NATURE'S ACCOUNTABILITY: AGGREGATION AND GOVERNMENTALITY IN THE HISTORY OF SUSTAINABILITY

Conference at the GHI, October 9-11, 2008. Conveners: Sabine Höhler (GHI Washington / Deutsches Museum Munich), Rafael Ziegler (University of Greifswald/Centre Marc Bloch, Berlin). Participants: Dean Bavington (Nipissing University), Brett Bennett (University of Texas, Austin), Paul Erickson (Wesleyan University), Karen Hébert (Yale University), Richard Hölzl (University of Göttingen), Nayna Jhaveri (Colgate University), Jens Lachmund (University of Maastricht), Eva Lövbrand (Lund University), Timothy W. Luke (Virginia Tech), Emily Pawley (Chemical Heritage Foundation), Tejasvi Purusharth (NALSAR University of Law, Hyderabad), Sajay Samuel (Pennsylvania State University), Jonas Scherner (GHI), Sidharth Sihag (NALSAR University of Law, Hyderabad), Uwe Spiekermann (GHI), Mart Stewart (Western Washington University), Johannes Stripple (Lund University), Jeremy Vetter (Dickinson College), Cornel Zwierlein (University of Bochum).

"Sustainability" has become a global norm, endorsed by actors on all levels of governance and discussed across the natural and social sciences. Closely tied to the normative dimension of the concept have been ways of mapping and measuring, monitoring and managing nature, from sustainable forestry to the Brundtland Report's program of sustainable development. The conference on "Nature's Accountability" examined the ways nature has been taken into account—for the sake of maximizing sustained yields in fisheries or agriculture, or for dematerializing national economies based on material flow analysis—and how these accounting techniques relate and respond to economic and political accountability. The conference asked how nature has been quantified and statistically aggregated according to accounting ideals that associate natural objects with the objects of market economies, to be allocated and exchanged as stocks and shares, as profitable commodities, or as social liabilities. The conference also addressed the normative values, ethical reflections, and governmental regimes flowing from and instituting the accounts of nature. Inherent in the concept of sustainability are questions of environmental justice that seek accountability for the use and abuse of nature. Focusing on "nature's accountability" thus proved to be a fruitful way to discuss the history of sustainability up to the present where the norm has become both seemingly inevitable and impossible to achieve.

German "visionaries" appeared throughout the conference: Carlowitz's work on scientific forestry, wherein he coined the German concept of *Nachhaltigkeit* (sustainability) in the early 1700s; Liebig's agricultural chemistry around 1850; Heinke's population ecology in the 1920s; and Schellnhuber's metaphor of

planetary machinery in recent earth system science. While the role of these German scholars makes it seem appropriate that this event was held at the *German* Historical Institute, the complexity and reach of the theme clearly demanded a global scope. The GHI therefore offered a platform for an international and interdisciplinary group of scholars working at the intersection of the history of science, economics, environmental history, and philosophy to address the emergence of an objectifying environmental knowledge that accounts for various "kinds" of unruly nature. From "trees turned into thalers," arable land, and harvestable cod to profitable elephant tusks, valuable nutrients, and costly carbon molecules, the group explored the ways in which nature has been "straightened" into natural capital. The debate, lively and focused from the beginning, made this two-day event a satisfying intellectual experience for all participants.

The first conference day was devoted to the "resourcification" of nature, that is, to ways of taking and maintaining stock, starting with techniques of mapping forest territory and of classifying and cultivating trees for optimized growth. Richard Hölzl explored how *Holznot* (wood shortage) legitimized a rigid management system of state foresters in the Bavarian Spessart forest around 1800 to secure sustained yields. The normalized trees were fed into customized machines for efficient timber processing. The implementation of a state blueprint for steady revenue cut off villagers' traditional access to forest goods. Brett Bennett demonstrated how resistance to a new state-like gaze played out in another case of conversion of forests from "commons" to a "commonwealth" based on state-regulated property. In South Asian forestry, state foresters contested the utilitarian spirit of British timber merchants. Colonial forestry became the site of conflict between state conservationists and laissez-faire businessmen, who both claimed to follow natural laws.

In the nineteenth century, farmlands and rangelands were subjected to new forms of legibility. Emily Pawley presented the quantitative dream of agricultural "improvement" in the U.S. farming "according to the books" aimed at counterbalancing the hidden deficit that national husbandry was suspected of operating on. An array of measuring devices, analytical tables, and catechisms were meant to discipline farmers into keeping precise accounts of painstakingly converted expenses and returns. Around 1850, agricultural chemistry introduced the new currency of atoms and the "nutrient" as a universal conversion value. Jeremy Vetter studied the emerging field science of "agrostology," the scientific study of grasses. At the turn of the twentieth century, the U.S. Department of Agriculture dispatched professional survey teams and field stations to the Great Plains to develop efficient and profitable ways of grassland ranching and agriculture in one of North America's most arid regions. While

the taxonomic systems of the agrostologists relied to a great extent on local lay networks, the capitalist political economy of grassland productivity called for rationalized and standardized expert knowledge to control the vernacular. Vetter analyzed this agrostological work as a process of "factification" that—in analogy to commodification—would allow grass knowledge to enter global knowledge economies—an analytical tool that proved useful for the discussion of further case studies.

In the domain of legitimate scientific discourse, nature emerged as a "laboratory." The modeling of populations was seen as a form of experimenting on reality, as Dean Bavington outlined using the example of cod fishery in Newfoundland. In the early twentieth century the qualitative understanding of cod shifted to a statistical paradigm. Populations were defined as self-regulating systems that could be modeled and predicted in their size and yield. Within this framework of population ecology, "surplus" fishing meant skimming off the interest of the capital stock. Swimming inventories were allocated to national economic zones to regulate quotas of "total allowable catch" that pragmatically overrode local fishing experiences. The 1990s saw a tragedy not of the commons but of an ocean fishery industrially managed into extinction. In what could be described as an innovative twist of the analysis developed by James Scott in the 1990s, Paul Erickson investigated how not just states, but also capitalist markets make human-nature relations visible (while at the same time obscuring others). As examples he chose ecologist Charles Elton's use of data from the Hudson Bay Company and the use of market data in the contested protection of "the African elephant" under the International Trade in Endangered Species Convention.

The interventionist approaches of taking nature into account seem to bring about the uncertainties they set out to overcome. Yet, repeated failures of modeling and predicting the future did not prevent a growth in managerial ambitions. Since the late twentieth century, Earth System Science takes the "entire" earth into account as a system providing the stocks and services for the planetary household. Eva Lövbrand and Johannes Stripple offered a critical reading of this (meta-)science using a governmentality approach to analyze the origin and unfolding of the Earth System as the episteme of the "Anthropocene" understanding of nature as a "planetary machine." Likewise taking a governmentality approach, Timothy Luke described the planetary accountancy as world watching and ultimately "terraforming" performed by a rising "expertarchy." Both papers stressed the encompassing aspirations of scientific managerial approaches inherent in ways of accounting for nature in aggregate. Even the "humble" notion of "stewardship," they argued, relies on nature being transformed into a controllable ecological system. As the

entire planet has been reshaped according to neoliberal economic principles, "sustainable yield" has turned into "life support" at the outer limits of the ecological "carrying capacity."

How scientific expertise played into evaluating natural units in balanced accounts and how expert cultures centered on pricing natural resources to promote sustainable economies formed a common focus of the second day of the conference. Karen Hébert investigated recent predicaments in sustaining the Alaskan salmon fishery by marketing nature as a commodity. Where "poundage" had long been the primary indicator of sustainable cash flow, "quality" emerged as a new signifier of commodity aesthetics. Quality covered the imagery of original, regional, and natural red salmon – not produced and canned for mass consumption, but "babied" and "gently handled" wild salmon for upscale market segments. Also focusing on consumption, Nayna Jhaveri surveyed the history of material flow accounts in the U.S., that is, of a method for determining the "total material requirements" of national economies. The statistical aggregation of material throughput uncovers collective consumption patterns at the cost of reducing various economic flows under the single unit of weight. However, in spite of various research projects and reports, the U.S. never included material flows in an adjusted system of national accounts (as some European countries have done). And it departed from the goals of ecological economists insofar as material flows analysis was considered in terms of (national) environmental security. Sajay Samuel pursued the general problems of bringing units of nature into balance with monetary units in order to permit nature to be added, balanced, and exchanged in accordance with universal currency systems. Units of mass, volume, and time appear to provide, he argued, a de-historicized, abstract metrics for comparing and commuting items that were not alike or even similar. "Commensurating and artithmetizing machines" process nature in a form ready-made for the merchant's double-entry bookkeeping and for standardized market instruments.

Confronted with such managerial approaches, Samuel urged a reconsideration of the Aristotelian notion of politics as a domain concerning the question and struggle for the good life. Questioning who counts, how, and for whom, allows an investigation into shifting power relations, contingencies of political participation, access to resources, and the transparency of information. Sidharth Sihag and Tejasvi Purusharth described the efforts of local residents to be included in the cost-benefit analyses of large dam-building projects in India. Social movements forced environmental impact assessments on corrupt governments, expecting that an objective method would allow for the compensation of local people's displacement and thus maintain an overall social and economic balance. Environmental justice strategies that employ

market mechanisms to seek accountability for nature degradation often allow for trade-offs. Mart Stewart explored current carbon-trading regimes in which climate change is reduced to the denominator of carbon to allocate emission shares in equal units. A ton of carbon turns from a liability into an asset that sets up a market for emission credits and debits. Trading the "right to pollute" has also resulted in practices of substituting monetary terms for tainted nature. The wealthy industrialized nations utilize the weaker developing nations by investing in local green projects as a way of paying off their carbon debts. Whether there is hope for equity and efficiency, or whether we are witnessing large-scale "carbon colonialism" was a question raised by Stewart. Jens Lachmund studied another form of nature "displacement" through the example of "compensatory regimes" in urban nature regulation. Nature has become an object of political accountability and litigation as urban landscapes deteriorate and are being repaired in the city of Berlin. Lachmund highlighted the work of maintaining and legitimating the relations of equivalence between natures destroyed and replaced elsewhere. Not only social values and conventions have to be negotiated but also scientific expertise, economic rationalities, and legal provisions.

Projects of development transform not only natural but also social worlds. Returning to the Enlightenment period, Cornel Zwierlein explored the idea of the pursuit of happiness as a principle in the German and British economies. Nature entered the calculations of social welfare and security as an *Unglück* (an accident or hazard), a liability to be handled with foresight in pursuit of the general *Glück*. Accountants perceived the insuring of property against accidents of fire as an increase of credit in the overall balance of happiness—a principle of collective precaution in analogy to the principles of emerging sustainability thought. While Zwierlein moved from the discussion of general norms to a description of insurance practices, Rafael Ziegler scrutinized how such practices offered evidence and legitimizing metaphors for general systems of thought. His example was Kant's work on universal history from a cosmopolitan perspective. Noting the evidence and metaphors from cameral science in Kant's theory of development—the crooked wood and straight timber—leads to an extension of the Kantian theory of development to include the public use of reason for the promotion of the "hidden" plan of nature, Ziegler argued.

These two papers were not only a movement back to the century of Carlowitz, but also each in their way an illustration of the multiple sense of "nature's accountability" as referring to the ways in which nature is taken into account, to the norms and evaluations these ways of accounting yield, and to the norms and values that are invested in these accounts. In a final session, these dynam-

ics were discussed in terms of the crosscutting themes and questions that remained: the valuation, trade-off, and contestation of nature, factification, the tensions between commodification and singularization, and the control and prediction of natural temporal cycles and hazards. The Foucault-inspired governmentality approach simultaneously united and divided the studies – it united them in a demand for further descriptions of the political accountability of taking nature into account; it divided them in terms of the questions regarding the place of the various accounting approaches in the (global) political economy, and the many open normative questions of "sustainability" and "development" raised thereby. "Nature's accountability" raises the challenge to further disaggregate the settings, locate the actors, and identify the subject positions and the contesting views involved in projects of taking nature into account, from conservationists and stewards to technocrats, merchants, and scientific observers.

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