

## *Resources in Societies (ReSoc)*

### 1) Theoretical approach of the Leibniz Postdoc School ReSoc

Resources and their appropriation certainly represent an outstanding vehicle to describe transformations in human history. In contrast to natural raw materials, resources are socially produced constructions expressing what people perceive as relevant for their life, no matter if it is about their physical (food, water) or their social needs (status symbols, religious items). Resources are regarded as a product of social appropriation and construction first, either as material sources but also as mental perceptions. Such an approach allows us to specifically access to societal transformation and also to evaluate their impact to societal change in general. The constructions of these materialized environments are of great importance providing very specific affordances (in the sense of J.J. Gibson: Gibson 1977) and therefore inherit the potential of a transformative agency during the different periods of human history.

Particularly with regard to human entanglement to environment and resources and the relation to social transformation, there is still a major desideratum for theoretical approaches to these social transformations. ReSoc intends to investigate such resource-related transformations on theoretical and empirical levels. The Leibniz Postdoc School ReSoc emanates from a "Theory of practice" approach (e.g. Giddens 1984; Bourdieu 1977; Schatzki 1996) that helps to analyse the evolvement of social institutions and their economic actions, but includes furthermore the current materiality discourses. Our approach aims at a multifocal perspective on how humans are interwoven with their materialized environment through various practices and on how social institutions arise and transform during these processes. Hence, a transdisciplinary approach is essential that integrates social and cultural studies (e.g. archaeology, history, sociology, and anthropology), natural sciences (e.g. geosciences, material science, and engineering) and economics to discuss the transformative potential of resources and the subsequent social transformations.

Our scholarly approach to take materialized resources as affordances for individuals and societies and to integrate their potential role in transformative processes is to first open the discussion before ending up in general results. Such a transdisciplinary discourse will allow the single disciplines to embed various theoretical and empirical studies within a broader and new field of research on resource-related transformations. This holistic idea of ReSoc requires different levels of research, possibly best described as micro-, meso- and macro-level. It intends to start from the micro-level with the appropriation of (raw) materials and their conversion to materialized "things" (Heidegger 1950; Olsen 2010; Hodder 2013). "Things" are approached either by their analytical quality, by their social construction, or by the way they are entangled in human practices. A second discursive level is displayed by the question how these resources are related to the human production of space ("spacing": Bender 1993, Löw 2001), the "growing" of knowledge (Ingold 2000) and development of innovation within social entities. This focus on the "metabolisms", the interplay, of the physical and the socially constructed environments, the overcoming of our Cartesian thinking, hoists the experience with and knowledge of resources to a meso-level of argumentation. Finally, societal transformations are discussed on the basis of asymmetries of all kind. This research field will reach a third level that may help to better explain the transformation of societies and the transformative role of "resources/things". It therefore can be considered as a more general macro-level.

### 2) The Research fields

In order to describe the systematics of ReSoc, the arena of research will be shortly resumed and discussed under three different aspects composing the general research fields of our undertaking. Of course all three categories cannot be strictly separated.

#### *1. Appropriating (raw) material – converting to things. Resources and materials in practice*

One can consider the appropriation of resources as a main issue in the history of humankind. Societal needs and desires regulate and inspire what kinds of resources are acquired or ignored - it is the long story of human-modified materials that manifests itself in these manifold achievements and patterns of access. These access-patterns are embedded in landscapes where raw-materials are collected or exploited. Acting with resources therefore

discloses individual or societal intentions and additional strategies and concepts how to achieve a desired yield. Cultural norms for example often are in favour of special operative solutions. But within these procurement practices there is a potential for change: They can alter and develop norms how to act in a group but also within an ecological surrounding. This is true for any form of specialized procurement (agriculture, hunting/fishing, pastoral activities, mining). Investigating different systems of exploitation therefore enables an interesting insight into the appropriation processes but also in their technical and societal impact.

While landscapes are a part of human practice with resources, the production of objects allows another insight into the social needs, intentions, and preferences of humans. These crafts can be described by often specialized workflows (*chaînes opératoires*) (Leroi-Gourhan 1980), which allow us to see the entanglement specific experiences and embodied “knowledges” of the human actor (Ingold 2000; Marchand 2010). Additionally, craft-processes incorporate various fields of practices. The production itself enchases different cultural means, not only related to the craftspersons, but also to the spheres of consumption where “things” are embedded in the interwoven cognitive and practical spheres. As part of their social life, things are continuously loaded with different memories and allocations: These processes range from their production to their consumption and final depositing (Kopytoff 1986). Describing and researching such spheres is vital to understand how societal values could materialize in things. Values strongly influence consumption patterns: Gold as a shiny but more or less impracticable material in ancient societies is a good example: Many cultures have regarded the material as a transcendental one (used to express eternity in graves and symbols) no matter in which part of the world. Much of the material’s qualities can be discussed in a first step of investigation, but only the different ways of their cultural appropriation allow us to touch the surface of value-systems of resources in the end.

## *2. Spacing, making knowledge and innovation through resources and as resources*

In our second research field we intend to work on the relation of space and knowledge. As space is produced by all kind of practices we can approach people’s knowledge by tracing their experiences with landscapes and their perception of space (Tilley 1994; Bender 1993). Such practices may relate to the procurement and handling of resources and things and lead to the rise of new “scapes” of acting (scapes in the sense of Appadurai 1996). A focus will be the “growing” of knowledge and creative impetus through the experiences in/of landscapes and things possibly conducting in what we today perceive as innovation (Ingold 2000). Being thrown into a new environment leads to its appropriation and to a certain production of space which can enable transformation (“spacing”: Löw 2001).

This creativeness is especially required in handling of unknown and partly known landscapes. This can be traced by many cases through the history of humankind. Archaeology for instance is able to describe the consequences of such processes in a long-term perspective through material culture while geography does it through environments and landscapes (e.g. Braudel 1977; Whatmore 2002).

Spaces in which transformation can rise are manifold: Not only landscapes, but also institutions as for instance assemblage places or markets can be regarded as arenas of negotiation and communication, no matter if these are urbanized spaces with well-defined architectural frames or open fields of meetings. They are always conceptualized both as materialized locations (like architecture, conditions of nature) and as immaterial ideas. To compare and discuss them as arenas of practices allows a more detailed understanding of these processes. But any spatial formation is of interest that involves human actors handling things and resources. Within these spaces different people, things, and ideas converge, no matter if we are dealing with larger migrations or small-scale “mobilities” of things and individuals. Ideas are exchanged within these spheres and can converge into hybrids. Another examples for space in which people and things conflate are colonization processes or labour migration. Migrants for instance apply their know-how to new spheres of social and spatial interaction.

Whenever humans act, they gain experiences and consequently knowledge in appropriating their environment. Reconstructing such lines of action allows approaching the specific cultural access of societies to their space. It is therefore an important clue in understanding people and their landscapes. But it also sheds light on the resources themselves and how their involvement might lead societies to alter their spatial surrounding. Nowadays it is not any longer the simple question of mastering nature. It would be more the task to study ecology as an entanglement nature and society to overcome the Cartesian concept of a human–nature dichotomy. A combination of a theoretical and an empirical approach can discuss even conflicts of interest much better if regarding the complex human entanglement in and with space.

### *3. Transforming societies: actors in materialized asymmetries*

In the third research area the resource-related transformation of societies will be the focus of discussion and studies. In this field we regard asymmetries as important challenging factors since asymmetries are often related to environmental issues. They can put various kinds of pressure on societies. Asymmetries are not only defined as economic differences between social groups but also as cultural aspects that are sensed as unequal such as the access to ritual or rural spaces or participation in societal processes.

Growth and decline (or “de-growth”) for instance are important aspects in this tension of asymmetries. They can be particularly observed with the help of a long-term historical perspective, which is important for any empirical study on societal and economic change. In recent years the debate has evolved from the discussion of cyclical models, but they are not very convincing as neither the direction of cycles can be predicted nor is their development self-evident (Kondratiev 1984; Holling et al. 2002). But regarding such a “development” as a heuristic level of observation considerable limitations emerge as there are various levels that must be included: crises (“de-growth”) and their impact on our materialized surrounding for example are experienced and sensed by societal groups in different ways dependent on their respective life-world. For that reason it is of importance to clarify empirical limitations (e.g. by sources of archaeology or ecology) and discuss our economic and societal models to describe the transformative value of the ups and down (e.g. populations, settled areas, usage of resources). Interpreting economies and societies as complex adaptive systems may be a useful theoretical approach (Costanza et al. 2005) or rather interpreting economies as integrative element of social practices. Although such a macro-level can explain much, other transformative levels are only touched by it at the fringe. This is what ties back this research field with aspects of the micro- and meso-level described above. What we describe as innovation processes can be considered as an explanatory level which is also reflected in resources and “things”. A technical innovation becomes, for example, accepted by humans if its radiation to other social groups has proved certain feasibility (Rogers 1962). A copious application boosts a pressure to other groups to implement such an “innovation” as well. Sometimes there may be different possible choices but they seem to be guided ones in their embedding to various parallel processes.

These processes are tightly interwoven with peoples’ habits and how they act as socialized bodies in various fields of their daily life. This interplay has to be consequently analyzed and discussed, no matter if we are dealing with rather technical or societal innovations. Not all of them directly result in large scale economic or societal change but nonetheless they have an impact in specific spheres of life. These more hidden and on a macro-level not very evident changes can act as transformative agents either in an accelerating or in a limiting way - they represent one aspect how we can understand the resources’ impact on the transformation of societies. Such cultural choices - either conscious or not - are enclosed within the resources-related practices of societies described on the micro- and meso-level.

In cases when conscious choices are regulating decisions how resources are handled, we may call them governance structures or institutions. Ethnographic observations often show much clearer how societal choices as, for example, in specific ways of communication through exchange (Bourdieu 1998) or explicit conditions in exploiting resources are guided by “irrational” ritual needs or general norms. This stands in contrast to our assumption of our

seemingly “rational” interests in the sense of “modern” economies: Governance is therefore a system of various cultural choices embedded into societal needs (e.g. subsistence economy, rites, cognitive spheres). What is pivotal in the end is whether choices are regarded as appropriate to societal perspectives and norms. New governance structures or institutions for instance might help to solve societal problems, but they also add to societal complexity and can hence reduce the flexibility of a society to deal with new problems in changing environmental circumstances. Collapses for instance can be regarded as a consequence of such choices that may end in economic and environmental instability based on misleading human acting. Collapses, therefore, often have been regarded as a result of increased complexity and a rigid adherence to a specific trajectory and ultimately causes decline or “de-growth”. It is a long debated problem if complex adaptive systems often have bifurcations or tipping points, at which the common behaviour changes drastically. As argued above societal or even individual choices may result in tipping points and might lead to transformative asymmetries: It is interesting that economic growth and decline debates often result from a specific argumentative angle of World-System theories that came into discussion during the 1970s (Wallerstein 1974). It is therefore necessary to debate on their nowadays influential role in interpreting our data. Within this interplay certain disciplines often neglect the question of size and value while others overestimated it at the expense of qualitative factors. Scales are at first cultural concepts and display secondly in quantitative dimensions and limitations. Therefore, we also regard the debate on size, number and frequency as important to understand the scale of transformation. In this regard econometric issues are often discussed with focus on economy, but the social impact of the human factor and effects on other spheres of transformation processes are only poorly investigated.

Our three research fields are integrated by various cross-sections: by the human actor and his resource-related practices. Resource-related transformation processes will be, therefore, investigated in various ways and systematically integrated by a praxiological approach and a focus on materiality.

### 3) Research agenda/work plan including work units and milestones

Within the project, it is a core focus of transdisciplinary research to analyse if and how scaling behaviour of resource use emerges from the aggregation of atomic units such as individuals, groups (social sphere), individual houses, neighbourhoods and living spaces (material sphere) and the resource fluxes within and between these subsystems. The key to a transformation may be conceptualized as being located in a society’s resource use system, and the analysis focuses on different impacts of changes in this resource use across scale levels. Scale levels are interpreted as spatial scale levels that are closely interwoven with functional scale levels which represent functional relationships among actors, structures, and working practices. Multi- and cross-scalar analyses are a key to understanding the fluidity of resources and their transformation. This systemic approach understands societies as complex systems in interaction with natural systems.

One major challenge is to identify common ground between different approaches and to establish transdisciplinary methodologies. This needs to have a tight communication between the Postdoctoral fellows and all other participating parties of the ReSoc project.

The single ReSoc-projects will be discussed under various theoretical aspects within our three above defined research areas. This will serve as an encompassing level of observation, of analogous comparison and of theoretical reflection, mirrored by internal meetings (jour-fix-meetings, compulsory quarterly meetings, annual general milestone meetings) and the final international conferences 2019.

The backbone of the project is the postdoctoral fellows and their projects. The following structure is planned:

- **PostDoc 1:** Research focus archaeology: Materialized practice of (pre)historical societies (consumption and production)
- **PostDoc 2:** Research focus mining archaeology: Appropriation and managing resources in resource landscapes of (pre)historical societies (Production sphere).

- **PostDoc 3:** Research focus archaeometry: Consumption pattern of metal resources and their embedding to mineral deposits and landscapes of production.
- **PostDoc 4:** Research focus macro-economy: resource based practices of (pre)historical societies: agent-based modeling.
- **Junior-Professorship Ethnology of Resources:** Him/she will be supported to develop his/her own project and conduct a program of teaching and research in collaboration with the Institute of Archaeological Studies. DBM-budget funded.
- **PostDoc Curator:** He/She will be based at the Research area Mining history and will accompany this exhibition field within her/his research work within Medieval Mining history. DBM-budget funded.
- **PostDoc Management:** He/She will be coordinating the networking and the organisational work within the Leibniz PostDoc-school ReSoc. Furthermore it will be a key function of this position to further develop the postdoctoral program, especially with regard to the inclusion of a mentoring approach. Within this project all the other PostDocs of the DBM will be included and the School should be advertised to attract other PostDocs to take part.

The DBM through the research section **material sciences** provides a state of the art analytical laboratory, an important tool to perform technical and provenance studies. By purchasing a new mass-spectrometry (Multi-collector-ICP-MS with laser ablation) the laboratory will be enabled to measure various isotopic ratios from metals and organic materials: The laboratory will be one of the outstanding research tools to perform empirical studies on technology, materials, and their distribution in pre-modern cultures (especially the PostDoc studies 2-3). **Geographic Information System (GIS) technology** provides the platform for spatial analysis - the computational analysis of geographic patterns to understand the distribution of multiple features, to understand spatial relationships such as proximity, coincidence, intersection, overlap, visibility, and accessibility (PostDoc Studies 1-4). Spatial analysis explains changes in patterns over time, and is core to performing advanced predictive modelling. Another important tool of modelling our data will be **ABM (Agent based modelling)**: It is regarded as a strong tool to support our understanding of complex societal and individual behaviour in resource based transformation processes. Conceptually, agent-based modelling allows the modeler to give instructions to virtual agents which allow agents to interact. It shall be used in PostDoc-study 4. There is a lot of common ground between agent-based modelling and Geographic Information Systems. Agent-based modelling approaches in the project should be accentuated by Geographic Information Systems' capacities for spatial analysis, and vice versa.

The ReSoc research structure is open and attractive to include further research fields and researchers like foreign guests and colleagues who e.g. temporarily work at the DBM. All of them are invited to take part in the ReSoc activities e.g. in our panel discussions or milestone meetings. Through the frame of ReSoc, the postdoctoral fellows can apply for further workshops and organize them after the proposals are accepted by the steering committee.

Centre pieces of ReSoc are the pilot-studies. Like the workshops they are open to every postdoctoral fellow. It enables him/her to create new research ideas, to realize them as a forerunning activity or to evolve a new research project and apply for national and international grants at the end. These pilot-studies will inspire our researchers to follow the theoretical issues of ReSoc by their own research agenda and thus generate a reciprocal effect on ReSoc. We believe that ReSoc therefore can develop an ideal platform for discussion within the whole research field.

To support the various tracks described in the structural concept (see structural concept) is the great challenge of ReSoc. Besides the research abilities ReSoc aims at systematically strengthening other professional abilities.

#### 4) Management structure and organization

**Managing Board:** The Managing Board is responsible for the coordination of the project as a whole. It consists of a speaker and the managing coordinator (the postdoctoral fellow who

works in the Managing track). The coordinator administers the routine administrative and organizational work, whereas the speaker of the Managing Board is the contact person of the overall project and holds a leading role.

**Advisory Board:** The Advisory Board represents an independent body, which consists of four external scientists. They meet once a year with all project participants of the Leibniz Postdoc School during the Annual Meetings (Milestones). Their task is to give scientific support and advice as well as to discuss and to evaluate the intermediate research results of the postdoctoral fellows in order to guarantee the research quality. The results of their counselling will be reported yearly to the Managing Board, which will assure the compliance and implementation of the quality management.

**Steering Committee:** The Steering Committee consists of the principal partners and the postdoctoral fellows. It is responsible for scientific, financial and organizational decisions. The Steering Committee and the Managing Board come together in quarterly meetings. The financial support of pilot-studies, workshops and invitations will be organized by additional projects that will be financed and supervised by the Steering Committee.

## 5) Literature

- Abelshauer, Werner 1984: Der Ruhrkohlenbergbau seit 1945, Wiederaufbau, Krise, Anpassung, München: C.H. Beck.
- Alam, Shah Jamal, Hillebrandt, Frank, Schillo, Michael 2005: Sociological Implications of Gift Exchange in Multiagent Systems, Journal of Artificial Societies and Social Simulation (JASSS). 8(3) <http://jasss.soc.surrey.ac.uk/8/3/5.html>
- Appadurai, Arjun 1986: The Social Life of Things: Commodities in Cultural Perspective, Cambridge: Cambridge University Press.
- Appadurai, Arjun 1996: Modernity at Large. Cultural Dimensions of Globalization, Minneapolis: University of Minnesota Press.
- Bartels, Christoph, Küpper-Eichas, Claudia (eds.) 2008: Cultural Heritage and Landscapes in Europe. Landschaften: Kulturelles Erbe in Europa. Proc. Internat. Conf. Bochum 2007. Veröff. Deutsches Bergbau-Museum Bochum 161, Bochum: Deutsches Bergbau-Museum.
- Bender, Bárbara (ed.) 1993: Landscape, Politics and Perspectives, Oxford: Berg.
- Bourdieu, Pierre 1977: Outline of a Theory of Practice, Cambridge (UK): University Press.
- Bourdieu, Pierre 1984: Distinction: A Social Critique of the Judgment of Taste, Cambridge (Ma.): Harvard University Press.
- Bourdieu, Pierre 1998: Das ökonomische Feld. In: P. Bourdieu u.a. (ed.), Der Einzige und sein Eigenheim, Hamburg: VSA, pp. 162-204.
- Bourdieu, Pierre 2000: Pascalian Meditations, Cambridge (UK): Polity Press.
- Bourdieu, Pierre 2000a: Esquisse d'une theorie de la pratique, Paris: Seuil.
- Braudel, Fernand 1977: Geschichte und Sozialwissenschaften. Die longue durée. In: Claudia Honegger (ed.), Schrift und Materie der Geschichte. Vorschläge zu einer systematischen Aneignung historischer Prozesse, Frankfurt am Main: Suhrkamp, pp. 47-85
- Braudel, Fernand 1990: Das Mittelmeer und die mediterrane Welt in der Epoche Philipps II., Frankfurt am Main: Suhrkamp (3 volumes).
- Colander, David 2010: The economics profession, the financial crisis, and method, Journal of Economic Methodology, vol. 17(4), 419-427.

- Costanza, Robert, Graumlich, Lisa J., Steffen, Will (eds.) 2007: Sustainability or Collapse? An Integrated History and Future of People on Earth. 96<sup>th</sup> Dahlem Workshop Reports, Cambridge: MIT Press.
- De Certeau, Michel 1984: The Practice of Everyday Life, Los Angeles: University of California Press.
- Gibson, James Jerome 1977: The Theory of Affordances. In: R. Shaw, J. Bransford (eds.): Perceiving, Acting, and Knowing: Toward an Ecological Psychology, Hillsdale, NJ: Lawrence Erlbaum, pp. 67-82.
- Gibson, James Jerome 1979: The Ecological Perspective to Visual Perception. Dt.: Wahrnehmung und Umwelt, München: Urban & Schwarzenberg 1982.
- Giddens, Anthony 1984: The Constitution of Society: Outline of the Theory of Structuration, Cambridge (UK): Polity Press.
- Giddens, Anthony 1995: Die Konstitution der Gesellschaft. Grundzüge einer Theorie der Strukturierung, Frankfurt am Main: Campus.
- Grabher, Gernot 1990: On the Weakness of Strong Ties. The ambivalent Role of Inter-firm Relations in the Decline and Reorganization of the Ruhr, Berlin: WZB discussion paper Fs I 90-4.
- Habermas, Jürgen 1981: Theorie des kommunikativen Handelns 2, Zur Kritik der funktionalistischen Vernunft, Frankfurt am Main: Suhrkamp.
- Hauptmann, Andreas, Pingel, Volker (eds.) 2008: Archäometrie. Methoden und Anwendungsbeispiele naturwissenschaftlicher Verfahren in der Archäologie, Stuttgart: E. Schweizerbart'sche Verlagsbuchhandlung.
- Hauptmann, Andreas, Modarressi-Tehrani, Diana (eds.), Archaeometallurgy in Europe III. Proceedings of the 3rd International Conference Deutsches Bergbau-Museum Bochum 2011 (Bochum 2015)
- Helmstädter, Ernst (ed.) 2003: The economics of knowledge sharing: a new institutional approach, Cheltenham: Elgar.
- Heidegger, Martin 1950 (2000): Das Ding. In: M. Heidegger, Vorträge und Aufsätze. Gesamtausgabe. I. Abteilung, Band 7, Frankfurt: Klostermann, pp. 167-184.
- Hillebrandt, Frank, Spresny Daniela, Hamsch Matthias 2004: Sozialsimulation, Gabentausch und soziales Lernen. Konzeptionelle Überlegungen aus der Sozionik, in: Florian, Michael und Frank Hillebrandt (Hg.): Adaption und Lernen in und von Organisationen. Beiträge aus der Sozionik, Wiesbaden, VS Verlag, S. 187-228.
- Hillebrandt, Frank 2009: Praktiken des Tauschens. Zur Soziologie symbolischer Formen der Reziprozität, Wiesbaden: VS Verlag.
- Hodder, Ian 2013: Entangled. An Archaeology of the Relationships between Humans and Things, Chichester: Wiley-Blackwell.
- Holling, Crawford S., Gunderson, Lance H., Peterson Garry D. 2002: Sustainability and Panarchies. In: L.H. Gunderson, C.S. Holling (eds.), Panarchy: understanding transformations in human and natural systems, Washington: Island Press, pp. 63-102.
- Holt, Richard, Rosser, J. Barkley, Colander, David 2011: The Complexity Era in Economics, Review of Political Economy, vol. 23(3), 357-369.
- Husserl, Edmund 1913: Ideen zu einer reinen Phänomenologie und phänomenologischen Philosophie: Allgemeine Einführung in die reine Phänomenologie, Halle, Jahrbuch für Philosophie und phänomenologische Forschung vol. 1(1), 1-323.

- Ingold, Tim 2000: *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill*, London: Routledge.
- Kienlin, Tobias, Stöllner, Thomas 2009: *Singen Copper, Alpine Settlement and Early Bronze Age Mining: Is There a Need for Elites and Strongholds?* In: T.L. Kienlin, B. Roberts (eds.): *Metals and Societies. Studies in honour of Barbara S. Ottaway*. Universitätsforsch. Prähist. Arch. 169, Bonn: Habelt, pp. 67-104.
- Kohler, Timothy A., Gumermann, Georg J. (ed.) 2000: *Dynamics in Human and Primate Societies. Agent based Modeling of Social and Spatial Processes*, Oxford: University Press.
- Köllmann, Wolfgang, Korte, Hermann, Weber, Wolfhard (eds.) 1990: *Das Ruhrgebiet im Industriezeitalter. 2, Bde.* Düsseldorf: Schwann im Patmos-Verl.
- König, Wolfgang 2009: *Technikgeschichte. Eine Einführung in ihre Konzepte und Forschungsergebnisse. Grundzüge der modernen Wirtschaftsgeschichte 7.* Darmstadt: Franz Steiner.
- Kondratiev, Nikolai D. 1984: *The Long Wave Cycle*, New York: Richardson & Snyder.
- Kopytoff, Igor 1986: *The Cultural Biography of Things. Commoditization as process.* In: Arjun Appadurai (ed.): *The Social Life of Things: Commodities in Cultural Perspective*, Cambridge: Cambridge University Press, pp. 64-91.
- Latour, Bruno 2005: *Reassembling the Social*, Oxford: University Press.
- Latour, Bruno, Woolger, Steve 1979: *Laboratory Life: The Social Construction of Scientific Facts*, Los Angeles: Sage.
- Leroi-Gourhan, Andre 1980: *Hand und Wort. Die Evolution von Technik, Sprache und Kunst*, Frankfurt am Main: Suhrkamp.
- Löw, Martina 2001: *Raumsoziologie*, Frankfurt am Main: Suhrkamp.
- Marchand, Trevor H.J. (ed.) 2010: *Making Knowledge. Explorations of the Indissoluble Relation between Mind, Body and Environment*, Chichester: Wiley-Blackwell.
- Olsen, Bjørnar 2010: *In Defence of Things. Archaeology and the Ontology of Objects*, Lanham: Altamira Press.
- Polanyi, Karl, *The Great Transformation. Politische und ökonomische Grundlagen von Gesellschaften und Wirtschaftssystemen* (Sinzheim 1978)
- Rehfeld, Dieter 2012: *Modes of regional embeddedness: companies in seven European regions compared.* In: Martin Heidenreich (ed.): *Innovation and institutional embeddedness of multinational companies*, Cheltenham: Elgar, pp. 249-270
- Reulecke, Jürgen 1990: *Vom Kohlenpott zu Deutschlands „starkem Stück“.* Beiträge zur Sozialgeschichte des Ruhrgebiets, Bonn: Bouvier.
- Rogers, Everett M. 1962: *Diffusion of Innovations*, Glencoe: Free Press.
- Roos, Michael 2002: *Ökonomische Agglomerationstheorien – Die Neue Ökonomische Geographie im Kontext*, Lohmar: Josef Eul Verlag.
- Roos, Michael 2008: *Willingness to consume and ability to consume*, *Journal of Economic Behavior and Organization* 66, 387–402
- Von Rügen 2014: *Beyond and East-West Dichotomy in Syrian and Levantine Wall Paintings.* In: Brian Brown, Marian Feldman (eds.): *Critical Approaches to Near Eastern Art*, Berlin: DeGruyter.
- Von Rügen 2015: *Making the Way through the Sea. Experiencing Mediterranean Seascapes in the Second Millennium B.C.E.* *Current Approaches to Spaces, Resources*

- and Connectivities. Conference Bochum 2012. Mittelmeerstudien 6, Paderborn: Fink/Schöningh, 31-66.
- Von Rüden 2016: Approaching Ancient Techniques. From Technology to Bodily Learning and Skill. In: Walter Gauß, Gudrun Klebinder-Gauß, Constance von Rüden (eds.): The Distribution of Technical Knowledge in the Production of Ancient Mediterranean Pottery, Wien: Verlag der Akademie der Wissenschaft.
  - Schatzki, Theodore R. 1996: Social Practices. A Wittgensteinian Approach to Human Activity and the Social, Cambridge (Ma.): University Press.
  - Schatzki, Theodore R. 2002: The site of the social. A philosophical account of the constitution of social life and change, University Park (PA): Pennsylvania State University Press.
  - Schatzki, Theodore, Knorr Cetina, Karin, von Savigny, Eike (eds.) 2001: The Practice Turn in Contemporary Theory, London and New York: Routledge
  - Schlögel, Karl 2003: Im Raume lesen wir die Zeit: Über Zivilisationsgeschichte und Geopolitik, München: Carl Hanser Verlag.
  - Schütz, Alfred, Luckmann, Thomas 1988: Strukturen der Lebenswelt, Bd.1, 3. Auflage, Frankfurt am Main: Suhrkamp.
  - Slotta, Rainer (ed.) 2005: 75 Jahre Deutsches Bergbau-Museum Bochum (1930-2005). Vom Wachsen und Werden eines Museums. Veröff. DBM 134, Bochum: Deutsches Bergbau-Museum.
  - Stöllner, Thomas 2003: Mining and Economy. A Discussion of Spatial Organisations and Structures of Early Raw Material Exploitation. In: Th. Stöllner, G. Körlin, G. Steffens, J. Cierny, Man and Mining. Studies in honour of Gerd Weisgerber. Der Anschnitt, Beiheft 16 (Bochum 2003) 415-446.
  - Stöllner, Thomas 2008: Mining Landscapes in Early Societies - Imprinting Processes in Pre- and Protohistoric Economies? In: Bartels, Küpper-Eichas 2008, pp. 65-92.
  - Stöllner, Thomas 2015: Humans approach to resources: Old World mining between technological innovations, social change and economical structures. A key note lecture. In: Hauptmann, Modarressi-Tehrani 2015, 63-82
  - Tilley, Christopher Y. 1994: A phenomenology of landscape: places, paths, and monuments, Oxford: Berg.
  - Wallerstein, Immanuel 1974: The Modern World-System I, New York u.a: Academic Press.
  - Whatmore, Sarah 2002: Hybrid Geographies: Natures, Cultures, Spaces, London: Sage.
  - Werlen, Benno 2010a: Gesellschaftliche Räumlichkeit 1. Orte der Geographie, Stuttgart: Franz Steiner Verlag.
  - Werlen, Benno 2010b: Gesellschaftliche Räumlichkeit 2. Konstruktion geographischer Wirklichkeiten, Stuttgart: Franz Steiner Verlag.
  - Ziegler, Dieter 2005: Die Industrielle Revolution, Darmstadt: Wissenschaftliche Buchgesellschaft.
  - Ziegler, Dieter 2013: Rohstoffgewinnung im Strukturwandel. Der deutsche Bergbau im 20. Jahrhundert, Münster: Aschendorff.

## Resources in Societies (ReSoc)

### The Structure of the Postdoc-Program

The Deutsches Bergbau-Museum (DBM) is strongly aware of the importance to provide postdoctoral researchers with an opportunity to establish their own professional profile at a crucial career stage (generally 2-7 years after PhD). Therefore, the DBM will establish a multifaceted sustainable postdoctoral program, which will serve as best practice model in the Leibniz-Gemeinschaft, especially in the research museums. With regard to the specifics of a Leibniz research museum the DBM developed postdoc-strategies, that do not only take into consideration careers that aim at a university appointment, but also career tracks that aim at a curator career as well as tracks that cover research management abilities which are relevant for careers within research funding associations or governmental departments (Fig. 1).

### Postdoctoral Career Tracks at the DBM

Generally, researchers at any postdoctoral career stage can apply for a position at the DBM and are free to choose between the different tracks available. After having completed a project, it is even possible to change between the career tracks.

#### Career-track "Researcher"

Within this track postdoctoral fellows pursue academic independence and aim at developing their research profile within their academic fields. Most positions within the **ReSoc**-project will be integrated in this track.

The DBM promotes postdoctoral researchers by different means, either household or three party funded, to pursue their own research questions and therefore establish an independent research profile to build up a scientific career. With regard to the **ReSoc**-project, researchers can apply with a research proposal of individual choice. In the first case, the SAW-project **ReSoc** will allow for a scientific start-up-funding to enable the postdoctoral fellows to develop a research project afterwards. In the second case, they can use their time to carry out the first phase of their project. Further third-party funded postdoctoral projects can be accompanied in the frame of this project.

Moreover, the DBM, in close cooperation with the Ruhr-University, will offer a temporary, 100 % budget-financed position (2\*3 years) with a strong emphasis on teaching. It will be structured based on a junior-professorship and will allow for the possibility to develop a new and innovative field of research (e.g. ethnology of resources). According to a junior-professorship a mid-term evaluation will be conducted by the DBM.

#### Career-track "Curator"

Within this career-track approach, the DBM offers a temporary position (2\*2 years), which is 100 % budget-financed. The postdoctoral fellow aims at establishing a scholarly career within a (research) museum. Particular emphasis is placed on research on museum collections as well as curatorship for respective collections as well as exhibitions. Therefore, in the first phase the postdoctoral fellow performs a research project (2 years) with the intention to develop an exhibition concept and subsequently conduct a special exhibition (2 years) at the DBM. The designated mid-term evaluation after two years will assess the research results, as in the third year publication of the results as well as the development of an exhibition concept are scheduled. This exhibition has to convey research results to the public and should be accompanied by scientific activities (publications, lectures, talks etc.). Especially in context with the recently submitted national roadmap project "KultSam" (historico-cultural collections) by the DBM and several other Leibniz research museums, postdoctoral fellows within this track at the DBM will be provided with unique potentials in the near future.

#### Career-track "Manager"

The postdoctoral fellow intends to build up competence with regard to a career in the management or administration of research institutions, research funding associations, publication organization and strategy or governmental departments. To enable the postdoctoral fellow to access this line of career, this track is split into a part-time

## Resources in Societies (ReSoc)

management position (50-100 %, either third party or budget funded), e.g. coordinator of projects such as **ReSoc** or – as have been recently filled at the DBM - scientific editors. Postdoctoral fellows within this track are strongly encouraged to take further part in academic activities as publications, lectures and talks.

### Young Academics at the DBM – integrating ReSoc

All postdocs, academic trainees and doctoral students at the DBM, constitute the young academics, called “WiN” (“Wissenschaftlicher Nachwuchs”), which allows for a lateral exchange of experiences. The members of the WiN, which is a self-managed structure, annually elect three official spokespersons (one for each group). For and upon consultation with the WiN the DBM offers a set of advanced trainings in a variety of soft-skills (e.g. leadership, fundraising, management) twice a year.

The DBM intends to establish a mentoring program for the postdoctoral fellows to provide them with further feedback and the possibility to obtain an external view on their career. To develop the specifics of such a program will be one of the **ReSoc** coordinators of tasks.

Naturally, the postdoctoral fellows will be included in all activities of the DBM research department: They will contribute to the overall academic activities like the “Researchers Day”, held twice a year at the DBM, where all academics present their current projects and results. This will not only provide the postdoctoral fellows with access to feedback of established researchers, but also serves to expand their scientific networks, as all guest researchers (e.g. postdoctoral researchers from national and international institutions who earned the yearly Winkelmann-stipend of the DBM) are also present and presenting their work.

However, being included in the overall research framework at the DBM postdoctoral fellows will be responsible for the coordination of general activities (e.g. workshops or conferences) of the DBM research clusters. This enables them to build up competence in coordinating research activities with a pool of experienced and young researchers of the DBM. Furthermore and due to close cooperation, they will collaborate with young researchers of the RUB as well, which will be of mutual benefit. Besides, there are further frameworks linked to the overall young academics strategy, some are already established, some require further development. The latter will be a key function of the management postdoc position of the submitted project/program **ReSoc**.

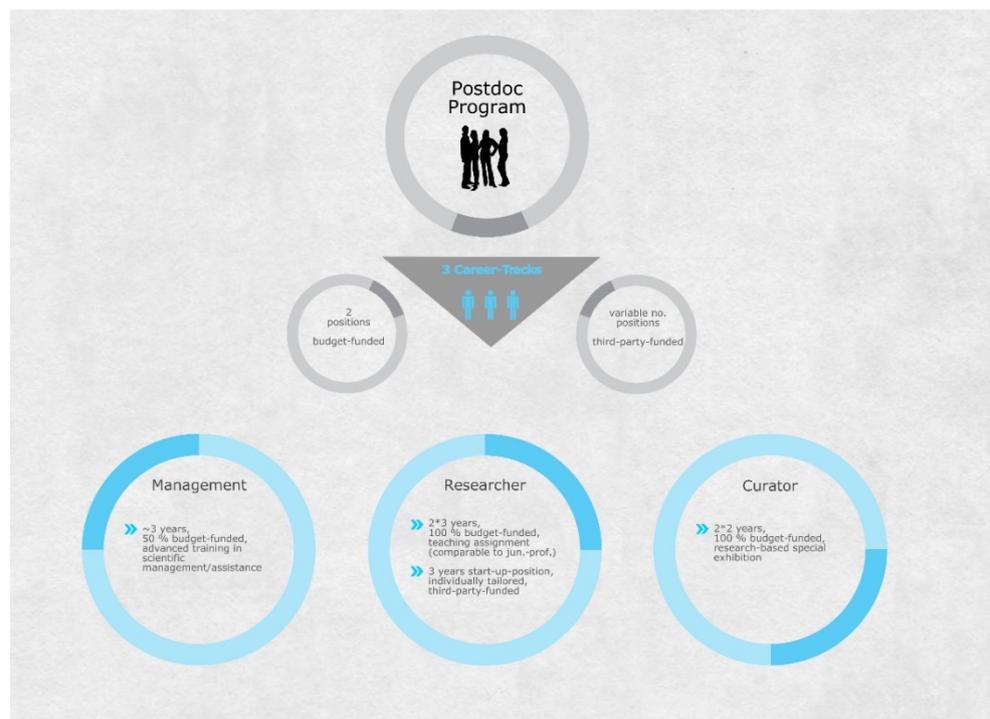


Fig. 1. Career tracks at the DBM