

MANAGING THE UNKNOWN: NATURAL RESERVES IN HISTORICAL PERSPECTIVE

Conference at the GHI, February 21–23, 2008. Conveners: Uwe Lübken (GHI), Frank Uekötter (Deutsches Museum, Munich). Participants: Cornelia Altenburg (Bielefeld University), Ranjan Chakrabarti (Jadavpur University, Kolkata, India), Alena Drieschova (International Water Management Institute, Colombo, Sri Lanka), Mark R. Finlay (Armstrong Atlantic State University), Deborah Fitzgerald (Massachusetts Institute of Technology), Hugh S. Gorman (Michigan Technological University), Rüdiger Graf (Ruhr University, Bochum), Susan Herrington (University of British Columbia), Sabine Höhler (GHI), Kuang-chi Hung (Harvard University), Carmit Lubanov (Tel Aviv University), John R. McNeill (Georgetown University), Joachim Radkau (Bielefeld University), Stefanie Rixecker (Lincoln University, New Zealand), David Schorr (Tel Aviv University), Ole Sparenberg (University of Göttingen).

What fear I then, rather what know to fear [?]

Eve, upon picking the apple (John Milton, *Paradise Lost*)

Conventional wisdom has it that mankind's knowledge doubles every ten years. Or was it every five years? The self-proclaimed knowledge society of the twenty-first century has a hard time accepting ignorance as anything but a temporary phenomenon, bound to disappear after a thorough search on the Internet or some more research. Environmentalists in particular have long conveyed a sense that the key problem is usually defunct policies rather than deficient knowledge. And don't they have a point? We know that global temperatures are rising, that the Amazon rainforest is shrinking, and that whales are on the brink of extinction, and still the problems remain unsolved. In fact, some researchers have even felt so certain about mankind's knowledge of natural processes that they put a price tag on Earth's performance: We now know that the ecosystems of the world provide benefits for humanity worth \$33 trillion per year, courtesy of a *Nature* article of 1997 (Robert Costanza, et al., "The Value of the World's Ecosystem Services and Natural Capital," *Nature* 387 [May 15, 1997]: 253–260). Given this overabundance of information, the conference theme certainly came across as somewhat counterintuitive: Does it really make sense to ponder upon questions about the unknown?

As it turned out, the question struck a note with researchers in many different contexts, resulting in a conference that was rich both in its range of topics and its geographic scope. The conference looked at forests and botanical gardens, oil and nuclear power, seeds and nature reserves, seas

that hold fish and a sea that does not. The papers crisscrossed the world from Canada to New Zealand, with major stops in the American West, Germany, Israel and the Middle East, India, Bangladesh, Japan, and the seas in between. To everyone's surprise, the conference did not fall apart in discussions over the individual papers, as ignorance emerged as the recurring theme of the conference. Time and again, the unknown turned out to be far more than an ephemeral phenomenon: Discussions devoid of more than informed guesses were obviously no exceptional event, and probably even the rule historically. If anything, the conference brought a stark reminder of how little we know about the state of the natural world—and that we are bound, indeed forced to make decisions nonetheless.

Ignorance usually becomes the most obvious when contemporary scenarios for the future later turn out to be false. Energy prophecies of the 1970s provide a case in point: In the wake of the 1973 oil price shock, notions of an impending energy shortage ran rampant within the expert community. But rather than criticizing these statements as "false prophecies," as a convenient right-wing cliché has it, Rüdiger Graf used them as the starting point for an exploration into the historical knowledge base of oil-hungry societies. It turns out that even though the importance of petroleum was plain, information about the extent of the reserves was weak. To some extent, that was due to the vagaries of petroleum exploration, which geologists and petroleum engineers could only reduce through decades of research, but never eliminate entirely. However, the prevailing ignorance was also due to a conflict over professional jurisdictions. Geologists and petroleum engineers were competing with energy economists and political scientists, and with demand rising sharply and unexpectedly during the postwar years, these latter groups gradually won the upper hand. As a result, prevailing scenarios were largely disconnected from the material reality of the oil reserves, instead stressing the trend in energy consumption as the decisive factor. It became plain only in hindsight that all professions could offer half-truths at best.

Surprisingly, Graf's paper was one of the few where professions played a major role. Could it be that professions shy away from fields with a large degree of uncertainty because their claims to privileged knowledge are particularly hard to sustain in these contexts? Even forestry, perhaps the oldest environmental profession, came out as surprisingly weak and disoriented at the conference. In her discussion of forestry in British Columbia, Susan Herrington showed that ideas about seemingly endless and inexhaustible woods were far more important for forest policy than anything resembling professional management. In order to develop the inventories that any proper management would presuppose, foresters resorted to makeshift practices like aerial inspections, a highly

subjective method that had a hard time counteracting the power of the forest industry, which dominated the economy of the province. David Schorr showed that Palestine forestry was to a great extent guided by a colonial discourse that saw afforestation as the key to environmental improvement. It seemed that an increase in well-kept woodlands would improve the soil, increase the water supply, and repair the climate, a promise all the more remarkable since it had little to do with local conditions, and everything to do with overarching visions within the British imperial forest community. Deborah Fitzgerald drew a line to American notions of the rain following the plow, another trope that, upon close inspection, essentially encapsulated an enormous extent of ignorance.

With that, the tensions between global discourses and specific local conditions emerged as one of the major themes of the conference. If anything, the meeting showed that the global history of the environment is to a large extent that of international notions and concepts traveling around the world as a kind of intellectual correlate to economic globalization. As Kuang-chi Hung showed, the opening of Japan paralleled the integration of Japanese scientists into an international network of botanical gardens. The tension between the global and the local was also crucial in Ranjan Chakrabarti's discussion of the Sundarbans, a mangrove swamp on the border between India and Bangladesh. The present tiger reserve, created with significant input from the international environmental community, is deeply resented within the local population. Even in international politics, usually a rather conservative field, Alena Drieschova could identify a common trend in international water treaties toward more open-ended management strategies in recent decades that allow a more flexible response to unexpected events. In many cases, new treaties drew on previous experiences and even copied entire passages, a fact that prompted John McNeill to propose a daring analogy: "Like at US universities, we do not know whether learning goes on, but we do know that plagiarism is going on."

With the shortcomings of global debates in specific contexts so apparent, it proved to be productive to have a paper that looked at the opposite, namely local, indigenous knowledge. Stefanie Rixecker provided an overview of customary fisheries management by the Maori in New Zealand and its conflict with the concepts of the settlers who ultimately prevailed. The first surprise was that Maori fishing was neither a small-scale endeavor nor one isolated from the settler community: Maori dominated commercial fishing until the 1870s, supplied settlers with their products, and had even exported fish commercially to Sydney, Australia, earlier in the century. But behind the flourishing business stood a traditional ecological knowledge that differed sharply from Western concepts: It favored a holistic approach and stressed quality and health of the fish

over sheer numbers. For the Maori, lack of knowledge was not really a problem but rather one of the many paradoxes of life. At the same time, Rixecker dispelled notions of an indigenous population living in harmony with nature; in fact, the existence of a single Maori culture was to a large part the result of pressure from the colonists. Unlike so many stories of traditional ecological knowledge, Rixecker ended on an optimistic note, as the Maori have recently received a major share of the fishing rights from the government, allowing them to bring their knowledge to bear in practice. However, it should not go unmentioned that all this happened in the wake of a serious decline in fish stocks, and in one of the few countries in the world where population pressure is still relatively weak.

During the discussion, Sabine Höhler argued for a concept of reserves as socially constructed in a strong way. No paper underscored this point more clearly than Hugh Gorman's discussion of the nitrogen cycle. In sketching how the use of manure, guano, sewage farms, and mineral fertilizer changed the flow of nitrogen through the biosphere, Gorman showed how naïve a simple essentialization of resources and reserves really is. While the basic function of fixed nitrogen, namely fertilizing plants, remained unchanged, the origins of nitrogen changed dramatically, and so did the effects and repercussions. In the end, the paper provided a stark reminder of the arbitrariness (and the anthropocentrism) that definitions of reserves inevitably imply. However, Gorman probably overstretched his argument when he brought photochemical smog into his story of the nitrogen cycle, as historians seem to be somewhat averse to thinking in anonymous cycles and material flows, and probably rightly so. As Fitzgerald remarked, Gorman's story was strangely devoid of human actors.

As befits a lively conference, Rumsfeldian puns of "known unknowns" and "unknown unknowns" flew around the conference table, though always in an ironic vein. After all, it was hard to argue for the political innocence of the unknown after Carmit Lubanov's presentation on the sinking water table of the Dead Sea, where any decision is inevitably caught up in the quagmires of Middle East policy. And yet Fitzgerald noted in her concluding remarks that the state rarely emerged as a strong actor in the papers, and she had a point. Even in forestry, the state was struggling to assert itself as a guardian of long-term sustainability, and that was not just due to the fact that western Canada and Palestine were no classic forestry regions. As Joachim Radkau pointed out, it was perfectly illusionary to devise rigid rules for forest use for centuries into the future, as the German forester Georg Ludwig Hartig did in the early nineteenth century: Local conditions were far too variable for this kind of doctrinism, and so was the uncertain development of the timber market.

Thus, even the famous German forestry tradition comprised a good deal of bluff about the unknown.

Even when the state was enforcing a policy of autarky, usually in the context of a war economy, its role was surprisingly ambiguous. Ole Sparenberg's discussion of the boom of marine resource use in Nazi Germany provided a case in point. In the end, the boom fell far short of the original intentions, failing to close the much-touted German "fat gap" (*Fettlücke*) and meeting with enormous skepticism among consumers. And that was not the only point for doubts: for Nazi politicians, expanding into fishing and whaling was just a temporary solution until expansion towards the east would provide Germany with more room for agricultural production, making it almost certain that investments in fisheries would not pay off—not to mention the fact that British naval supremacy made the fishing industry useless in times of war. And this was not even the weirdest autarky story that the conference had to offer. Mark Finlay's paper provided a fascinating account of the discussion over a rubber reserve in the American West, where shifts between booms and busts were so dramatic that any thought of rational government planning quickly became obsolete. Sparenberg noted that, in the end, the government's decision was right in claiming that there was no need for a rubber reserve, but that was only the wisdom of hindsight. As Höhler emphasized, the government had a perfectly rational plan at any given moment, except that it was subject to drastic change time and again. Uwe Lübken referred to a possible link between the rubber reserve cycle in the American West and US military contingency planning.

In the end, the plant in question, guayule, emerged as perhaps the best-understood plant in technical and scientific terms that was never put to commercial use. So does knowledge—or ignorance for that matter—really make a difference? It was hard to sustain Baconian notions of "knowledge is power" at this conference, as many participants suggested that it is time for an amendment: knowledge may be power, but ignorance may be even greater power. In his concluding remarks, Frank Uekötter made a case for the liberating power of deficient knowledge. It is easier to exploit Canada's forests if one believes that they are indeed endless. It is easier to invest in modern whaling—a complex and expensive seaborne industry—if one forgets that whaling has historically shown dramatic fluctuations and repeated collapses of whaling fleets. And it is easier to go into industrialized farming if one does not ponder questions about what it means for the soils, the topic of some improvised remarks that Uekötter made to fill the slot of a participant who had cancelled on short notice. Clearly, the absence of knowledge allows measures and behaviors that more informed agents would shy away from—

though this kind of ignorance rarely seems to play out in favor of the environment.

Both Radkau and McNeill tried to tackle the concept of the unknown in their concluding remarks, though in somewhat different fashion. Radkau proposed a taxonomy that makes a distinction between three types of ignorance: uncertainty of knowledge due to the complexity of the world; uncertainty about the future; and uncertainty about the risks of technology. In contrast, McNeill called for deeper reflections on the types of knowledge, pointing toward the partisan interests involved: Certain parties may cultivate ignorance because it plays out in their favor. In some respects, McNeill's remarks echoed Robert Proctor's concept of agnotology, the scientific production of uncertainty and ignorance for special interests, with the tobacco industry's handling of health concerns being Proctor's prime example (Robert Proctor and Londa Schiebinger, eds., *Agnotology*, Stanford, 2008). It seems that agnotology may be an important part of the story—after all, the interests at stake in discussions over oil reserves were obvious—but it is probably not the full story. Many papers nourished the impression that knowledge and ignorance are not so much absolutes as two extremes, with a large and rather murky field opening in between. The curious thing is that ignorance did not simply go away over time as people were struggling against it; in fact, the unknown seemed to increase as people were making decisions. It may be time to reflect more deeply about the cognitive status of the known and the unknown.

One thing that became clear is that ignorance does not necessarily mean a lack of information. Rather, processing information emerged as the crucial point. Canadian foresters had plenty of aerial observations of forests, but transforming them into a management strategy was quite a different matter; in the end, a small but highly visible tract of forest land along the coastal road became the key engine of change. Likewise, in estimating the remaining oil reserves, the key issue was piecing together a coherent vision from an overabundance of facts spread over three professions, with few people being in a position to judge which information was trustworthy and which was not. And all this happened in the modern era under serious time constraints. As Finlay pointed out, one of the great drawbacks of guayule was that the plant needs four to five years to reach its maximum rubber yield, obviously an almost prohibitive factor for the impatient agriculturalists of the twentieth century.

Some discussion arose over the geographic framing of the case studies. For example, Sparenberg pointed out that the German autarky rhetoric frequently referred to the seas as a colony waiting to be exploited, but the more experienced Norwegian whalers probably saw that differently. Others suggested the concept of the frontier, though the stabilization of

knowledge and business that the frontier concept somehow implies seemed to materialize only very slowly in the cases under discussion. Going through the individual papers, it is clear that the conference was somewhat tilted toward peripheral regions, but that was sometimes a matter of perspective. Lubanov vigorously denied that the Dead Sea was a peripheral area, noting its importance for recreation and biblical references. Cornelia Altenburg discussed how a West German parliamentary commission dealt with uncertainty over future energy use in the late 1970s. Uekötter stressed that modern, presumably “science-based” agriculture is to a great extent based on a constrained concept of the soil that is basically seen simply as temporary storage for nutrients. Clearly, the struggle with the unknown also took place in late twentieth-century Europe.

In their call for papers, the conveners had raised the question of whether unknown, “hidden” reserves serve as “buffer areas” that provide a kind of insurance for unexpected events. With that, they followed Radkau’s path, who had argued in his global environmental history that the existence of these hidden reserves may be a key factor for sustainability (Radkau, *Nature and Power*, Cambridge/New York, 2008). However, this encouragement did not generate many responses by the presenters: Only Chakrabarti referred to the concept in his discussion of the Sundarbans, arguing that the area also served as a refuge for people and a food reserve in times of crisis. Was it only coincidental that Chakrabarti’s paper was also the most sweeping in scope, covering an entire region with multiple uses over several centuries? Perhaps the concept of the buffer area is simply too broad for individual case studies, making it advisable to rephrase the discussion as a metahistorical one that summarizes trends in different fields. Or maybe the concept has a basic flaw in that it stresses a collective interest in sustainability that usually takes second place to the specific interests of individual parties. There seems to be a certain tension, to say the least, between Radkau’s thesis and classic actor-centered narratives.

If the unknown is such a powerful and enduring part of environmental debates, the question of dealing with this kind of uncertainty in the future inevitably hung over the conference. Two papers specifically dealt with this topic. Altenburg described how a specific German parliamentary commission, established in the context of a bitter dispute over nuclear energy, identified a common ground for discussion by thinking in four scenarios, two with nuclear power and two without. Lubanov outlined a similar conceptual approach for the Dead Sea, where multiple technological options are possible to stop the dramatic fall of the water table, with different costs and risks. But can the scenario method, which inevitably carries the air of an academic enterprise, survive in the harsh

world of politics, where power and money often trump clever concepts? During the discussion of Altenburg's paper, it was pointed out that the commission's success was also due to personal friendships that ran across the front lines of the debate—an old-boys' network that opened opportunities for an open dialogue. But fraternities of this kind usually develop within national contexts, a dire prospect for discussions over the Dead Sea, which touch on the interests of Israelis, Palestinians, and Jordanians alike.

So were we less ignorant about the unknown after two days of intensive discussions? It seems that the conference merely opened the door toward a new field of research, as the participants clearly raised more questions than they answered. The unknown remains a frontier of historical research both in empirical and in methodological terms. It seems that, in spite of all reflections, the epistemology of ignorance remains largely unresolved, but some progress has probably been made. We now know that it makes sense to discuss topics as diverse as fisheries, soils, and forests with the same set of questions in mind. We also know that managing the unknown is a truly global issue: It is a challenge in frontier societies as well as in advanced, industrialized countries. Even more, it is a challenge that will not go away automatically as soon as the much touted "knowledge society" evolves into full swing, as the problem is clearly more than one of simple lack of information. Ignorance is not only a scientific problem, but also a cultural one, as Rixecker reminded us when, in concluding her paper, she invoked a popular phrase of the Maori:

He aha te mea nui?	What is the most important thing?
He tangata.	It is people.
He tangata.	It is people.
He tangata.	It is people.

Frank Uekötter (Deutsches Museum, Munich)