Panel "Natural Resources in the Age of Mechanization and Digitalization: Technological Change, National Narratives and Transnational Connections"

Session organizers: Matthias Heymann, Aarhus University and Elena Kochetkova, National Research University Higher School of Economics, St. Petersburg

Session 1

Elena Kochetkova, National Research University Higher School of Economics, St. Petersburg, Russia, "Soviet Forests, the Age of Mechanization, and Cold War Modernity"

Cold War Soviet Union was full of attempts to modernize. As early as in the 1950s, the Soviet leadership said explicitly about the need to investigate the best domestic and foreign experience of technological advancement in order to win the competition with the West in technology and economic production and finally "make a leap" into modernity. The performance of many industries which were based on natural resources, however, was not effective enough. Thus, even in the 1950s forest works were still completed mostly by muscle labor while many operations on pulp and paper making plants were not automated. The problem of mechanization and automatization became part and parcel of Soviet modernizing beginning in the 1950s until the end of the regime. In my talk I will examine the processes of mechanization and automatization in the use of forests, ranging from forest works like wood harvesting and transporting to transforming timber into industrially manufactured goods. I will show the reasons for successes and failures in Soviet uneven development and stress the connections of cybernetics and industrial production when exploiting natural resources in the context of East-West competition during the Cold War. My talk, thus, will reflect on the roles of automated technologies, resources, and modernity.

Jiří Janáč and Kryštof Drnek, Czech Academy of Sciences in Prague, "Automation and Computerization of Water Resources: Transition from Extensive to Intensive Water Use in Cold War Eastern Europe"

Since the Second World War, the computerization and automation has fundamentally affected and changed the water resources field on various levels. During the so-called „construction era"(1950s -1960s) automation enabled the construction of large multipurpose dams, cascades and large scale water supply systems, while computerisation emerged especially in planning and design of new facilities. Since 1970, emphasis has shifted towards resource management rather than development, and efficient operation of existing facilities, including also environmental concerns, become a dominant area for application of automation, computers and digital modelling (Wurbs 1994).

Growing computerization and automation fuelled this transition variously described as a shift from “extraction” towards “distribution”, from “provision” towards “use-rationalization” or, in other words, from extensive to intensive water-use. This affected both the theory (modelling, planning, design) and practice (production of water) of water management.

The proposed contribution looks at this transition from the perspective of Socialist Czechoslovakia. How did this process sunveilon the national level in water-use planning and management (Janáč) and in the daily-practice of water treatment plants (Drnek)? Who were the principal actors and agents of change (local, transnational, east-west dichotomy)? How this transition affected what James C. Scott calls legibility of the resource, ie the technocratic calculations of available capacities and forms of resource extractions? Did this process re-define, to ask with Linton, “what is water”? Last but not least, concerning the authoritarian context of the state socialism – did this transition opened the water use management to broader range of actors?

Ihediwa Nkemjika Chimee, University of Nigeria, “Colonial mechanization as transition in resource extraction in Nigeria: Perspectives from the coal industry”

The discovery of coal in Udi Hills in Enugu, Nigeria by the British in 1909 marked a turning point in the area. It led to the building of railway line from the hinterland to the coast. Coal was needed by the British, not only was it used in the industries; it was an essential ingredient in powering steam engines. At the time coal was discovered in Enugu, the mines were manually operated using pick axe and diggers. The manual labour requirement was enormous and this made conscription of labourers become a feature of the mining economy of colonial Nigeria. To expedite production and maximize resource extraction, the colonial regime began the mechanization process of the coal industry, introducing machines for mining, which in turn changed the process of production. The paper examines the role of mechanization in coal production and the changes it produced in the colonial economy of Nigeria.

M. Luísa Sousa, NOVA University of Lisbon, “Construction, Maintenance, and Forced Labour: Laterite Roads in Mozambique and Angola”

In this paper I will deal with the use of a local natural resource, laterite, to the construction of the so-called “low cost” roads by Portuguese engineers in Angola and Mozambique, in the late Portuguese colonisation period (1950s, 1960s), focusing on two aspects:

1) the collaboration of civil engineering laboratories from the Portuguese metropole and those of Angola and Mozambique and the increase of the investment in public works in the colonies during the colonial wars.

2)the use of forced labour, which played an important part in the history of road construction and maintenance in Guinea, Mozambique, and Angola.

I will follow the development of these technical collaborations and how the silence regarding the use of forced labour in laterite road construction and maintenance was framed by a technopolitical agenda that supported a less visible part of the war effort aiming at sustaining Portuguese colonial rule over those territories.

Session 2

John Martin, Leicester University, "The development of modern British agriculture: the role of mechanization and digitalization"

Since the state directed transformation of British agriculture which took place in the second world war, mechanization, in the form of the substitution of mechanical power for manual and horse, and more recently digitalization and automation have revolutionized methods of farming. This is particularly evident in respect of milk production, where hand milking was initially replaced by machine milking operated by technical operators , before on many farmers being replace by automatic milking set ups in which the cows have freedom to decide for themselves. This has been accompanied by a scientific and technological revolution in terms of nutritional understanding, progeny testing and the selection of offspring for optimum performance.

A similar process is also evident in respect of arable cropping where tractors are increasingly controlled by GPS systems and the productivity of crops have been revolutionized by plant breeding and the use of science based methods of weed and pest control

The aim of this paper is to explore the role played by the state, scientific and technological initiations in the development of what is in essence a new agricultural revolution.

Sebastian Haumann, TU Darmstadt, "Scaling Up Limestone Production. Exploration and Projecting Around 1900"

The proposed paper will analyze the transition to large-scale exploration and long-term projections that were a prerequisite for the mechanization of industrial limestone quarrying. As a material heavily used in iron smelting and steel production, the demand for limestone rose sharply towards the end of the 19th century and the mechanization of quarries became an important objective. Different from other resources, the right to extract limestone lay with the individual property owner. This was not a problem as long as manually operated quarries were enlarged in a piecemeal fashion wherever land was available and geological knowledge of the immediate surroundings seemed favorable. For mechanization, however, this mode of exploration based on fragmented access to land and narrow geological knowledge was a limiting factor. Therefore, a new mode of exploration emerged around 1900 in order to project the kind of large-scale and long-term quarrying operations that were necessary for the economies of scale to set in on which mechanization hinged.

Christos Karampatsos, Institute of Mediterranean Studies, Crete, "On Constant Technological Change and Permanent Ideological Stagnation: Musings on the History of Petroleum Research and Exploration in Greece, 1890-2010"

The Greek state and private actors have sought out petroleum and gas resources since the late nineteenth century. Such attempts enlisted the transnational aid of foreign petroleum engineers and employed cutting-edge technologies, ranging from aerial geological surveying (beginning in the 1930s), to seismic exploration (with the advent of the digital era since the 1960s) to deepwater drilling (after 2010). At the same time they were constantly accompanied by a discernible ideological discourse revolving around geopolitical "empowerment", fiscal "salvation" and technological "progress".

I will show the history of petroleum research and exploration in Greece to be characterized by constant technological change, permanent ideological stagnation and invariably meagre outcomes. I will ponder the reasons for which this important history remains unexplored for more than a century. Finally, I will point out that this history becomes all the more important since the renewal of exploration efforts and the resurfacing of accompanying ideologies in 2010, with the onset of the "Greek crisis".

Dr. Ole Sparenberg, Karlsruhe Institute for Technology, Germany, "Unconventional Technologies for Unconventional Resources: Deep-Sea Mining, 1965-2018"

Manganese (or polymetallic) nodules are minerals containing significant amounts of nickel, copper, and cobalt and can be found in high quantities on the surface of abyssal plains at water depths of c. 3.500 to 6.500 m especially in the Pacific Ocean. They have been known since the late 19th ct., but it was not until the 1960s that the nodules were considered as an economically viable source of ores. Numerous research and exploration activities by various Western countries including West Germanyculminated in successful mining tests in 1978. However, commercial interest waned again afterwards, and by the mid-1980s, deep-sea mining projects had come to a standstill. The project of mining manganese nodules and other minerals in the deep sea only experienced a revival in the 21st ct. Now, more than fifty years after the idea first came up, deep-sea mining on a commercial scale might start in a few years.

The exploration and extraction of deep-sea minerals obviously differ considerably from conventional mining and require different technological solutions. Early proponents of deep-sea mining saw this as an opportunity, however, because the to-be-developed technologies could be designed for automatization and mechanization from the start on. This paper examines the technological challenges of deep-sea mining, the proposed solutions from the 1960s to today for automated exploration and extraction, and the likely effects on the sea-floor environment.

Urban Wråkberg, UiT The Arctic University of Norway, "Northern Hubs: Digital Logistics, Local Commodity Bourses and Transfer Storage/Reloading in the Euroarctic Raw Material Producing Periphery"

The presentation/paper will apply an STS approach to explore some recent trends on globalized raw material and energy markets, made possible by digitalization, to move certain operations and perhaps some decision-making of Arctic extraction industry to regional centres up-north. The presentation will focus major harbour towns in Northern Norway and North-west Russia engaged today in among other oil and gas transfer-loads, storage of fish awaiting price-movements and transport along the Northern Sea Route.

Biographic notes

Dr Sebastian Haumann. Since 2012 Sebastian Haumann is Assistant Professor of History at TU Darmstadt. He has received a PhD in 2010 with a dissertation on urban planning in the 1960s and 1970s and completed his Habilitation on limestone as an industrial resource in 2017. He has been visiting scholar at the University of Pennsylvania and Leicester University and has recently held visiting professorships at Friedrich-Schiller University Jena and TU Darmstadt.

Christos Karampatsos is an 'Archers' postdoctoral fellow at the Institute of Mediterranean Studies, Crete, working on a project that focuses on the history of petroleum research and exploration research in Greece during the interwar period. He has graduated from the Department of Mechanical Engineering, National Technical University of Athens (NTUA) and then worked for a decade as an engineer before moving on to receive an MA and a PhD (2016) from the Graduate Program in the History and Philosophy of Science and Technology, offered jointly by the Department of History and Philosophy of Science, National and Kapodestrian University of Athens (UoA) and NTUA. His doctoral dissertation covered social and labour aspects of the introduction of new machinery in Greece during the first half of the twentieth century. His research focuses on the history of technology as well as social, labor and environmental history and he has taught graduate and undergraduate courses on the history of technology and environmental history at the UoA, the University of Thrace and the University of Western Attica. His work has been published in various Greek and international scientific journals.

Ole Sparenberg defended his dissertation in 2012 at the Göttingen University, Germany. Currently he is a visiting lecturer, Karlsruhe Institute for Technology, Germany. In 2011 – 2018 he was a research assistant, Saarland University, Saarbrücken, Germany.

Jiří Janáč received his PhD from Eindhoven University of Technology in December 2012 (cum laude) and currently holds a post-doctoral position at the Institute of Contemporary History of the Czech Academy of Sciences in Prague, Czech Republic. His research project called "*Hydrosocialism*" (started 2018) focuses on the interplay of ideology, water and society in the history of the socialist centralized water management in the Czech(-oslovak) Republic in the second half of the twentieth century. His interests lie primarily in the history of technocratic governance, state socialism and environment (water).

He has (co-) authored two books - *European Coasts of Bohemia: Negotiating the Danube-Oder-Elbe Canal in a Troubled Twentieth Century* (Amsterdam – Amsterdam University Press, 2012), which examines the history of the never constructed large-scale water infrastructure project in a broad historical context of Europeanization. His 2nd monograph, co-authored with DoubravkaOlšáková, focuses on the history of the Stalinist Plan for Transformation in Czechoslovakia (1948-1964).

Kryštof Drnek successfully defended his dissertation on the modern history of urban water supply in the city Prague in 2017 at the Charles University, Prague, Czech Republic. Since 2018,

he works as a junior researcher at the Institute of Contemporary History of the Czech Academy of Sciences in Prague, Czech Republic, in the team working on the project on Hydro-socialism.

Dr Elena Kochetkova holds her PhD in social sciences from the University of Helsinki (2017). Currently, she is a senior lecturer at the department of history and researcher at the Laboratory for environmental and technological history at the National Research University Higher School of Economics – Saint-Petersburg. She is working on a monograph devoted to Soviet forest resources in 1945-1991 also participating in a number of projects on technological and environmental history of the USSR and Russia. She is an author of many articles published in leading Russian and international journals.

Urban Wråkberg is professor of Northern Studies – an interdisciplinary and circum-polar research field. He holds a PhD in social studies and the history of science and a MSc in metallurgical engineering. He conducts research on social, political and technological issues of the north, with a focus on the borderlands of the Barents Euroarctic Region. He has published in English, Swedish, Norwegian and Russian on the geo-economic drivers of science and industry in the Polar Regions, on the history and ideology of polar exploration and on the nexus between scientific and indigenous knowledge-formation in the north. He analyses theories and practices of sustainability in northern industrial development. He teaches in the English language based Bachelor of Northern Studies, an on-line internationally open course programme offered by the Arctic University of Norway.

Ihediwa Nkemjika Chimee teaches in the Department of History and International Studies, University of Nigeria, Nsukka Nigeria. His research interest areas include political history, conflict and genocide studies, environment, science and technology history as well as social and cultural studies. He has published in reputable journals within and outside Nigeria, and has appreciable book chapter contributions. He has attended conferences in Europe, Israel, Asia and Africa.

M. Luísa Sousa is a Post-doctoral Researcher and an Assistant Professor (Adjunct) at the Interuniversitary Centre for the History of Science and Technology (CIUHCT), Department of Applied Social Sciences, Faculty of Sciences of Technology of NOVA University of Lisbon (Portugal). Her publications include works on mobility history, namely automobility and road construction, in Portugal, and its former colonies of Angola, and Mozambique.

Professor **John Martin** is Research Fellow Leicester University. In 1979-2017 he was Lecturer, Principal Lecturer, Professor of Agrarian History, De Montfort University. He has authored and

co-authored five books, over 90 articles/book chapters and undertaken the role of agricultural consultant for four major television series, three of which he starred in.