing, they made the northern "wastelands," as non-native developers had labelled them, attractive to industry by reporting on hydro-electric, timber and mineral resources. In so doing, the surveyors acted as the vanguard of settler governments who sought to obtain control over Aboriginal homelands and use them as resource hinterlands. Rivers also played a pivotal role in First Nations' resistance to industrialism for they used the rivers for their own purposes and

claimed the lands through which they flowed. As a result, the First Nations imposed constraints upon industrial expansion, including the need to negotiate treaties with them, but were thus subject to colonialism, a process of intrusion and control that left them marginalized within Canada. (Morantz, 2001) Consequently, this study of rivers in northern Ontario will provide a case study of the process of colonization of a landscape by specific national and international capitalist forces, namely technocrats, (Piper and Sandlos, 2007) and the resistance offered to them by local indigenous peoples.

1097 **The Battle for the Fringe: Culture and Nature in an Interior Borderland**

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Western Canada is known as the 'breadbasket of the world.' Photographs of the region invariably show an astonishing sunset over treeless prairies framing a golden field of wheat. But there is "another country altogether"[Waiser, Saskatchewan: A New History, 2005]: the interior north, with its rocks, lakes, and brooding boreal forest. These two ecozones -- forest and prairie -- have almost completely separate economic livelihoods and cultural expectations, leaving the Canadian western interior deeply divided. This paper interrogates these two solitudes at their point of contact: the forest fringe. The fringe is both a natural divide between ecozones and a cultural construction, a borderland between two very different ways of life.

International researchers, particularly scientists, have long been interested in the economic and physical dynamics of forest fringe regions. Scholars have examined fringe regions of the Phillipines, Australia, and West Central Africa in recent studies [Overmars and Verberg, 2005; McGuinness, 1997; Parmentier 2003]. The Canadian forest fringe has received less study, and little from a cultural perspective. A recent exception is J. David Wood?s problematic Places of Last Resort [2006], hampered by its narrow agricultural focus.

This paper focuses on the Canadian fringe's most obvious physical characteristic: the trees. The tree-line divides forest from prairie, north from south, resource from agriculture, 'wilderness' from 'civilization.' Using the techniques of microhistory/local history on the edge of Prince Albert National Park in the heart of this interior borderland, this paper questions the natural, the economic, and the cultural role of trees. Prairie and forest fires destroyed and created new boundaries between the ecosystems. The advent of forestry and the growth of pulp and paper mills, followed by large-scale agriculture pushing from the prairies into the forest fringe, further transformed this border region as trees became both crop and weeds. But the forces that removed the trees were no less powerful than the forces that insisted on keeping them. The tourism industry; local First Nations and homesteader's subsistence economics used the trees for shelter, sustenance, and beauty. Now, environmentalists promote 'green capital' and forest re-establishment while much of the local economy still hinges on the pulp and paper industry. The battle for the trees still rages.

This story has broad international resonances. The changing values, physical transformations, and cultural constructions in this borderland region throughout its history offers a dynamic view of the intersection of place, perception, and human life at the point where ecosystems meet. The ultimate question is, where does one ecoysystem end, and another begin?

1098 **"'Paddle to the Sea': The United States and Canada Confront the Environmental Consequences of Incorporating the Great Lakes into a Worldwide Maritime Navigation System"**

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Canada and the United States share four of the five Great Lakes, Ontario, Erie, Huron, and Superior, which straddle 1,900 kilometers (1,187 miles) of the border between the two nations. Lake Michigan is contained entirely within the United States. The five Great Lakes form a vast interconnected system with a comparatively small drainage basin and one natural outlet to the Atlantic Ocean through the St. Lawrence River. The Great Lakes system is overlain by a complex political jurisdiction, which includes two nations, one Canadian province, eight American States, and numerous cities and towns.
During the twentieth century, Americans and Canadians re-engineered the once-isolated Great Lakes to become part of a global, maritime navigation system. Freighters and recreational vessels enter and leave the lakes via the St. Lawrence Seaway and the Atlantic Ocean; they bypass Niagara Falls by using the Canadian-built Welland Canal; at Sault Ste. Marie, locks with 305 meter (1000-foot) chambers permit passage between Lakes Huron and Superior; and the Chicago Sanitary and Ship Canal provides access to the Mississippi River system in the United States, as well as the Gulf of Mexico. These navigational developments produced significant, largely unintended and unanticipated environmental consequences, which have challenged Canada and the United States to jointly manage and regulate the Great Lakes. Key among the inter-related environmental consequences of incorporating Great Lakes into a world wide transportation system are water quality, migration of exotic species, and fluctuation of water levels in the lakes.
This paper will provide an overview of Canadian/American efforts to develop the Great Lakes for navigation during the twentieth century. It will analyze the joint efforts of the two nations to regulate, limit, mitigate, and control the environmental consequences of that development in the inter-related areas of water quality, migration of exotic species, and lake levels. At least in the twentieth century, Canada and the United States have shared a peaceful border; yet, the cross-border challenges of jointly regulating these complicated and inter-connected issues has proven difficult. Navigation with its potential for economic growth and its companion environmental impacts not only is significant in Canadian/American relations but also has world wide connections and implications. The paper will be based on original, primary research conducted by the author in repositories in repositories in Canada and the United States.

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1100 **An inter-continental comparison between the environmental histories of two lake catchment sytems in montane environments of France and South West China.**

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This paper puts forward an argument for the potential of conducting inter-continental comparisons between the environmental histories of discrete lake catchment systems in montane environments. In this paper examples of such systems are taken from the 'foothills' of France and South West China. The paper highlights broad differences in 'regional geography' but also explores a more 'complex' comparison drawn from aspects of each locations environmental history. Cultural variations in farming strategies are presented to illustrate unique adaptations and innovations in these systems. Elsewhere it is argued that more or less constant modes of action towards the environment are found in montane water-control systems. These to some extent show up the constraints imposed by 'nature' on the range of viable cultural variation. The paper then examines and contrasts the spatial and temporal characteristics of environmental hazards in both lake catchment systems to illustrate how similar environmental problems can result from independent causes. Finally the relevance of these tentative findings are applied to current Mountain policy in these regions.

1101 **Amazon Rainforest Environmental History**

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The Amazon River Basin has experienced human presence for millennia without irreversible damage to the environment, a situation that ended in the midst of the 20th Century. According to Gaspar de Carvajal (1542) and Rojas reports (1638), Catholic priests that have authored some of the earlier European descriptions of explorations to the Amazon River, whilst several River margin tracts were uninhabited and covered by an impenetrable forest, others displayed mushrooming Indian settlements, usually located on fluvial islands where maize and cassava were grown in quantity (Maderuelo 2002). Estimates revealed that in the 16th Century there were about 2 million islanders along the middle and lower River course floodplains, a population density of 14 residents per square kilometre, whereas around 98% of the Amazon rainforest was scarcely populated by itinerant tribes (Meggers 1977).
Following the Second World War, transportation networks were designed and implemented all over Brazil and thus both the forest and the river margin areas started having a number of ecological problems. The first road connection built through the rainforest was Belen-Brasilia, conceived during Kubitschek mandate (1956-61), a president recognised for having moved the capital city from Rio de Janeiro to Brasilia (Madaleno 1996). During the 1970's, the road opening process was accompanied with internal colonisation movements and the creation of development poles, and continued during the 1980's with extractive and heavy-industry projects, supported by hydro plants. Overgrazing, over cultivation and deforestation were the outcomes and the main sources of environmental stress.
Favoured by government subsidies, aimed at commodities production enhancement and exportation, in particular beef, minerals and soybeans, the 1990's experienced a soy boom (Motta 1996). Heat resistant species of grain have been developed ever since leading to farming migration northwards, as soil in southern and central Brazilian states becomes scarce and expensive. The process is dramatic along Cuiabá-Santarém road, where a synoptic view using remote sensing permits to make a good Amazon deforestation assessment. The paper case studies the historical relationship established between Caboclo communities and their environment along Amazon River floodplains, using field research initiated in Belen (1998) and recently completed at Santarém municipality (2007), contrasting ancestral multi-functional ways of life with recent depredatory farming formulas.

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1102 **Land cover change and living conditions in colombia**

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This paper attempts a quantitative approach to vegetation cover change as an indicator of environmental (ecosystems) conditions in Colombia and to cover change relations with living conditions (poverty, violence and population trends, mainly migrations). History of main land cover change processes is analyzed, in order to

identify major driving forces of ecosystem transformations. A historically based explanation to changes is proposed. Basing on SIG overlying of maps, remaining natural vegetation cover in Colombia and its distribution in biomes, bio geographic regions, river basins and municipalities is studied. About 38% of Colombia's forest and other dense vegetation cover have been replaced mainly by pastures as a consequence of human disturbance. Transformation is not even in all regions; while only 13% Colombian Amazonia is deforested, up to 86% Caribbean dry vegetations and 60% Andean vegetations are transformed. 47% of municipalities have no significant remaining vegetation; 45% of river basins keep less than 30%; most populated areas are largely affected. Nevertheless, Colombia should be considered a well preserved country, comparing with Earth's 72% terrestrial ecosystems transformation and an important place for conservation. Empirical approaches basing on poverty, violence, economical and population indices suggest strong correlations with land cover change indices. History of cover changes reveals a strong role of economy as a driving force, but not enough to explain apparently unnecessary destruction of forests and its resources. Further explanations should be looked for in social and power fights and also, very important, in social representations of tropical nature as an enemy. Basing on historical relations between land (and natural resources) availability and labor scarcity, a hypothesis is proposed: change is supposed to be, at least in part, a result of social fights to control peoples labor force, the scarcest resource in natural resource abundant tropical America. Deforestation and resource destruction is one into a group of strategies to control nature and people. Nowadays, inequality, poverty, violence, internal migrations, coca and poppy plantation affecting Colombia keep relation with historical environmental damage.

1103 **"The First Green Revolution: How Chile and Peru Fertilized Global Agricultural Expansion, 1845-1930"**

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To many of us, the term "Green Revolution" brings to mind the controversial array of programs and polices that brought high-yield seeds, intensive irrigation techniques, agricultural mechanization, pesticides, and petrochemical fertilizers to parts of the developing world during the second half of the Twentieth Century. One of the most profound consequences of this so-called "revolution" was an increase in the amount of nitrogen available to farmers throughout the world. Through the application of imported nitrogen fertilizers, these cultivators overcame – at least temporarily – a crucial obstacle to achieving higher yields of basic crops such as corn, rice, and wheat. Historians and scientists have often portrayed this twentieth-century intervention in world food production as the first large-scale human alteration of the global nitrogen cycle.
Such a depiction is misleading because it obscures an earlier Green Revolution. Between 1845 and 1930 Peru and Chile exported millions of tons of nitrogen-rich guano and sodium nitrate from a remote and rainless region of South America's west coast to places as far flung as California, Prussia, and Great Britain. For North American and European farmers, guano and sodium nitrate facilitated the remediation of soil that had been subjected to years of intensive cultivation. These two South American fertilizers also provided the necessary nutrient subsidy to underwrite experiments in new areas of cultivation, such as citriculture, viticulture, and sugar beet cultivation. In addition, agriculturalists adopted guano and sodium nitrate as potent symbols of progressive farming practices informed by the nineteenth-century revolution in soil chemistry.
This unprecedented human intervention in the nitrogen cycle occurred during a period of worldwide social and economic upheaval. As the global slave trade came to an end, new systems of labor exploitation arose to fill its place. In the case of the nitrogen fertilizer trade, forms of indentured servitude and debt peonage met the labor needs of the expanding capitalist world economy. In this era prior to the full-scale mechanization of mineral extraction, Peru and Chile met the tremendous labor requirements of guano and sodium nitrate mining through the exploitation of workers who were neither slaves nor freemen. Just as nitrogen-rich compounds provided Europe and North America with an indispensable nutrient subsidy during the later phases of the Industrial Revolution, indentured laborers from around the world supplied the raw power that underwrote this large-scale transformation of the nitrogen trade. In this paper, I employ both environmental and labor history to connect the changing nature of work to the work of changing nature. In doing so, I hope to suggest new ways of looking at world environmental history in the context of global transformations and transnational connections.

1104 **Fashion Hats, Beautiful Birds, Natural Consequences: the Influence of the International Trade of Feathers in Colombia's Social and Natural Environment**

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At the end of the nineteenth century an enormous international trade of birds and feathers flourished, driven by new fashion trends in Europe and the United States. Adorning one's head with the plumage, and sometimes whole bodies of birds, became the vogue of upper and middle-class women. Millions of bird skins from places as different as New Guinea, Egypt or South America were sent each year to milliners in New York, London and Paris to supply this latest craze. This story is certainly not new to American environmental historians. After all, one of the big success stories of American conservation took place when the U.S. government prohibited this trade of birds with commercial purposes, siding with conservationists that lobbied strongly to protect their winged friends from possible extinction. However, we have yet to understand how the traffic of birds and its eventual ban shaped relationships to nature in the countries that supplied the millinery trade. What were the local conditions in which birds were extracted and what can the feather trade tell us about changing valuations of nature in these countries?
Taking into account recent literature on Latin American environmental history as well as new trends in commodity history, this paper recreates the story of Colombia in the international feather trade. Colombians hunted and distributed millions of birds overseas at the turn of the twentieth century. I argue that this vast commodification of birds brought different dynamics to the way in which Colombians—and

Americans—perceived nature. Debates around the importance of wildlife preservation for the moral and economic well being of the country, contrasted with views about the apparent endless natural resources Colombians had the right to exploit. For a native hunter or a peasant in the region of Arauca—a poor and peripheral region in Colombia—a snowy egret had a completely different meaning than to a politician or a naturalist based in Bogotá, the country's capital. At the same time, a commercial collector perceived a hummingbird in a different way than a conservationist in Boston or a wealthy woman in New York City. Analyzing the relation between birds as commodities and the interactions of the different people that became associated with the feather trade proves important to understand not only the influence of power relations in Colombian constructions of nature and wilderness, but also the problematic around environmental protection in Latin American history at large.

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1105 **Naturalists of Zanzibar: Caleb Cooke and Robert Lambert Playfair in a 19th-Century Fish Tale**

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During the mid-nineteenth century, European and American naturalists began to visit the east coast of Africa in search of plant and animal specimens to send home to museums. Zanzibar, the political and economic center of the region, became something of a hub for these naturalists, several of them living on the island for years at a time. This paper follows the divergent scientific fortunes of two of these naturalists. Caleb Cooke of Salem, Massachusetts, arrived in Zanzibar on orders from his mentor Louis Agassiz, and spent several years eking out a precarious existence with little funding, little equipment and low social standing. Between daydreams of purchasing a boat and exploring the marine life of the island, Cooke vented his anger at being far from home during a time of civil war. Meanwhile, the British political representative on the island, Robert Lambert Playfair, happily drew on his superior social standing, expensive equipment, and scientific connections to build an impressive collection of East African fish specimens. Playfair's collection quickly found its way to publication in the well-received "Fishes of Zanzibar" (1866). The differing results obtained by Cooke and Playfair offer insight into the social and political realities of scientific production in "remote" (i.e. non-western) parts of the world.

1108 **Of Rocks and Reindeer: Making Sense of State-Socialist Modernization and the Environment**

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This paper will concentrate on two examples of economic transformation of the environment to elucidate nature use by modernizing state-socialist regimes. The reindeer economy and the mining and processing industry on the Kola Peninsula in northwest Russia underwent dramatic change during the Soviet Union. For comparative purposes they served as polar opposites in terms of what the state defined as the most "traditional" and "backward" economic activity and the most "modern" and "developed" one. They can help reveal the divergent prestige afforded to living and non-living natural resources, the levels of intrusion into how agricultural and industrial labors handled the environment, the extent to which conservation concerns could be addressed by these industries, and the general character of state-socialism's transformative vision toward the natural world. Together these two industries can deepen our understanding of how socialist states approached the environment beyond a trite emphasis on their harmful legacy.

The reindeer economy on the Kola Peninsula has existed for centuries, but the emergence of large-scale reindeer herding occurred only in the late nineteenth century and was inextricably linked to the migration of a group of Komi to the region. Unlike their relatives in the rest of northern Europe, Kola Sami, along with the Russian Pomors, had mostly hunted reindeer and kept small groups of draft animals. The Soviet approach to transforming Kola reindeer herding involved a confluence of enlightenment campaigns, nationality politics, efforts to control and regulate space, the use of agricultural science to increase herd size unsustainably, conservation areas for wild reindeer, and the mixed definition of this type of nature use as both traditional and modern.

The mineral-based economy in the region stands in sharp contrast in that many of the first discoveries of deposits, let alone systematic geological surveying, took place under Soviet auspices. As opposed to the campaign to redefine an older practice as modern and socialist, the development of mining and processing on the Kola Peninsula involved an attempt to create both a new socialist civilization and ecosystem, which was made up of a series of new urbanized industry-towns that began to appear in the 1930s. The story of Kirovsk and its combine Apatit (primarily producing phosphorous material for fertilizer), Monchegorsk and its nickel and copper enterprise Severonikel, and the post-second world war reconstruction of the nickel operations at Pechenganikel reveal the contours of the creation of a new state-socialist environment in the far north.

1109 **Taboo, Hunter Philosophy, and Land Ethics in Taiwanese Indigenous Fiction**

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Enforcement of environmental reservation rules in the indigenous traditional homelands has been a controversial issue that involves contested perspectives on sovereignty rights, cultural values, and environmental ethics. What is foregrounded in the debates and discussions in this paper is the respect for ethnic differences in environmental ethics. I intend to discuss on the taboo, hunter philosophy, and land ethics as revealed in two representative, award-winning Taiwan indigenous writers' works--Ahronglong Sakinu's The Sage Hunter (1998), and The Wind Walker (2005), and Neqou Soqluman's Palisa Tongku Saveq (2008). Through chronicling the hunter's acquaintance with, recognition by, and responsibility to the animals, the land, the water, and the wind, the Paiwan writer, Sakinu envisions a hunter's school, abundant with ethno-ecological wisdom. Bunun writer, Neqou Soqluman reweaves the myths, legends, and taboos around Kalibuan, into a fantasy with detailed geographical, linguistic references to the Bunun lived environment.
Different from the Native American counterparts, the Taiwan indigenes show a comparatively amiable attitude toward the dominating socio-political power, and a genuine willingness to translate their tribal taboos, customs, wisdom, and philosophy into the languages of their ethnic Other—Chinese and Taiwanese. What emerge from such an ethno-ecological translation are the beauty of "translating with the other" and the power of land-based imagination. In examining the diverse cultural translations of ethno-ecology between Taiwan indigenes and Native Americans, this paper envision both a negotiation with different principles for sustainable practices and a critical reflection on globalization and its encroachments on environments.

1111 **Distant powers and socio-environmental processes in mountain forests and logging towns - The case of Taipingshan, Taiwan**

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Taipingshan (or Taiping Mountain) was one of Taiwan's three largest forest production districts during the period of Japanese colonial rule on the island (1895-1945). A logging town, Lou-Dong, was formed by forest company employees beginning from 1915 and has expanded since then to become one of the major towns in the area. After 70 years of logging (1915-1985), a new forest law was passed that prohibited timbering and called for the transformation of the forest lands into forest recreation areas. In this paper we analyze the historical-political ecology of the transformation of Taipingshan and surrounding mountains, forests and logging towns. The analysis focuses on ecologically unequal exchange brought about by distant powers for the extraction of resources and production for distant markets especially during the colonial era. After the new forest law, the domestic wood market became another source of distant power to other resource extraction areas elsewhere. On the other hand, investments in reforestation and logging towns have strengthened the local economy. This paper illustrates the socio-environmental processes in the area with analyses of distant powers, ecologically unequal exchanges, landesque capital and landscape changes.

Keywords: forest, socio-environmental processes, ecologically unequal exchange, landesque capital, distant power

1112 **Making sense of the 'Rabbit Acts': An exploration of the efficacy of historic law in controlling an environmental catastrophe**

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In Australia, environmental historians emphasise the importance of post-European land-use history, especially the influence of historic law as it affected settlement and landscape change. This paper explores the effects of the law on what some historians have described as catastrophic and as 'one of the world's [most] significant ecological events' (Ratcliffe 1959, p.545). The European rabbit (Oryctolagus cuniculus) was introduced to Australia in the nineteenth century. What followed was unprecedented environmental degradation. During plagues, rabbits consumed seedlings and ringbarked trees and shrubs. The effects exacerbated already existing problems of soil and vegetation degradation (Lines 1991). However, even authoritative accounts of rabbits in Australia deliberately avoid the 'Rabbit Acts' admitting being overwhelmed by the 'maze of legislation' and the 'sheer amount of verbiage' (see Coman 1999, and Rolls 1969). Instead, they have concentrated their efforts on the ways the laws were implemented, enforced and litigated. Finn (2003, p.56), makes the point that, when assessing legal developments, some historians 'suffer from a lack of judgement bordering on hyperbole'.

This paper will argue that a failure by historians to confront the statutes themselves overlooks the complexity created by gratuitous obscurity, ambiguity and errors in the legislation. To determine the efficacy of the 'Rabbit Acts' this paper traces their development and explores six environmental history postulates for the failure of the Acts to suppress rabbits: 1) the dominance of centralised government; 2) the timing of the legislation; 3) differences in the regulatory treatment of pest species; 4) the agendas of the major protagonists; 5) the lack of inter-departmental coordination; and 6) changes in legal terminology.

The paper concludes that although all five contributed to the escalating degradation, conflicting laws with unwieldy and complicated sections, fatal weaknesses and loopholes, challenges the importance of the law as an effective means of environmental control. The paper concludes by suggesting that a different approach to interpreting land-use history is warranted.

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1113 **Conceiving Fairways: Golf Course Development and Transforming Land Use in Northeastern North American in the 1920s**

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Since 1873, golf course development in North America has been highly reflective of broader social, political, cultural, technological and environmental issues. The current investigation constructs a geo-regional historical analysis of Quebec's Royal Montreal Golf Course and New York State's St. Andrew's Golf Club in the 1920s, founded in 1873 and 1878 respectively. The paper argues that as landscapes in close proximity to populated areas in both Canada and the US – intermixing rural and urban landscape goals into a single environment – these golf courses are interpretive keys to actual land use transformations and touchstones for debates concerning "appropriate use" of nature during the beginning of the twentieth century.

Golf courses – which almost uniformly straddle both physical and theoretical zones – are neither solely agro-ecological landscapes – in Donald Worster's phrasing – like farmers' fields, nor public aesthetic/leisure landscapes such as national parks. Considerable historical attention has been paid to these agricultural and national park landscapes in North America for what they intimate about the society in which they are found. Investigating the development of these golf courses, which represent another form of large-scale landscape creation, provides an alternative perspective regarding the social, political, cultural, technological and environmental perceptions and realities of early twentieth century North America. Merging archival material with technological and geographical contexts, as employed within both environmental history and historical geography frameworks, my paper has four sections. First, both courses are situated within their social and physical environments. Second, the reasons for and implications of the need to relocate both courses from their original locations due to increased urbanization and industrialization are addressed. Third, how the golfers and architects conceive these new course areas is explained in terms of aesthetic and technological change and then is compared to the manufacture and perception of other large-scale landscapes. Fourth, with similar histories, transnational comparisons are made between these Canadian and American golf analyses in order to garner wider trans-border environmental realities and concerns.

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1114 **Science, politics and the discourse on historic responsibilities in climate negotiations**

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This article focuses on the role of science in negotiations under the UN framework convention on climate change (UNFCCC), specifically on historic responsibility (HR), a concept that distribute responsibilities based on present effects of countries' past accumulated emissions. The historic perspective of this paper calls attention to a trait in the biography of HR: conflict has not been solved despite the fact that several consensuses have been reached.

An analytical framework of two archetypes is applied to this process: science in the world and about the world (Fuller, 1991). Science in the world holds the view that science can never be external to politics. Science about the world produce objective knowledge. It follows logic of getting-the-facts-right-and-act. A diversity of alternatives exists between these archetypes.

Negotiations on HR rest on the assumption that science can produce knowledge about the world without being in the world. This has enabled hiding conflict rather than solving it. This perspective recognizes merits of hard science while subsuming core conflict –distribution of responsibility– to politics and a domain of what is called 'normative' social sciences. The climate issue is often described as driven by natural sciences (Burch and Robinson, 2007). The case of HR show that this has created a hierarchy in how to valuate various statements in negotiations. Following this, framings that lend towards social sciences have been devalued.

In the backwaters of this discursive mechanism follows consensus on climate models yet mistrust in fundamental epistemological assumptions behind consensus. Such mistrust has plagued negotiations. Although progress has been made to address conflict over distribution (Najam, 2005) it could be much enhanced by an

understanding of its discursive foundations. An interdisciplinary logic of ontology (Barry et al., 2008) could guard against the misuse of science as power resource in politics. It could favor an understanding of natural science as not merely about but also in the world, and social science as not merely in but also about the world. Applied to Intergovernmental Panel on Climate Change, this could help solve the divide between the traditions of the global North and South.

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1116 **Oil, Indians, the Natural Environment and Federal Indian Policy**

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This paper addressed the early oil industry and exploiting American Indians in Indian Territory, largely involving the Osage, Muscogee Creek and Seminole tribes and how the federal government responded with policy making.

In the early 20th century, the exploitation of the Osage "Reign of Terror" and Jackson Barnett (Creek), the World Richest Indian, as well other cases provoked a federal investigation that re-shaped the native understanding of the natural environment. The story did not end here in Oklahoma, but continued throughout Indian Country into the Post-WW II years, causing a triangle of heated discussions between tribes, energy companies and the federal government. As oil led to the development of other tribal natural resources such as coal, uranium and natural gas, 25 tribes responded with the forming of the Council of Energy Resource Tribes (CERT) during the Jimmy Carter administration.

Today CERT of 43 tribes works with the federal government to protect tribal oil, other resources and the environment on reservations lands. The Indian Energy and Self-determination Act of 2005 has resulted in more tribal control and less federal intervention as this paper stresses the pre-CERT era of oil and Indians.

1117 **Civilising people and parks: Recreation and resistance in green urban areas**

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Since early urbanisation, green urban areas have been places for activities less accepted by society, such as political meetings, sexual activities, criminality and drug use. They have also been the localities of provocative idleness and passivity, aggravating the anger and moral indignation of the ruling classes. In the late 19th century, the working class was the main target for the bourgeois moral endeavour to improve the conduct in parks and green areas. The project was partly successful but was also met by a certain social resistance. Green areas and parks were subjected to a similar moral process, as authorities ventured to clear and create order and control of previously hidden areas. Signs and local rules were presented to direct the behaviour of visitors. The civilising process has continued up til today. Now, the human target for the civilisation of outdoor behaviour seem to be immigrants of extra-European origin, whose barbecuing and picnicking seem to disturb the idea of ideal Scandinavian healthy outdoor activities. The poster will analyse the process through which parks and people are civilised – or tamed, using Malmoe as the empirical example.

1118 **Undercurrents of the Snake River Aquifer: Hydrology and Policy**

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1119 **The 1990 peace dividend – a counterfactual hypothesis**

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According to Stern 2006, postponing investments against global warming leads to much higher costs in the future. Historically, the world already experienced such a time-delay and its costs. After the fall of the Berlin Wall, less than 2% of global GDP in two decades, available from halving military expenditure, would have been sufficient to make the world safe against global warming. The energy procurement, chemicals and transport sectors, agriculture and other energy application systems could have been reconstructed ecologically and the debt burden of developing countries removed (Commoner 1990). Boomerangs of the international debt crisis including bail-out of U.S. banks, deforestation, migration, conflict and war could have been avoided (George 1992).

Defending its geopolitical position, the dominant block at power excluded, however, any peace dividend (Fortune 1990). In crucial bifurcations, environmentally progressive alternatives are easily dismissed. Although technologically advanced scenarios for low energy paths make the very concept of sustainable development operational (Czeskleba-Dupont 2003), it is made irrelevant that they falsify prognoses of ever rising demand (WCED 1987, chapter 7). In the raison d' état of an anarchic world-system, it seems more 'secure' by violence to expropriate others of their natural resources.

1120 **Ecological-based water resource planning and management since 1974**

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Over the last 35 years, Danish water planning has changed focus for several reasons. The aims of this poster are threefold, firstly to identify and present the major changes emphasising the ecological methods used in planning and management, secondly to discuss advantages and shortages in the abatement of pollution and, finally, to analyse the effects on the quality of water ecosystems.
The overall perspective of the poster is to identify Danish experiences that can inspire other countries, here as an example Malaysia, in their water resource management. For this reason, some of the methods are described in greater detail.

1121 **Narratives about the river and the dam**

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Narratives of the harnessed river and the dam have been a strong and long-lasting theme in environmental history, probably because the theme illustrates very distinctly and obviously the encounter between man, technology and nature. Consequently such histories constitute good examples of how historians position themselves in the discussion on the nature/culture dichotomy and how it influences methodological choices in narratives about the river and the dam. In this presentation I will look closer on how historians have discussed the harnessed river as technology, and their view of the importance of alterations in the river discharge.

I will exemplify the modern discourse of the harnessed river (rivers of empire (Worster), virtual rivers (Wohl), industrialized rivers (Jakobsson), nature incorporated (Steinberg)), labeling them in a Merchant-tradition as histories of "The Dead River". By using sub-categories as "The Exterminated River", emphasizing the physical and ecological degradation of the river, and "The Conquered River" - histories written within a perspective of domination, actors and power, I will stress the different themes of the modern discourse. When Richard White published TheOrganic Machine. The Remaking of the Columbia River (1995), he argued in favour of abandoning this dichotomy between culture and nature. I will look at some examples of how the post-modern narratives of the dam are constructed. What are the narrative characteristics in histories that reject the distinction between nature and culture?

Finally I will argue that the challenge posed by post-modern constructivists to break up from the nature/culture dichotomy has proved to be problematical for environmental historians. Our reluctance to abandon the nature/ culture dichotomy lies deep in us – as the modern discourse on nature is deeply rooted in our 20th century minds.

1122 **Perspectives from the Columbia River**

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