



Critical review

Ecological concepts: Seeing, placing, imposing



Stephen Bocking

Environmental and Resource Science/Studies Program, Trent University, Peterborough, Ontario K9J7B8, Canada

ARTICLE INFO

Article history:

Received 22 August 2015

Accepted 24 August 2015

Available online 28 August 2015

Keywords:

Concepts

Ecology

History

Politics

Place

Nature

ABSTRACT

Concepts – abstract representations of nature – are ubiquitous in scientific work. Through them scientists organize and communicate knowledge, classify landscapes and regions, and control and conserve nature. Indeed, concepts create nature, serving not just as knowledge, but as physical objects – “forests” came into existence through the practice of scientific forestry, and we speak of mobile organisms as “invasive species” because of concepts constructed by conservation biologists. And so it has also been, as the contributors to this special issue explain, with several concepts essential to ecology and environmental science: faunal regions, animal migrations, ecosystems, and rewilding. Through analysis of their complex histories – both scientific and social – these authors demonstrate how these concepts originated, and now circulate and organize knowledge and power. This essay builds on these articles: outlining essential questions, identifying general lessons, and exploring potential future work. It also situates these articles in relation to work in several fields: the history and historical geography of science, environmental history, and political ecology. In doing so, it explores how scientific concepts are constructed as stable and uncontested, and how they derive from this status the capacity to circulate and to speak for nature: serving diverse institutional and social roles, imparting power to those who wield them, organizing not just nature, but humans. They therefore demand careful attention: because they reflect not merely reality, but the times and places in which they were created, and because they have consequences. From these features stem their ambiguous place in historical and geographical research, as essential tools that nevertheless require cautious and critical reflection.

© 2015 Elsevier Ltd. All rights reserved.

Contents

1. Introduction	489
2. Seeing	490
3. Placing	491
4. Imposing	491
References	492

1. Introduction

Ecologists view concepts as ways of thinking and doing – essential guides to organizing the study of organisms and environments. At certain times in their history particular concepts have achieved special authority. More than a century ago Henry Chandler Cowles

paced the Indiana Sand Dunes, constructing out of his observations of plants a concept of dynamic succession. Two decades later Charles Elton surveyed Bear Island, sketching niches, food webs and other concepts with which to organize the analysis of animal communities. In the 1940s Raymond Lindeman combined these concepts with his observations of life and death in Cedar Bog Lake, forming concepts of energy flow and transformation that would influence generations of ideas about ecosystems. More recently,

E-mail address: sbocking@trentu.ca

ecological concepts have proliferated (a presentation at the August 2015 meeting of the Ecological Society of America identified 130), reflecting rapid scientific, social and technological change, and confirming their continuing importance as contentious instruments of understanding, influence and power.

Attention to concepts might be taken as a return to traditional history of science, in which a discipline's progress is defined by its conceptual development (Mayr, 1982: 23). But the episodes mentioned above, and those examined in this issue of *Geoforum*, testify to the links between concepts and topics of lively interest to both scientists and those who study science. The locations where ecologists formed these concepts illustrate the importance of the places of research, exemplifying the geography as well as the history of science. Their methods testify to the relations between concepts and material practices. The wider movement of these concepts reflects the capacity of knowledge to circulate within the scientific community and in larger circles of influence. Concepts implicate the formation of disciplines, the social structure of scientific activity, and the authority of knowledge, exercised through both practical roles and impacts on conversations about humanity's place in the world.

Many of these conversations concern nature itself, that “most complex” of all words, as Raymond Williams once noted (Williams, 1976: 219). That ancient concept has been joined by many others – biodiversity, carrying capacity, ecosystem services, resilience, invasive species, to note a few – each serving not just as description but as ethical imperative or political program: amalgams of nature and culture. These concepts have also been tied to other ideas – consider, for example, the relation between ecosystem services and the role of the market in setting environmental priorities, or the ties between invasive species and ideas about race and nation. Ideas about global change are allied to other concepts: the future, prediction, expertise, the environment (Robin et al., 2013: 6). Most recently, the Anthropocene has become a terrain of debate over humanity's status as a planetary force. Geologists have framed this concept in scientific terms, aspiring to define it precisely according to the stratigraphic record. But it also embodies a sense of global limits, and both hopeful and pessimistic visions of society, and has provoked the coining of other concepts, such as the Capitalocene, that contest its political assumptions and implications. Like the Anthropocene, coined by two chemists, these concepts originated among scientists before traveling into wider worlds of practice and politics. These scientific origins reflect the dominance of science in environmental affairs – they travel beyond science because they do work: shaping how people understand and manipulate nature, making scientific advice useable, imparting scientific authority to political agendas.

How concepts form, change, circulate, and organize knowledge and power becomes evident in these papers. Kristin Greer's analysis of faunal regions and British imperial power in the Atlantic illustrates how taxonomic and biogeographic concepts incorporate knowledge, power, and cultural values. Robert Wilson places animal movements into North Americans environmental history, offering a reminder that humans too are part of the “natural” concept of migration. Laura Cameron and Sinead Earley examine how the ecosystem concept has circulated while carrying a heavy freight of political and scientific meanings. And Dolly Jørgensen tracks the multiplication of meanings of rewilding, and their shared ideal of landscapes without humans. Each of these papers offer careful analysis of where concepts came from and how they have represented the world, served as both scientific and social phenomena, and excluded other ways of knowing and living in nature.

Concepts are therefore central to our understanding of how people understand and act in the world – a category of analysis fully assimilated into the history and geography of science. But just

as Tansley saw the need in 1935 to examine the “use and abuse” of ecological concepts, so, I think, some critical consolidation and self-conscious reflection might be helpful in our own era of active invention of concepts (Tansley, 1935). These papers present many possibilities for such a consolidation, but I would like to focus on a few ideas that may be of general value.

2. Seeing

A starting point can be the relations between concepts and perceptions. These are often at best rather distant. As Castree (2014) noted recently, much of our understanding of nature is second-hand, based on what we hear from others, rather than what we see ourselves. Much of what scientists seek to explain is also beyond human perception: change on global scales or over long periods of time; the movement of energy in ecosystems; the effects of contaminants at only a few parts per billion. Concepts tell us what we could perceive if we were there, serving as ways of “seeing,” understanding, and acting on otherwise invisible phenomena. But concepts do, after all, also relate to physical matter – the stuff of observation – and these papers examine several episodes in which people have used concepts to make sense of things, placing them within larger frames of understanding. Barbed wire exemplify the collision between animal migrations and property lines. Heck cattle and mammoth DNA are the stuff with which to rewild the European landscape. Tropical fish in the untropical environs of Halifax justify a biogeographic region. To these instances we can add others in which scientists' experience in nature has shaped their concepts. One is the relation between survey practices and species concepts: as Robert Kohler has explained, American naturalists' shift to survey collecting encouraged them to adopt a new concept of species that could accommodate broad variation, not narrow types (Kohler, 2006). Another is the relation described by Naomi Oreskes between geologists' field practices and their reception of continental drift (Oreskes, 1999). A third is the transformation of atmospheric observations into the concept of global climate change (Edwards, 2010). These episodes remind us that the workaday world of science is not only about conceptualization, but also observing, manipulating, and living in the world. Close attention must therefore be paid to how scientific practices – and all the other activities that form part of living, working, and experiencing – form relations between nature and concepts.

But we can also turn this relation around: concepts are not just the product of our perceptions, but actively shape them. That our understanding of nature is mediated by our knowledge, assumptions and interests is not an argument that needs to be made; but it's worth putting in order just what roles concepts play in the complicated relations between our minds and the world. A prominent one is that of imposing order, suggesting what to look for, guiding the selection and collection of evidence and the construction of stable facts. Concepts describing the distribution and interactions of species, or the movement of energy and nutrients, privilege certain ecological processes as fundamental, and so determine what should be observed, and why.

Allied to this disciplining of observation by concepts is their role in defining disciplines themselves. Disciplinary concepts assert shared ways of seeing and practicing, specifying research objects, methods, and study sites, underpinning scientists' collective identities. They also constitute claims that the organization of scientific activity corresponds to how nature itself is organized. We can see this in the history of ecology: in Cowles' designation, just as the discipline was becoming established in America, of succession as the basis for dynamic plant ecology; and Tansley's coining, when he perceived that his discipline was at a turning point, of the ecosystem as ecologists' shared unit of study. Similar ties can be

Download English Version:

<https://daneshyari.com/en/article/5073842>

Download Persian Version:

<https://daneshyari.com/article/5073842>

[Daneshyari.com](https://daneshyari.com)