Rachel Carson Center

Perspectives

# Minding the Gap

## Working Across Disciplines in Environmental Studies

Edited by

ROBERT EMMETT
FRANK ZELKO

2014 / 2

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RCC Perspectives

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Robert Emmett, Dominic Kotas, and Frank Zelko

## Introduction

Today more than ever, academics are encouraged to work across disciplines. The consensus seems to be that while disciplinary research has its merits, the future lies in cooperation. Rigid adherence to the borders of academia is a twentieth-century relic, scholars are told; the challenges of the twenty-first century (and beyond) will require historians to talk to botanists, literary critics to talk to physicists, and anthropologists to talk to astronomers.

Nowhere is this attitude more evident than in environmental disciplines. Perhaps the threat of climate change has spurred the recognition that isolation can be a barrier to progress as well as a stimulus. Perhaps the environment is by definition a concept that requires scholars to emerge from their silos. Either way, academic articles and articles in the mass media regularly urge people from different fields to meet, talk, and find solutions.

So if working across disciplines is all the rage, why is it not really happening? Certainly—as this volume will show—there are major projects that productively cross disciplinary boundaries, but most scholars' output is unchanged. Monographs and single-author articles on topics relating heavily to one discipline remain the gold standard. The methods of research and the styles of writing reflect an approach that is apparently unfashionable yet nonetheless dominant.

Perhaps one impediment to working across disciplines is the problem of definitions. When the Rachel Carson Center convened a small workshop in 2013, it asked participants first to provide some reflections on the terms "multidisciplinarity," "interdisciplinarity," and "transdisciplinarity." The results were interestingly disparate. For some, the different concepts were clearly-defined and important. Basarab Nicolescu, for example, explains in his essay precisely how he understands the terms and why he prioritizes transdisciplinarity. Others were less interested in the distinctions or felt that such categorizing was unlikely to be helpful. For contributors like Tom Lekan and John Meyer, the important question was how to get people together in the same room despite bureaucratic and practical obstacles.

This volume of *RCC Perspectives*, composed of essays written after and in light of the workshop, highlights both aspects of this conversation. The first section, entitled "Principles and Axioms," considers what it means to work across disciplines from a theoretical point of view. Adrian Ivakhiv, for instance, discusses how "knowledge is always 'inter,' always between," while Nicolescu explains how transdisciplinarity in his understanding requires us to acknowledge multiple levels of reality. Contributors to the second section entitled "Institutions, Incentives, and Intellectual Movements," meanwhile, deal with the nuts-and-bolts issues that arise when scholars attempt to move beyond traditional disciplinary boundaries. Some of these concerns contrast sharply in tone with the theoretical speculations of the first section, highlighting one of the core questions to emerge from the workshop: what is the relationship between studying cross-disciplinarity and practicing it? Clearly the two are not mutually exclusive, yet contributors like SueEllen Campbell, who describes the importance of KISSing ("Keep it simple, stupid"), or Tom Lekan, who mentions the pressure on universities to bring in outside funding, seem to place a higher value on implementing a pragmatic form of cross-disciplinary cooperation than on developing a rigorous theoretical framework. Personalities, bureaucracies, and politics have to be taken into account when considering what can be achieved.

Claudia Binder illustrates one union of theory and practice in her report on the process developed in the Swiss transdisciplinary network (td-net) and associated with the work of Roland Scholz, Christian Pohl, and Gertrude Hirsch-Hadorn. And perhaps the relative success of td-net is characteristic. The RCC's workshop focused largely on the humanities, yet natural sciences sometimes seem more capable of pursuing their research as far as it will take them and then asking for help from other disciplines. What are the particular challenges that face the humanities in cross-disciplinary projects?

One recurrent theme of this volume is the question of language and communication. Language is the currency of the humanities: the results of humanistic research are inseparable from the language it uses. Unlike in some natural sciences, language is not a medium—or not only a medium, at least. The workshop highlighted the importance and the benefits of careful discussion. But there is always the danger of generating what an economist, in an anecdote in John Meyer's essay, furiously derided as "a blizzard of words." As Meyer himself notes, "this sort of verbal jousting [is] not uniquely able to generate insight."

So how can the humanities avoid creating a blizzard in which cross-disciplinary endeavor is lost? Many of the contributors to this volume offer suggestions. Several mention the importance of humility and of a willingness to set aside the jargon that often comes with expertise. But this volume both addresses and illustrates the difficulty of discussing complex matters in simple terms. For scholars like Angela Kreutz involved in transdisciplinary initiatives, the need to simplify academic discourse may be necessitated by the partners, who come not just from other disciplines but from outside academia. For scholars involved in cross-disciplinary projects within academia, negotiations towards a common language may be more difficult. Nonetheless, this volume is marked overall by optimism and excitement, whether in Peter Coates's discussion of how national funding bodies in the UK are encouraging cross-disciplinary work or in SueEllen Campbell's (and others') expressions of exactly how the environmental humanities can serve humanity.

The volume ends with its own cross-disciplinary dialogue, with Gregg Mittman and Rob Nixon discussing the kind of work that the RCC is keen to encourage. Their conversation touches on narrative, storytelling, activism, and film. An important role of the environmental humanities, they note, is to delineate the different worldviews through which cultures experience "nature." But alongside their insights, their exchange captures more broadly the lively nature of the workshop and the fruitfulness of the debates. The RCC convened the workshop partly in an attempt to establish how it could best continue to promote cross-disciplinary work. What we have learned is that there is a great willingness on the part of scholars to work with others; that definitions and modes of communication will always be an issue; and that the evolution of academia cannot be planned in advance, as it depends on creativity, spontaneity, and interpersonal factors. We look forward to promoting, funding, and encouraging much more of the kinds of work discussed and practiced by the contributors to this volume.

# Principles and Axioms

Adrian Ivakhiv

## The Discipline of Interdiscipline

Training in a discipline is a honing of skills comparable to any craft—like that involved, say, in running a farm. One masters the tools and learns the routines. One gains a feel for the soil, the moisture, the weather, the signs and clues coming from one's animals, and in the process internalizes the daily, seasonal, and annual round of activities. One comes to *inhabit* those skills, background assumptions, and tacit knowledges in ways that reshape one's very demeanor, posture, gait, and sensibility.

For such a farmer, a sedentary knowledge-maker, interdisciplinarity is a walk in the mountainous woods separating one's cultivated plain from another's. Or it is something even more foreign—perhaps the nomadic movement of traders setting off on journeys or meeting in ports, where goods will be exchanged and prices negotiated, but where food is now a product, a currency, not one's lifeblood (or that of one's animals).

One could wander by chance into interdisciplinary woods. But just as one cannot successfully cultivate a field one just happened to wander into, so is interdisciplinarity nothing without its methods, skills, and knowledges. Interdisciplinary fields—area studies, urban studies, ethnic studies, women's and gender studies, environmental studies, cultural studies, semiotics, science and technology studies, global studies, complexity theory, sustainability science, and others—arise when new problems have emerged and the old tools no longer suffice for addressing them. New toolkits and sheds must be built before they can become "homes" for new trainees (and those homes may never be as comfortable as the disciplinary ones, into which the interdisciplinarian may gaze longingly from the outside).

My graduate training came from an institution of environmental interdisciplinarity. The Faculty of Environmental Studies at Toronto's York University was a school that had been formed by a quirky assemblage of geographers, urban planners, environmental philosophers, organizational managers, and natural scientists in 1970, during the heyday of the first environmental revolution. My master's and doctoral defense committees included a cultural anthropologist, a human geographer, a sociologist of media and culture, a political scientist turned geographer, a filmmaker-philosopher-naturalist, a

biologist turned ecophilosopher, and an Allende-era Chilean socialist politician turned political ecologist. None of them began as an "environmental studies scholar," so it was up to my generation—the first to graduate with environmental studies PhDs in North America—to define what it means to be one.

We defined it through a process not too different from the one that forms disciplines: trial, error, and the messy bricolage of collective self-fashioning. Making our way through North American academe, we learned to pay attention to disciplinary boundaries and maps. We learned to compare these maps and negotiate our ways between them, to probe the disjunctions between one map and another, and between the maps and the territories they ostensibly referred to. It was these territories, after all—the "real world" of (in our case) socioecological problems—that prompted the birth of our interdiscipline.

But being an effective interdisciplinarian, we realized, required even more discipline to be effective—and to communicate effectively, and convincingly, to and between other disciplines. It required learning the methods, crafts, rules of conduct, and modes of existence (as Bruno Latour calls them) of not one discipline, but several. It required learning the skills of translation—the habitus of the ethnographer of academe. It required skill in seeing how concepts, methods, and tools *travel* across domains, and how they could be bent to travel more smoothly.

Environmental scholarship—of the sort that might effectively tackle the complex, multiscalar problems we identify as "environmental" today—is inherently interdisciplinary at its outset, if not transdisciplinary (since it is rooted in and actively responds to real world affairs). But this interdisciplinarity is not some supplement grafted onto a set of primary homes called disciplines. Rather, it is paradoxically the best name we have for a practice of knowledge-making that is hybrid at its origins. Knowledge *is* bricolage; it is an understanding of things that draws on methods and practices that did not begin as a standardized set of disciplinary measures, but only became so over time. Knowledge is always "inter," always between: between the knower and the known, but also between the knower and other knowers, including those who know things differently, knowers in the past who have shaped our knowledge, and future knowers to whom we direct our efforts. Disciplined knowledge becomes "trans" when a leap between levels or discourses becomes necessary: between academe and the "real world," or between a paradigm being questioned and a new one that is called for.

The question for me is as much "when should environmental scholarship become inter- (or trans-) disciplinary?" as it is "when should environmental scholarship remain firmly rooted within a single discipline?" In the face of the environmental crisis, perhaps the onus should be on the disciplines to reassert their value. There is no doubt in my mind that historians, philosophers, classicists, literary and art scholars, and others bring much value to environmental scholarship. Some of their labor can certainly be carried out in the traditional confines of disciplinary discourse, for that is where disciplinary tools are refined and strengthened. But some of what they do ought to be done with others—across boundaries dividing disciplines and even those separating academe from lived reality. It need not be obligatory to abandon our ships to swim in the tempestuous currents of transdisciplinary seas. But disciplinarity and transdisciplinarity ought to be seen as the two faces—the inward gaze and the outward gaze—that shape the ways we make, negotiate, and question our knowledge, and the ways we constitute our common world.

John M. Meyer

## Less is More

On the one hand, transdisciplinarity is an ambitious and far-reaching aspiration for many in the contemporary academy—and is given lip service by many more. There are good reasons for this. We are confronted by challenging, "wicked," problems that can require diverse forms of knowledge to comprehend and address; tightly drawn disciplinary boundaries can impede recognition of these as appropriate subjects of inquiry. On the other hand, pressures toward disciplinary (and often sub-sub-disciplinary) specialization remain pervasive. In part this is a product of academic silos that lead both peers and evaluators to protect their turf. Yet it is also a product of the exponential growth in scholarly production itself, making mastery of even one discipline seem a quaint goal.

I am a strong proponent of cross-disciplinarity as a scholar, as a participant in collaborative research projects, and as someone responsible for crafting academic programs. Yet given the inescapable influence of disciplinary knowledge production, I have found that more modest efforts at boundary-crossing are often the most successful and rewarding. In this essay, then, I wish to advance two claims. First, that rather than arguing for or against a particular model of cross-disciplinarity, we should identify and embrace a set of virtues integral to the success of any such endeavor. Second, that the call for problem-driven rather than method-driven scholarship is vital, yet is not identical with the call for cross-disciplinarity itself.

Two brief anecdotes from my own experience might help to ground these claims. The first took place years ago at a mildly contentious meeting of faculty members from across my university convened to revise the environmental science major curriculum. Scholars from the natural sciences and applied natural resource fields (forestry, wildlife, fisheries management, etc.) were around the table with ones from history, politics, philosophy, geography, sociology, and Native American studies, among others. The meeting had gone on for over an hour before the source of the divergence became clear: those in the social sciences and humanities envisioned our goal as somehow transcending the disciplines represented at the table and re-weaving them into a greater whole (what we'd likely have called transdisciplinarity had we known the term), while those from the natural sciences and applied resource fields regarded the program as first and foremost

an effort to fill particular gaps *between* existing disciplines. What we shared was a sense that our own work—almost always grounded in a particular discipline—was driven by the need to tackle challenges that emerged from environmental problems.

The second took place during a set of conversations on the nature of "interdisciplinarity" itself, at an international research institute in the social sciences. Many of us, from history, political science, anthropology, gender studies, and sociology, found that despite differences in disciplinary conventions and substantive interests, we were able to share work in a way that was mutually comprehensible and constructive. Yet there were also economists—formal modelers— in the group. The chasm between their work, methods, and framing of a research question and ours often proved insurmountable. Yet we all tried. One memorable exchange took place at the end of a lengthy roundtable discussion. The non-economists had been arguing, one after another and at length, for the necessity of rich contextual knowledge as an alternative to (or at least a prerequisite for) the sort of social and political decision-making models that the economists were pursuing. Finally, one of the economists erupted: visibly shaking with anger, he held his hands to his ears and cried, "Words, words, words, it's just a blizzard of words!" From his perspective, parsimonious models were vital to our ability to gain insight into real-world problems, while our many words posed obstacles to such efficacy.

When I left the curriculum planning meeting, I was quite confident that our holistic, transdisciplinary approach to the major was far more meaningful than the natural scientists' narrow sense of *inter*disciplines. Yet the very resistance of half the academics in the room would have made this infeasible and—if it were pursued in the face of this resistance—unsustainable. We would have been crafting a curriculum that we ourselves could not effectively model or deploy. We didn't pursue the *inter*disciplinary approach either. In their stead, we pursued a more modest form of cross-disciplinarity. At the time, it seemed little more than a détente—no grand integrated approach, but a diverse array of scholars making their own contributions to a shared endeavor, in this case the contours of an undergraduate education. Yet I've come to see that our imperfect settlement did bring certain values and virtues to the surface. It relies upon scholars sharing a common problematic, and a commitment to reflexivity, dialogue, and learning across disciplinary boundaries. It also relies upon the participation of scholars with a substantial degree of disciplinary humility: recognition that one's discipline is not uniquely capable of addressing the research questions.

The clash between formal modeling economists and other social scientists highlights the centrality of such humility. For me, as a partisan in this dispute, the one-size-fits-all character of the economists' formal models was an evident problem. Because they sought to use a hammer to solve all conceptual puzzles, everything looked to them like a nail. Yet without an understanding of history, culture, and politics, these puzzles were largely unanswerable. I still think this is right. Yet upon later reflection a second (less comfortable) insight about humility also emerges: our reliance upon "a blizzard of words" was itself a tool—one we were professionally adept at deploying in a fast-paced and rhetorical fashion—but this sort of verbal jousting was not accepted by all as a means of persuasion, and the tool we were deploying was not uniquely able to generate insight.

These anecdotes are no doubt a reflection of the individual perspectives and personalities involved. Yet the virtues that emerged are likely to facilitate success in other cross-disciplinary endeavors. When we view our own disciplinary or methodological approach as a lens distinctively capable of illuminating social or natural phenomena, we position it as a potential competitor with others and a potential "master" discipline or approach. Consider the social sciences. Disciplines here are often regarded as pursuing distinct subjects of inquiry: anthropologists study culture, psychologists study mental states and individual behavior, and economists study production and exchange. This is admittedly simplistic, but it is clearly distinct from another common view in which anthropologists view culture as the primary explanatory variable, psychologists regard the psyche as constituent of society, and economists regard instrumental exchange relations as characteristic and predictive of all social relations.

Individuals and disciplines that tend toward the latter, "master," conception will therefore be less egalitarian partners or collaborators with other social science disciplines. More broadly, scholars convinced that their method is consistently superior and universal—think E. O. Wilson's "consilience" or (some) game theory—are most likely to pursue such endeavors by reducing all others to their singular preferred method. The result is holism manifest as reductionism.

"Multidisciplinarity" is often characterized as the least ambitious and so least interesting form of crossing disciplinary boundaries. However, it may be the sort of endeavor likely to emerge in a context where humility, provisionality, and recognition of the insights from plural perspectives and forms of analysis are respected. The cultivation of these

distinctive virtues and qualities are likely to make it more sustainable over time. Moreover, as a model for university programs in fields that seek to draw together natural and social sciences, humanities, and the arts—such as environmental studies or a growing number of sustainability studies programs—it is the only one that offers an appropriately pluralistic framework within which all can contribute to a shared mission.

The virtues that best enable us to collaborate effectively across disciplines can also remind us that cross-disciplinary scholarship is best understood as a means, not an end. The instrumental value of crossing disciplinary boundaries is that it can facilitate understanding and the ability to address complex real-world problems. Yet the distinction between research that is problem-driven and that which is driven by questions or methodologies internal to a body of scholarship is simply not identical with the distinction between cross-disciplinary and disciplinary work.

Scholars rooted within one disciplinary tradition can pursue problem-driven research, as can transdisciplinary scholars. Indeed, the distinction between problem-driven and method-driven scholarship has been the subject of significant arguments and writings within my own discipline of political science.[1] Here, the divide is not between academic disciplines but between the academy writ large and potential audiences and collaborators on the "outside."

In many cases, universities provide perverse incentives that encourage inquiry into puzzles defined by the work of one's colleagues rather than into puzzles defined by those outside the academy. Only once these incentives are addressed is the question of *how* to stimulate such research questions a meaningful one. Here, the question of whether disciplinary or cross-disciplinary approaches can best contribute to our understanding also becomes important. Once again, I believe that virtues of humility, provisionality, pluralism, reflexivity, and dialogue are vital to the success of scholarship that links the work of those in the academy with broader communities.

1 See for example Ian Shapiro, "Problems, Methods, and Theories in the Study of Politics, or What's Wrong with Political Science and What to Do about It," *Political Theory* 30, no. 4 (2002): 596–619.

Basarab Nicolescu

# Multidisciplinarity, Interdisciplinarity, Indisciplinarity, and Transdisciplinarity: Similarities and Differences

## 1. Multidisciplinarity, Interdisciplinarity, Indisciplinarity, and Transdisciplinarity

*Multidisciplinarity* involves studying a research topic in not just one discipline but in several at the same time. Any topic will ultimately be enriched by the incorporation of the perspectives of several disciplines. The multidisciplinary approach overflows disciplinary boundaries but its goal remains limited to the framework of disciplinary research.

*Interdisciplinarity* concerns the transfer of methods from one discipline to another. Like multidisciplinarity, interdisciplinarity overflows disciplines, but its goal still remains within the framework of disciplinary research.

*Transdisciplinarity* concerns that which is at once *between* the disciplines, *across* the different disciplines, and *beyond* all disciplines. Its goal is the understanding of the present world, of which one of the imperatives is the unity of knowledge.[1]

One approach to transdisciplinarity is characterized by the refusal to formulate any methodology and by its exclusive concentration on the cooperative solving of problems pertaining to the science-technology-society triad. This approach was principally expressed at the transdisciplinary conference held in Zurich in 2000.[2] While this version of transdisciplinarity does not exclude the meaning "beyond disciplines," it reduces it to the interaction of disciplines with social constraints.

Another interesting approach, developing in the field of art, is that of *indisciplinarity*.[3] "Indisciplinarity" denotes the transgression of disciplinary boundaries; it is therefore closely related to transdisciplinarity. However, the refusal of any methodology, evident in some of the work produced by indisciplinarity, makes it more of an anarchical form of knowledge.

1 Basarab Nicolescu, *La transdisciplinarité, manifeste* (Monaco: Rocher, 1996). Translated into English by Karen-Claire Voss as *Manifesto of Transdisciplinarity* (New York: SUNY Press, 2002).
2 Julie Thompson Klein et al., ed., *Transdisciplinarity: Joint Problem Solving among Science, Technology, and Society—An Effective Way for Managing Complexity* (Basel: Birkhäuser Verlag, 2001).
3 Thomas Mitchell, "Interdisciplinarity and Visual Culture," *Art Bulletin* 77, no. 4 (1995): 540–44.

The above formulation of transdisciplinarity is both unified (in the sense of a unification of different transdisciplinary approaches) and diverse. Much confusion arises when people fail to recognize that there is a *theoretical transdisciplinarity*, a *phenomenological transdisciplinarity* and an *experimental transdisciplinarity*. The word "theory" implies a general definition of transdisciplinarity and a well-defined methodology (which has to be distinguished from "methods": a single methodology corresponds to a great number of different methods). The word "phenomenology" implies the construction of models that connect the theoretical principles with the previously observed experimental data in order to predict further results. The word "experimental" implies the performance of experiments that follow a well-defined procedure, allowing any researcher to obtain the same results when performing the same experiments.

The reduction of transdisciplinarity to only one of its aspects is very dangerous because it will transform transdisciplinarity into a temporary fashion. The huge potential of transdisciplinarity will never be realized if we do not undertake a simultaneous and rigorous consideration of the three aspects of transdisciplinarity. This simultaneous consideration of theoretical, phenomenological, and experimental transdisciplinarity allows both a unified and non-dogmatic treatment of transdisciplinary theory and practice.

## 2. Methodology of Transdisciplinarity

A number of important researchers in many countries around the world have agreed upon a methodology of transdisciplinarity that they apply in their research.

The axiomatic character of the methodology of transdisciplinarity is an important aspect. This means that we have to keep the number of axioms (or principles or pillars) to a *minimum*. Any axiom which can be derived from the already postulated ones is rejected.

This axiomatic approach is not new. It developed when disciplinary knowledge acquired its scientific character, with the three axioms formulated by Galileo Galilei in *Dialogue on the Great World Systems:*

*1. There are universal laws, of a mathematical character.*
*2. These laws can be discovered by scientific experiment.*
*3. Such experiments can be perfectly replicated.*

It should be obvious that if we try to build a mathematical bridge between science and ontology, we will necessarily fail. A bridge can be built between science and ontology only by taking into account the totality of human knowledge. This requires a symbolic language, different from mathematical language and enriched by specific new notions.

After many years of research, I have arrived at the following three axioms of the methodology of transdisciplinarity:[4]

**i. The ontological axiom:**
*There are, in Nature and in our knowledge of Nature, different levels of Reality of the Object and, correspondingly, different levels of Reality of the Subject.*

**ii. The logical axiom:**
*The passage from one level of Reality to another is made possible by the logic of the included middle.*

**iii. The epistemological axiom:**
*The structure of the totality of levels of Reality is a complex structure: every level is what it is because all the levels exist at the same time.*

The above three axioms give a precise and rigorous *definition of transdisciplinarity.*

Let me now describe the essentials of these three transdisciplinary axioms.

### 3. The Ontological Axiom: Levels of Reality

The key concept of the transdisciplinary approach to Nature and knowledge is the concept of levels of Reality. The *levels of Reality* offer the possibility of a new taxonomy of today's more than eight thousand academic disciplines.

Here the meaning we give to the word "Reality" is pragmatic and ontological at the same time. By "Reality" we intend first of all to designate that which *resists* our experiences, representations, descriptions, images, or even mathematical formulations.

4 See Nicolescu, *La transdisciplinarité, manifeste.*

In so far as Nature participates in the being of the world, one also has to assign an ontological dimension to the concept of Reality. Reality is not merely a social construction, the consensus of a collectivity, or some inter-subjective agreement. It also has a trans-subjective dimension: experimental data can ruin the most beautiful scientific theory. (Or to take a more pointed example, collective denial of climate change will not stop warming seas from rising.)

By "level of Reality," I designate a set of systems that are invariant under certain general laws (in the case of natural systems) and variable but robust under certain general rules and norms (in the case of social systems). Two levels of Reality are different if, while passing from one to the other, there is a break in the applicable laws, rules, or norms, and a break in fundamental concepts (like, for example, causality). In this case there is a *discontinuity* in the structure of levels of Reality.

This approach is not hierarchical. There is no fundamental level. Every level is characterized by its *incompleteness:* the laws governing this level are just a part of the totality of laws governing all levels, including perhaps those which remain to be described. And even the totality of laws does not exhaust the entire Reality: we also have to consider the Subject and its interaction with the Object.

The zone between two different levels and beyond all levels is a zone of non-resistance to our experiences, representations, descriptions, images, and mathematical formulations. Quite simply, the transparency of this zone is due to the limitations of our bodies and of our sense organs—limitations that apply regardless of what measuring tools are used to extend these sense organs.

The unity of the levels of Reality and its corresponding *zone* of non-resistance constitutes what we call the *transdisciplinary Object.*

Inspired by the phenomenology of Edmund Husserl,[5] I assert that the different levels of Reality of the Object are accessible to our knowledge thanks to the different levels of Reality of the Subject that are potentially present in our being.

5 See Edmund Husserl, *Cartesian Meditations*, trans. Dorion Cairns (Dordrecht: Kluwer Acadmic Publishers, 1999).

As in the case of levels of Reality of the Object, the coherence of levels of Reality of the Subject presupposes a zone of non-resistance. The unity of levels of Reality of the Subject and this complementary zone of non-resistance constitute what we call the *transdisciplinary Subject.*

The two zones of non-resistance of transdisciplinary Object and Subject must be identical for the transdisciplinary Subject to communicate with the transdisciplinary Object.

The zone of non-resistance plays the role of a *third* between the Subject and the Object, an Interaction term, which allows the unification of the transdisciplinary Subject and the transdisciplinary Object while preserving their difference. I call this Interaction term the Hidden Third.

Based upon our definition of levels of Reality, we can identify levels other than the ones in natural systems. For example, in social systems we can speak about the individual level, the geographical and historical community level (family, nation), the cyber-space-time community level, the planetary level, and the cosmic level.

The transdisciplinary Object and its levels of Reality, the transdisciplinary Subject and its levels of Reality, and the Hidden Third define the transdisciplinary approach of Reality. Based on this ternary structure of Reality, we can deduce other ternaries of levels which are extremely useful in the analysis of concrete situations:

Levels of organization – Levels of structuring – Levels of integration

Levels of confusion – Levels of language – Levels of interpretation

Physical levels – Biological levels – Psychical levels

Levels of ignorance – Levels of intelligence – Levels of contemplation

Levels of objectivity – Levels of subjectivity – Levels of complexity

Levels of knowledge – Levels of understanding – Levels of being

Levels of materiality – Levels of spirituality – Levels of non-duality

### 4. The Logical Axiom: The Included Middle

The incompleteness of the general laws governing a given level of Reality signifies that, at a given moment in time, one necessarily discovers contradictions in the theory describing the respective level: one has to assert A and non-A at the same time.

However, our habits of mind, scientific or not, are still governed by the classical logic, which does not tolerate contradictions. The classical logic is founded on three axioms:

1. *The axiom of identity:* A is A.
2. *The axiom of non-contradiction:* A is not non-A.
3. *The axiom of the excluded middle:* There exists no third term T ("T" from "third") that is at the same time A and non-A.

Stéphane Lupasco (1900–1988) demonstrated that the logic of the included middle is a true logic, mathematically formalized, multivalent (with three values: A, non-A, and T) and non-contradictory.[6] Our understanding of the axiom of the included middle — there exists a third term T that is at the same time A and non-A—is completely clarified once the notion of "levels of Reality," a notion absent in Lupasco's work, is introduced.

In order to obtain a clear meaning of the included middle, let us represent the three terms of the new logic—A, non-A, and T—and the dynamics associated with them by a triangle in which one of the vertices is situated at one level of Reality and the two other vertices at another level of Reality. The included middle is in fact an *included third*. If one remains at a single level of Reality, all manifestation appears as a struggle between two contradictory elements. The third dynamic, that of the T-state, is exercised at another level of Reality, where that which appears to be disunited is in fact united, and that which appears contradictory is perceived as non-contradictory. Of course, this conciliation is only temporary. The action of the logic of the included middle on the different levels of Reality induces an open structure of the unity of levels of Reality. *Knowledge is forever open.*

6 Stéphane Lupasco, *Le principe d'antagonisme et la logique de l'énergie: Prolégomènes à une science de la contradiction* (Paris: Hermann & Cie, 1951).

## 5. The Epistemological Axiom: Universal Interdependence

There are several theories of complexity. In the context of our discussion, it is important to understand that the existing theories of complexity do not include either the notion of levels of Reality or the notion of zones of non-resistance.[7] However, some of them, like that of Edgar Morin,[8] are compatible with these notions. It is therefore useful to distinguish between *horizontal complexity*, which refers to a single level of reality, and *vertical complexity*, which refers to several levels of Reality. It is also important to differentiate between *transversal complexity* and vertical, transdisciplinary complexity. Transversal complexity refers to the crossing of different levels of organization at a single level of Reality. From a transdisciplinary point of view, complexity is a modern form of the very ancient principle of universal interdependence.

## 6. Conclusions

A unified theory of levels of Reality is crucial in building sustainable development and sustainable futures. The considerations made until now in these matters are based upon reductionist and binary thinking: everything is reduced to society, economy, and environment. The individual level of Reality and the cosmic level of Reality are completely ignored. Sustainable futures, so necessary for our survival, can only be based on a unified theory of levels of Reality. The ideology of scientism could lead to the self-destruction of our species.[9]

*Reality is plastic*. Reality is not something outside or inside us: it is simultaneously outside and inside. We are part of this Reality that changes due to our thoughts, feelings and actions. This means that we are fully responsible for what Reality is.

7 Paul Cilliers and Basarab Nicolescu, "Complexity and Transdisciplinarity: Discontinuity, Levels of Reality and the Hidden Third," *Futures* 44, no. 8 (2012): 711–18.
8 Edgar Morin, *La méthode,* 6 vols (Paris: Seuil, 1977–2001).
9 Paul Ehrlich and Anne Ehrlich, "Can a Collapse of Global Civilization Be Avoided?" *Proceedings of the Royal Society of Biological Sciences* 280, no. 1754 (2013). doi: 10.1098/rspb.2012.2845.

Angela Kreutz

## Reconciling Theory and Practice: Transdisciplinary Insights from an Indigenous Case Study

In my professional experience as an architect and academic, there has always been a necessary research orientation to my practice and a practical orientation to my research. I have worked for architectural practices, local government, and as a community consultant on various Indigenous housing projects with a number of Aboriginal communities in Australia. The diverse practice-oriented expertise that I gained over the years continues to inform the inter- and transdisciplinary approaches I adopt in my main field of research: children and the environment. This ethnographic work transcends disciplinary boundaries to engage with architecture, environmental psychology, ecological psychology, and anthropological perspectives. It was never a question of *whether* research should have practical outcomes, but *how* these practical outcomes can be best achieved. In my view, the success of practice-oriented outcomes is made possible only through recognizing and transcending the limitations of individual disciplines—transdisciplinary research.

The following reflection on the transdisciplinary approach to the study of children and the environment is based on an Australian Indigenous children's ethnography. It draws on a case study conducted in the rural Aboriginal community of Cherbourg, located in South East Queensland, Australia. Where do these children go, what do they do, and how do they feel? The study explores children's mobility, describes their place-use, identifies place attachments, and characterizes existing planning and design aspects that frustrate rather than facilitate children's needs. This study is significant in its combined academic and practical contributions. It transcends disciplinary boundaries to examine theoretical constructs and conceptual models from environmental and ecological psychology by empirically road testing these ideas within a distinct cultural community. But more than that, it yields significant insight into the design of Aboriginal children's environments for planners, architects, and policymakers working with children. I have found that this produces higher quality research that identifies, structures, analyzes, and practically utilizes findings to connect with concrete societal, environmental, and economic issues.

Transdisciplinary research creates a unity of disciplinary and intellectual frameworks. This integrative process seeks higher intellectual involvement between disciplines to challenge each of their basic assumptions, theories, and methodologies. This counteracts the fundamental commitment of disciplinary scholars to specialize within their discipline, which often limits diverse perspectives and can lead to a "tunnel vision" of reality.[1] In environmental psychology, for example, the *interactionalist* perspective has been dominant. Here the individual (the subject) and environment (the object) are treated as interacting yet independent factors. In this point of view, cultural influences tend to be marginalized as background factors, and cultural historical processes play a causal rather than a constitutive role in human development.[2] This perspective, in which culture is contextual rather than intrinsic, imposes an epistemological obstacle to the ethnographic study of Indigenous children.

A *transactional* perspective and framework was adopted in order to frame, conceptualize, and structure the transdisciplinary perspective adopted in the Cherbourg case study. While a transactional perspective borrows concepts, models, and theories from person-environment research, it is for the most part independent of any disciplinary window.[3] This overarching perspective and framework was necessary in order to produce a unified and coherent approach to this transdisciplinary study. The transactional perspective focused on the *trans*action rather than the *inter*action and took on a holistic perspective suitable to transdisciplinary work. In my case, it allowed me to focus on the "whole child." A transactional approach attempts to describe the complex interrelationships between people and their environment, consisting of the physical, biological, and psychological functioning individual, the natural and built environment, the sociocultural milieu or context, and the temporal qualities. This perspective was conducive to my Cherbourg case study for two reasons. First, there is no subjective and objective divide; and second, human experience and behavior are expected to be studied in situ.

Creating, nurturing, and promoting a culture of transdisciplinary research is critical to the generation of application-orientated solutions to complex socioenvironmental

1 James M. Blaut, *The Colonizer's Model of the World: Geographical Diffusionism and Eurocentric History* (New York: The Guilford Press, 1993).
2 Harry Heft, "Environment, Cognition, and Culture: Reconsidering the Cognitive Map," *Journal of Environmental Psychology* 33 (2013): 14–25.
3 Irwin Altman, "Toward a Transactional Perspective," in *Environment and Behaviour Studies: Emergence of Intellectual Traditions*, eds. Irwin Altman and Kathleen Christensen (New York: Plenum Press, 1990), 225–55.

issues. While transdisciplinary collaboration has the significant potential to increase the rate of evidence-based practices, the success of the project outcomes is dependent upon the sustained quality of the project processes. In my case, the transactionally oriented, methodological approach adapted itself to the nature of the phenomenon, encouraging an initial exploration of the local environmental setting and identifying unforeseen problems and issues. This collectivistic, empowering, and non-measurement-based approach was suited for research with Indigenous peoples who have in the past criticized Western theoretical concepts and bipolar constructs and their corresponding methods. From experience, I found that having a common goal (the appropriate framing of a problem-driven research agenda) and multidirectional communication (the effective and sustainable translation of ideas) were fundamental to the successful implementation of transdisciplinary research.

The benefit of working across disciplines is the production of application-oriented perspectives and outcomes. In the Cherbourg case study I wanted to discover those planning and design aspects that were frustrating rather than facilitating children's needs, desires, and aspirations. In other words, I wanted to discover the degree of child-environment congruence. This involved understanding children's sociocultural environment and their perception of boredom, safety, privacy, and control in direct relationship to their physical and sociocultural environment. Researchers such as anthropologists who are conducting work among Aboriginal communities discuss these perceived problems and issues,[4] yet they lack the conceptual or methodological tools to deal with the issues in a way that might be useful to design professionals. In contrast, the transdisciplinary research approach applied to the study of Cherbourg produced findings that planners and architects can use. They can design for those environmental elements that are missing, address certain social issues, and encourage more culturally appropriate design approaches.

I worked with the community, government agencies, and other stakeholders; however, I was the sole researcher. In larger, more complex transdisciplinary projects one has to expect that research- and practice-oriented groups come with their own beliefs, assumptions, preferences, and practices. Transdisciplinary research projects focusing on community-oriented design often involve citizens in participatory design activities;

4 See for example Yasmine Musharbash, "Boredom, Time, and Modernity: An Example from Aboriginal Australia," *American Anthropologist* 109, no. 2 (2008): 307–17.

however, upon collection of citizen perspectives, planners and local government bodies often revert to the traditional practices and processes that are most familiar. This has a significant impact on rural communities such as Cherbourg. Citizen participation is then reduced to a mere token gesture. The success of transdisciplinary outcomes therefore appears to lie within the sustained realization of interpersonal and intergroup communication processes.

Inter- and transdisciplinary research and scholarship in environmental disciplines is profoundly important because these studies work within the scope of several disciplines in order to achieve a greater understanding of socioenvironmental themes, issues, and critical questions. As this reflection on Indigenous children's environments has shown, environmental problems are not only related to the physical environment; they are also inextricably tied to the sociocultural environment. The key to understanding the environmental problems that we encounter today is to understand that they are as much a physical as they are a social issue.

Critics have highlighted that the all-encompassing perspectives of transdisciplinary approaches often lack a coherent framework and encounter higher levels of information overload.[5] While in recent years there have been attempts to achieve clearer definitions, consistencies, and guidelines, these remain developmental for the most part.[6] With the increasing number of successful case study examples, however, the development of a coherent framework is conceivable in the near future. From my experience, transdisciplinary research approaches and collaborations are often simplified when they are tailored and addressed to specific concerns within local socioenvironmental contexts.

5 Patrick Wilson, "Interdisciplinary Research and Information Overload," *Library Trends* 45, no. 2 (1996): 192–203.

6 Daniel Stokols, "Toward a Science of Transdisciplinary Action Research," *American Journal of Community Psychology* 38, no. 1 (2006): 63–77.

Claudia R. Binder

## Transdisciplinarity: Co-creation of Knowledge for the Future

Imagine that science were asked to contribute to a vision of the future for a community, a region, or a nation. The following questions would emerge: When, where, and for whom is the future? Who sets the criteria for a desirable future? What kind of scientific knowledge is required to decide on the nature of a desirable future?

Asking these questions situates us within a transdisciplinary process as defined by Häberli, Scholz, and others.[1] Tackling the issue requires "coping with complex, ill-defined (wicked), contextualized, and socially relevant problems (issues) that are nowadays often defined in the frame of uncertainty and ambiguity." Furthermore, we are required to integrate knowledge from different disciplines and societal bodies of knowledge.

What does this imply for scientists involved in co-creating knowledge for the future? Wolfram Mauser and his group suggest separating this process into three phases, namely co-design, co-production, and co-dissemination.[2] In each of these phases, different types of integration of knowledge are required. Moreover, different stakeholders are involved at different levels.

I will illustrate the co-creation of knowledge for the future with the case of the "Energieregion Weiz-Gleisdorf." The goal of this project was to design a vision for how, given different external scenarios, the region of Weiz-Gleisdorf in Austria could become $CO_2$ neutral by 2050. For this project we developed scenarios in a transdisciplinary process; the local population then selected one vision of the future to be developed. The selected vision is currently being disseminated and implemented by the stakeholders of the energy region.

1 See Ruedi Häberli et al., "Summary and Synthesis," in *Transdisciplinarity: Joint Problem Solving Among Science, Technology, and Society*, ed. Julie Thompson Klein et al. (Basel: Birkhäuser Verlag AG, 2001), 3–22; Roland Scholz et al., "Environmental Problem Solving Ability Profiles in Application Documents of Research Assistants," *Journal of Environmental Education* 28, no. 4 (1997): 37–44; Roland Scholz, *Environmental Literacy in Science and Society: From Knowledge to Decisions* (Cambridge: Cambridge University Press, 2011).

2 Wolfram Mauser et al., "Transdisciplinary Global Change Research: The Co-creation of Knowledge for Sustainability," *Current Opinion in Environmental Sustainability* 5, no. 3–4 (2013): 420–31.

*Co-design of the Scenario Process*

This first step addresses the questions mentioned above: A future for whom? A future when? A future where? These are by and large normative questions that set the boundaries of the research to be performed. They directly relate to the stakeholders and representatives of the societal spheres who have to be involved in the process. This phase therefore includes the distribution of roles and responsibilities of the involved parties, the definition of the extent of involvement of different experts and the population, and agreements on the working process within the TD-consortium, in particular with respect to decision-making, public relations, and management of the individual interests of the people and institutions involved. Special account has to be taken of power relations when designing this first phase as such relations might bias the process.

In our case we ensured that science and practice played equally significant roles. The role of the scientists was to assure scientific soundness—to establish a framework, to handle methodological issues, and to provide an adequate interpretation of the results. The stakeholders were tasked with providing the specific regional knowledge, identifying stakeholders from different societal spheres to be included in the process, and acting as facilitators. The degree of involvement of the stakeholders and the population during the process designed in the TD-consortium is depicted in figure 1. It should be noted that some specific parts of the project were related to disciplinary knowledge while other parts related to inter- and transdisciplinary knowledge generation.

*Co-production of Knowledge*

This step addresses the questions: What are the possible futures? Who would like which future to come true? Who sets the criteria of what a desirable future could be? It involves, first, a scientific element, in which disciplinary knowledge is created and integrated to provide interdisciplinary scientific knowledge. This step must ensure that "the disciplinary research questions are derived from the overall needs of the project and then researched by the respective discipline, and that the scientific quality is maintained in the research process."[3] Secondly, in a transdisciplinary dialogue the stakeholders and the population are included and their normative perspectives come into play, ensuring that the research maintains its societal relevance.[4]

3 Mauser, "Transdisciplinary Global Change Research," 428.

4 Urs Wiesmann et al., "Combining the Concepts of Transdisciplinarity and Partnership in Research for Sustainable Development," in *Research for Sustainable Development: Foundations, Experiences, and Perspectives*, ed. Urs Wiesmann and Hans Hurni (Bern: Geographica Bernensia, 2011), 43–70.

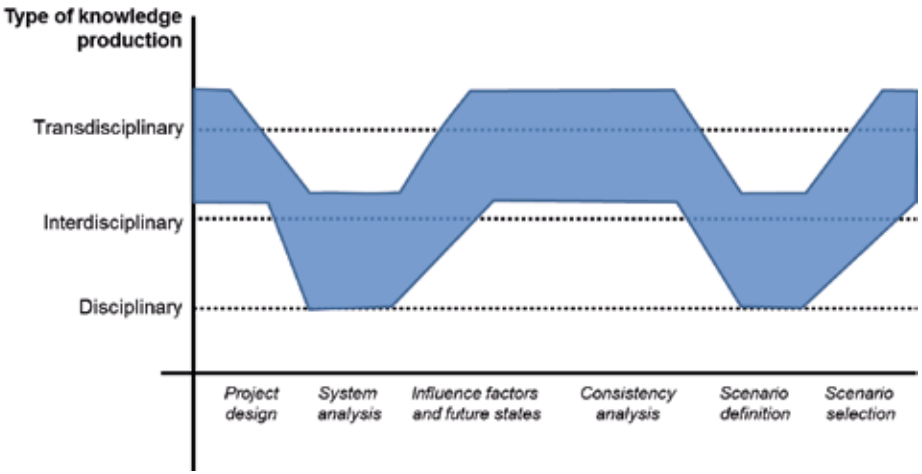


**Figure 1:**
Phases of the process of transdisciplinary scenario development and the link to disciplinary, inter- and transdisciplinary knowledge.

(Adapted for this case study from Wiesmann, "Combining the Concepts of Transdisciplinarity")

In the case of Weiz-Gleisdorf, the scientists first developed the *system knowledge* of the region, which included an understanding of the relevant socioeconomic and environmental developments in the region. This constituted the disciplinary and interdisciplinary step. Secondly, the scientists identified the main *influence factors* potentially affecting the future of the region. They then defined, based on a review of the literature, the development of these impact factors and two potential future states for the year 2050. The relevance of the factors and their *potential future states* were discussed and validated with the relevant stakeholders (a transdisciplinary process).

Third, a *consistency analysis* was performed in which the TD-consortium and the relevant stakeholders defined the consistency of the future states of the influence factors.[5] Fourth, based on the consistency analysis, the scientists defined seven *consistent scenarios*. Those were analyzed regarding their impact on the region and narratives were developed in collaboration with the TD-consortium. Finally, the scenarios were visualized using posters, and the population was invited to *assess the scenarios* and rank them into (i) the most desired one, (ii) the one they disliked most, and (iii) the one they considered the most probable (using a Likert scale of 1 to 5). The result was the selection of one scenario, which became the vision for the energy region Weiz-Gleisdorf for the year 2050.

5 Roland Scholz and Olaf Tietje, *Embedded Case Study Methods: Integrating Quantitative and Qualitative Knowledge* (Thousand Oaks, CA: Sage Publications, 2002); Claudia Binder et al., *Sequence of Transition Pathways in Energy Transitions: The Role of Technology Acceptance, Scenarios and Visions* (under review).

*Co-dissemination*

This step involves co-dissemination of the scenario among different societal groups. This includes publication in scientific journals, translation of the results into easily understandable information, and dissemination workshops in which backward planning processes can also be included.[6]

In our case, following the scenario assessment by the population, the regional co-leaders of the project disseminated the agreed vision and used it to develop the agenda for the next four years. In a final workshop, the selected vision was depicted using scientific simulation models, facilitating the definition of strategies to achieve the desired scenario.

## Concluding Remarks

The example I have presented here shows how a transdisciplinary process can be designed to co-generate knowledge for the future. In this process, different types of knowledge generation are combined. Disciplinary knowledge provides the scientific foundation for understanding the system and building a model. Interdisciplinary methods are necessary to ensure that the different system components and their interaction are represented in an adequate way. Transdisciplinary processes ensure that the role of stakeholders is clearly defined (i.e., design of the project, generation of knowledge and dissemination), help to monitor the relevant societal issues, and lead to a higher acceptance of the results and a higher probability that the results will be implemented.

6 A backward planning process starts with the goal or objective and moves backwards from there to develop the plan.

# Institutions, Incentives, and Intellectual Movements

Thomas Lekan

## Toward a Problem-Centered Approach to Environmental Studies: Challenges and Prospects

Over the past decade I have been involved in a number of interdisciplinary research consortia and undergraduate research projects, as well as engaged scholarship from a variety of disciplines in single and coauthored articles, essays, and edited volumes. Some of these engagements—most especially the Southeast German Studies Workshop, the German Studies Association Environmental Studies Network, and the oral history-documentary film undergraduate research project *Tales of the Tidelands*—have enriched and enlivened my writing and teaching. Other initiatives—such as a collaboration with Congaree National Park (about 20 miles from my university) on cultural landscape preservation or the faculty reading group PLACE (Paradigms in Landscape and Cultural Exploration)—had lots of good will and energy in the initial phases but faded due to competing demands on all the participants. Others, such as a University of South Carolina Environmental Forum, were dead on arrival due to a lack of faculty interest and the departure of a director who had been keen on promoting the environmental humanities.

As I reflect on these varied outcomes for this volume and in my current role as director of the USC History Center, I find myself less interested in the precise delineation and application of terms such as multidisciplinarity, interdisciplinarity, transdisciplinarity, or environmental humanities, and more on the identification of concrete mechanisms for fruitful collaboration within the modern research university. Here I will speak about the North American experience, not the German one, and even less the special environment of the Rachel Carson Center. In my view, successful efforts to work through and across disciplines depend far more on a common sense of purpose, the personalities of the researchers involved, the ability to create an environment of trust and mutual respect, and the availability of institutional incentives.

The trend toward multidisciplinary research is by no means a mere academic fetish. Indeed, two of the most groundbreaking collections of essays in environmental studies produced in the past 20 years—William Cronon's *Uncommon Ground: Rethinking the Human Place in Nature* (1995) and Melissa Leach and Robin Mearns' *The Lie of the*

*Land: Challenging Received Wisdom on the African Environment* (1996)—were the result of multidisciplinary teams working together to reassess dominant assumptions about human-nature relationships. Each book offers case studies of how such assumptions had led to significant misunderstandings of these relationships, and (especially in *The Lie of the Land*) also suggests concrete policy and development solutions.[1] The breadth of engagement in these books would not have been possible from a single disciplinary perspective.

In my view, the most promising way to foster such innovative and eco-socially relevant scholarship, given the competing demands of top-tier research universities (in the United States, there are about 100 of these "Carnegie I" institutions), is to adopt a pragmatic, problem-centered approach to environmental knowledge production.[2] Such a model would marry the best features of the Humanities Center model pioneered at Stanford in the 1980s with the more rapidly produced, multi-authored publications of the best natural science institutes. In my view, such a fluid, "just-in-time," problem-centered approach to knowledge production brings out the best features of the research university—its rich array of faculty, students, and facilities—while side-stepping, in part, the zero-sum fight for funding and institutional recognition that has become endemic and paralyzing in the United States and Canada in recent decades, especially for the humanities.

The "problems" that could be tackled in such a scenario could range from the strictly scientific (how to create reliable models of nutrient flows in estuaries) to vexing political problems (how to create incentives for carbon emission reduction) to social-theoretical (is "green capitalism" really sustainable?) to the more philosophical (has the Anthropocene ushered in a new age of the "posthuman"?). I would advocate organizing one- to three-year team projects with multiple and discernible outcomes (publications, films, artistic exhibitions, public forums, etc.). Which disciplines are best suited to such endeavors—and whether their engagement is best defined as interdisciplinary or multidisciplinary—would depend on the problem or question being addressed.

1 William Cronon, ed. *Uncommon Ground: Rethinking the Human Place in Nature* (New York: W. W. Norton, 1995); Melissa Leach and Robin Mearns, eds., *The Lie of the Land: Challenging Received Wisdom on the African Environment* (Portsmouth, NH: Heinemann, 1996.)

2 In the United States, the Carnegie Foundation for the Advancement of Teaching classifies universities and colleges using various metrics; about 100 doctoral-granting universities are designated as having "very high research productivity." For the Carnegie Foundation's classification system, along with excellent additional advice and information about planning research projects and disseminating findings, see the Foundation's website: http://classifications.carnegiefoundation.org/.

Research universities in the United States and Canada are under pressure to bring in outside funding, and often speak about interdisciplinarity and multidisciplinarity in the abstract: which disciplines do "we" bring together to make us competitive for a multi-year National Science Foundation or Canadian Research Council grant? But in my experience, very few of them have thought about how to create an "intellectual incubator" that nourishes a bottom-up process of faculty engagement for those individuals with the requisite time, energy, vision, and departmental support to engage big-picture problems and to set aside time from their ongoing research projects to work across disciplines. Without strong faculty support, the push for interdisciplinarity or transdisciplinarity can indeed appear as an unproductive fetish: one pushed by administrators with their own ideas about the "worth" of a discipline based on student enrollments or grant-generating capacity, and usually with insufficient attention to the departmental or unit expectations placed upon individual researchers (e.g., the requirements for tenure and promotion).

One example of the mismatch between interdisciplinary agendas and departmental realities became evident when we applied to create an "Environmental Humanities Network" within the German Studies Association. The GSA's executive committee felt that the "humanities" label would send an unwelcome signal to the social sciences, even the more qualitative ones such as human geography, about the goals and aims of our network. So we re-named it the "Environmental Studies Network." I am quite comfortable with this label, but many literary scholars protested that this particular label has marginalized the humanities in favor of a natural sciences and policy studies nexus. With entire French departments being eliminated in the United States or being merged into mega "modern language" departments, these scholars justifiably wanted to showcase the contributions of the "classic" humanistic disciplines—literature, philosophy, history, religious studies—that have few funding opportunities in comparison to the sciences. I could cite a dozen more examples of how labels create new (real or perceived) hierarchies of knowledge that hinder rather than facilitate working through and across disciplines.

The larger point here is simple but critical: representatives of disciplines do not come to the table with equal power or institutional standing, and are often suspicious of the attempts of well-intentioned and better-endowed ones (the natural sciences to be sure, but also within the humanities, history and English) to "colonize" or co-opt smaller

ones with fewer resources and lower student enrollments. Building trust between individuals in such an environment means not only understanding how different disciplines approach a particular topic (i.e. what counts as "knowledge") but also using the collaboration to bolster the research agendas, institutional standing, and especially outside grant funding possibilities of all the participating disciplines. Acknowledging such inequalities in the planning phases—and working to alleviate them as much as possible to the benefit of all involved—resulted in one of my multidisciplinary success stories, the Southeast German Studies Workshop, whose non-traditional format is helping to reshape the goals of the national organization.

Limiting the individual researcher's commitment, at least initially, to a one- to three-year project would help to tackle another problem that arises when working across disciplines: the mismatch between day-to-day activities and individual career trajectories or research projects, on the one hand, and inter/multi/transdisciplinary agendas, on the other. On the most mundane day-to-day level, participating in an interdisciplinary working group that *might* lead to a collaborative grant usually ranks well below preparing lectures, grading, advising, finishing a conference paper, or carving out a few hours to incorporate reviewer comments on that article sitting in the file drawer and submitted over a year ago. In disciplines such as history and English literature, moreover, young and mid-career scholars must weigh their desire to participate in multidisciplinary projects, whose outcomes are usually edited volumes, multi-authored books, or multi-authored articles, with departmental recognition and demands for single-authored articles and monographs. Such considerations are particularly acute when it comes to annual raises and promotion—most units rank pieces in anthologies far below those that appear in "high impact factor" journals, even when there is usually no discernible difference in the quality of the essays in each venue.

For such humanities scholars, a time-limited commitment, particularly after career milestones such as promotion to associate or full professor, is an ideal way to bring their skills and talents to bear on a problem without feeling a sense of career "derailment." The problem of incentives may be less acute for scholars in the natural and social sciences, who are well-equipped to work in teams on multi-authored publications that are well-recognized and rewarded in their respective disciplines. Yet even here, the limited time commitment is often welcome; a conservation biologist who devotes herself for two years to questions of humanism and post-humanism, for example, does

not have to give up her ongoing individual research on estuaries and fisheries management. And to the extent that multidisciplinary efforts bear fruit—for example, through well-placed publications or further grant funding—they can begin to reset assessment criteria within disciplines for environmental studies scholars who often feel more "at home" in interdisciplinary settings. Very few universities in the United States—most notably UC Davis and Duke—have understood this fundamental tension between team research and individual incentives and worked to alleviate it.

In a problem-centered approach, the teams would need to do a good amount of disciplinary "show and tell" (for example, in *Uncommon Ground*, the "found object" exercise initiated by Donna Haraway) to set the right tone of trust and engagement, especially in resolving the "realist epistemologies" of the natural sciences and some social sciences (i.e., the goal of universally applicable models or experimentally replicable results) with the "epistemologies of suspicion" so common now to literary studies, cultural studies, and historical analysis.[3] Yet I am surprisingly sanguine about meeting the challenges and opportunities of such encounters. I have had little trouble convincing natural scientists of the value of my work and have had positive experiences working together with marine scientists in the South Carolina low country, sitting with geologists on master's thesis committees, or helping biologists organize workshops on questions about "what is the human?" The roadblocks to a deeper engagement with my colleagues in these fields are less epistemological or methodological than institutional: the accounting procedures, incentive structures, and enrollment targets that make even the smallest steps toward interdisciplinarity immensely challenging.

3 I borrow the term "hermeneutics of suspicion" from Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham, NC: Duke University Press, 2010), xiv, who uses it to describe the theorists' tendency to locate a human "will to power" behind claims to nonhuman agency, especially of "nature" or objects. Dipesh Chakrabarty has also spoken of the difficulties reconciling a postcolonial hermeneutics suspicious of Western universalist histories of liberalism and capitalism with the "species history" necessary to imagine human beings as geological agents capable of changing the climate and creating a new geologic epoch, the Anthropocene. See Dipesh Chakrabarty, "The Climate of History: Four Theses," *Critical Inquiry* 35 (2009): 197–222, especially 220–21. The significance of this scholarship for humanities-natural science collaborations deserves further investigation.

SueEllen Campbell

## The Simplicity Complex

I want to speak briefly about three of my multidisciplinary projects. Though they combine solo with collaborative work in different ways, some of the lessons they've taught me seem to hold across those differences.

First, *Even Mountains Vanish: Searching for Solace in an Age of Extinction* (2003). During a winter walk among Ancestral Puebloan ruins in Bandelier National Monument, just below the nuclear weapons lab and radioactive waste at Los Alamos National Laboratory, I asked myself some questions about the deep history of that place and a few of its inhabitants. When I first entered the library to look for answers, I had in mind a month's work and a very short personal essay. Years later, after the essay had grown too long to publish alone, I had a book that foregrounded the process of stepping outside my knowledge—and the emotional impact of dwelling on certain questions, facts, and ideas.

In tackling my geological and evolutionary questions, I first encountered a cluster of interlinked problems that I'll call the *simplicity complex*: how to find reputable sources I could read at a reasonable pace, with vocabularies I could manage (with glossaries for help), at the intermediate level of detail, generalization, technicality, and scope I wanted; how to identify which issues were at least temporarily settled and which were actively disputed, and why; how to know which of my questions were good ones and which weren't, and why; how to understand certain information and assumptions so basic to other fields that writers didn't bother to explain them. At first, I felt mostly frustrated by my ignorance, but gradually I learned to negotiate this complex and started to enjoy myself.

Second, *The Face of the Earth: Natural Landscapes, Science, and Culture* (2011). While this book started out as a full-fledged collaboration, the percentage of my solo work increased for various reasons. Two kinds of texts make up the book. Five chapters bring together material from the humanities, arts, and natural and earth sciences into a coherent "big picture" and narrative, while 26 short essays offer first-person accounts of visiting particular places at particular times. Twenty writers contributed prose, five of

them (in very different ways) to the research-intensive main text, and I consulted many additional advisors, some much more helpful than others. In this project, the simplicity complex appeared everywhere, both in the research (as with *Even Mountains Vanish*) and now also in the writing (as we wanted general, not specialist, readers): in every aspect of the main chapters, in the difficulties experienced by some collaborators, in the range of helpfulness from advisors, in collision scars such as changes in voice during transitions between the sciences and the humanities, and in lingering jargon from both. At some point, I realized that if the book were ever to be finished, I would need to take a strong lead—one that involved a lot of editing and rewriting to balance the ingredients and create a reasonably consistent style, especially in the main text but also in the short essays by scientists new to personal narrative.

Third, climate change. In the spring of 2005, I read the series of *New Yorker* articles by Elizabeth Kolbert that became *Field Notes from a Catastrophe*, and climate change began its march to the front of my mind, where it has stayed. By the release of the Intergovernmental Panel on Climate Change's 2007 assessment, my husband's concern had caught up with mine (he's a fellow English professor who has also written about science for general audiences) and we launched Changing Climates @ Colorado State (CC@CSU): a multidisciplinary education and outreach initiative born at our kitchen table, fed by enthusiastic and helpful colleagues, with nobody's permission, no official status, and funds from our dean to pay for posters and a room rental or two. (That is, until other money started coming our way—including enough from an National Science Foundation-supported cloud-modeling center on campus, CMMAP, to pay for some of my time.)

We began by organizing talks for the campus and community. So far, we've run about 120 of them (all free), given by as many different speakers, drawn from 28 academic departments and numerous other entities on and off campus, spanning (and sometimes bringing together) as wide a range of disciplinary perspectives as we could find speakers for, to a total audience of around six thousand. We have now branched in two directions. We've done some climate communications training, especially for young scientists and social scientists interested in collaboration. And we run a website, "100 Views of Climate Change," which offers annotated materials from many disciplinary perspectives to interested non-specialist adults—including university-level students and their teachers. In arranging talks and coaching speakers, in working with sci-

entists, and in finding, selecting, annotating, and creating materials for the website, we have encountered the simplicity complex again and again, and our experience in negotiating it has allowed us to help others do the same.

So, the simplicity complex: or, how high-quality information can best be made available to people beyond small groups of specialists. Clear communication has emerged as critical. What works in teaching juniors new to a major, say, works equally well for talking with faculty from other fields: indeed, we ask scientists to imagine they're speaking to faculty or advanced students in fashion design, poets to computer programmers. Plain, ordinary language works best—not specialized terms, which range from the obvious to the more dangerous "iceberg words," such as a field's keywords, where a seemingly ordinary term contains a huge weight of assumptions, theorizing, and scholarship that only fellow specialists can see. Careful simplification is usually the key to clarity and understanding. We tell ourselves and others: decide what main points are most relevant and focus on them—not on the complications, nuances, details, or debates that interest you as an expert. If this means explaining things that you think are obvious, as it quite often will, remember that you are talking to experts in other fields, not yours. And to audiences we say: please ask questions, even ones you think might be stupid.

The US military, I've heard, speaks about KISSing—short for Keep It Simple, Stupid, with stupid referring to the speaker. But really, simplifying well is anything but simple. It's a high-level skill, maybe even an art, one we can all strengthen by paying attention, working hard, and practicing over and over.

Peter Coates

## In Praise of In- and Ill-Disciplinarity, Hybrid Vigor, and Porosity

In my fatuous search for watertight definitions of multi- and inter-disciplinarity, my first port of call was the grant applications forms of the Arts and Humanities Research Council (AHRC), the statutory UK government funding council for the arts and humanities. AHRC defines *multidisciplinary* research as that which "involves researchers from two or more different disciplines," and *interdisciplinary* research as that which "applies methods and approaches of several disciplines."

Multidisciplinarity is the least demanding of cooperative exercises for researchers. Interdisciplinarity requires more effort. Transdisciplinarity clearly requires the greatest effort and involves the highest degree of integration. And so, unsurprisingly, for most scholars it's a bridge too far. Whether, in its highest form, transdisciplinarity represents a super-discipline that subsumes individual disciplinary perspectives and methodologies—and therefore not only comes up with better answers to existing questions but also formulates new and improved questions—I just don't know.

What I do know, having been an environmental historian since I started my doctoral studies back in 1983, is that environmental history has been singled out for commendation as an area of exemplary multidisciplinary and/or interdisciplinary endeavor. In 1996, historical geographer Joe Powell commented that environmental history is "profoundly misnamed if it signals the arrival of another subdiscipline." Instead, it would be "better presented and much better managed . . . as another rejuvenating, galvanizing, interdisciplinary project."[1]

Since Powell challenged environmental history to realize its supra-disciplinary potential, environmental history has delivered the goods and carved out a highly productive middle ground between the natural sciences, the social sciences, and the arts and humanities. And I would argue that environmental history has fulfilled its promise precisely because, whether or not they are card-carrying historians[2], environmental historians—

1 Joseph Powell, "Historical Geography and Environmental History: An Australian Interface," *Journal of Historical Geography* 22 (1996): 259.

2 Another strength of environmental history is that it attracts talented visitors. Germanist David Blackbourn is a case in point. His book *The Conquest of Nature: Water, Landscape and the Making of Modern Germany* (2006) is one of the field's most acclaimed recent studies. But that doesn't mean that Blackbourn is a lifelong convert. His next book will be about Germany's global role between 1500 and 1800. You don't have to dedicate your working life to EH to make a valuable contribution.

as pointed out in 2000 by Stephen Dovers (another interdisciplinary Australian scholar, based at ANU's Fenner School of Environment and Society, and originally trained as an ecologist and natural resource manager)—have not only accepted but celebrated "methodological impurity."[3]

Though I prefer my food and drink to be uncontaminated, as far as my intellectual sustenance is concerned, impurity is a concept and substance that exerts a powerful attraction. The notion of impurity cropped up in an event on the intriguing notion of "in-disciplinarity" recently held by historians of art at the Institut National d'Histoire de l'Art in Paris. That really grabbed my attention. For me, at least, in-disciplinarity connoted impurity and, in turn, quickly metamorphosed into ill-disciplinarity—an intellectual commodity with which I'm really comfortable.

Despite its degeneration into one of the most vapid buzzwords currently at large in British academia, the concept of porosity also offers food for thought. I like porosity because of its hydraulic roots and eco-desirability: porous surfaces (permeable paving) allow storm water to penetrate, reducing runoff and the associated danger of flash flooding, as well as assisting with the filtration of pollutants. Because of its receptive porosity, its willingness and capacity to absorb the insights of other disciplines, both proximate and more distant, and to adopt and adapt their methods, environmental history has provided a highly efficacious approach to environmental scholarship since the 1990s.

Recently, though, I've become more alert and attuned to the multi-perspectival approach increasingly referred to as the environmental humanities, and ever more inclined to regard it as one of the most promising ways forward for environmental scholarship. If environmental history is a dynamic mongrel, an offspring whose hybrid vigor is greater than that of its disciplinary parents, then the heterotic fitness of the environmental humanities (a budding field with super-disciplinary aspirations?) is proportionally even greater, and even less in danger of intellectual inbreeding and gene pool shrinkage.

This widening of my horizons has been encouraged by institutional forces and incentives. University structures, including those for career advancement, often remain locked within disciplinary traditions and boundaries, confronting environmental hu-

3 Stephen Dovers, "On the Contribution of Environmental History to Current Debate and Policy," *Environment and History* 6 (2000): 132.

manities scholars with real disincentives, not least through the tenacious lone scholar mode of research that enshrines the single-authored monograph or article as the gold standard. By contrast, national research funding bodies can incentivize and reward the pursuit of outward-looking and multi- and inter-disciplinary research in the environmental humanities. In 2005, the Arts and Humanities Research Council launched a five-year "Landscape and Environment" program, backed by a budget that, for the arts and humanities sector, was not to be sneezed at.[4]

This high-level endorsement has been instrumental in nurturing an embryonic environmental humanities community in the UK and in encouraging the cultivation of collaborations with a range of environmental managers, policymakers, and extra-academic stakeholder groups (a formal requirement for many grant applications). These relationships and joint activities breathe meaning into "user-informed" buzzwords such as knowledge *exchange* (as distinct from knowledge transfer) and the *co-creation* of research priorities and *co-production* of research findings and outcomes.

The "Landscape and Environment" program's momentum has been sustained and extended through various successor programs, including the strategic initiative "Care for the Future," with its highlight notice, tailor-made for us environmental historians, on "Environmental Change and Sustainability—Thinking Forward through the Past." Collectively, these initiatives have forged a palpable esprit de corps and engendered a spirit of shared endeavor among researchers who, prior to 2005, worked mostly in isolation, often unaware of each other's existence and interests.[5]

The most recent impetus to my developing perspective stems from a current role as convener of a working party on arts and humanities (AH) perspectives on the "ecosystem services" approach to assessing (measuring) the value of the non-human world of nature in terms of the benefits it provides for us—as suggested by the title of Tony Juniper's book, *What Has Nature Ever Done for Us? How Money Really Does Grow on Trees* (2013). This services/benefits approach came of age in 2000, when it was adopted

4 For the Programme Specification, see http://www.landscape.ac.uk/landscape/documents/programmedocuments/programmespecification.pdf. And for the associated website, see http://www.landscape.ac.uk/landscape/index.aspx.

5 Without the material stimulus of substantial external funding for collaborative, preferably multidisciplinary projects that bring in plenty of overheads for our universities—which make it possible to release researchers from at least some of their customary domestic duties—innovative projects and novel collaborations between disciplines will struggle to come to fruition.

as a basic conceptual tool by the Millennium Ecosystem Assessment (MEA)—a massive, five-year, United Nations–directed activity that mobilized an army of 1,400 scientists to survey the current condition of the planet's biophysical systems and the myriad threats they faced. A series of nation-state level surveys followed, including the UK government's National Ecosystem Assessment (NEA) exercise that reported in 2011.

As part of the follow-up phase, with research council funding, we assembled a group of scholars representing the broad spectrum of disciplinary areas that study environmental questions from vantage points beyond the social sciences and natural sciences, including (in addition to historical studies) human and cultural geography, linguistics, literary criticism, ethics, aesthetics, religious studies, and the performing arts. These scholars were augmented by representatives of governmental and nongovernmental management bodies such as Natural England, English Heritage, and the National Trust.

A central objective of this capacity-building exercise is to operationalize (another fine piece of jargon) two key points recently made by climate scientist Mike Hulme: that "the role of story-telling needs elevating alongside that of fact-finding" and that "the role of the arts and humanities is not simply to translate scientific knowledge into public meaning, as though science is the only source of primary knowledge."[6] We want to get beyond the deep-seated belief that what AH scholars do best is to critique hegemonic narratives, to ruffle the feathers of the powerful.[7] For this consigns us to permanent outsider status.

Social science research on environmental questions tends to be driven by the imperative to universalize and systematize knowledge about human interactions with "the environment." More interpretative AH approaches, by contrast, working with qualitative data (often described as "soft" by those who believe that quantitative approaches generate hard data), suggest that meaning lies not so much in generality as in specificity—the fine-grained, time-deep weaving of relationships between particular places and particular people for particular reasons.

But before we get too excited about the explanatory power of our combined forces, we must ask some basic questions. Can we identify a singular, inclusive AH perspective?

6 Mike Hulme, "Meet the Humanities," *Nature Climate Change* 1 (2011): 178.
7 Deborah Bird Rose et al., "Thinking Through the Environment, Unsettling the Humanities," *Environmental Humanities* 1 (2012): 3.

What unites those of us who belong to the AH community? A commitment to the study of things cultural rather than social? If so, then isn't that a pretty low common denominator? And here's possibly the most searching question: given the even broader reach of the already well-established notion of "environmental studies," which (at least in the USA) readily incorporates AH scholars and also routinely embraces natural scientists, how ambitious actually is the notion of the environmental humanities?

What we can do as a critical mass of scholars united under the umbrella of the environmental humanities is make a robust case that the cultural values (individual and shared) of the environment—the spiritual-religious, inspirational, aesthetic, educative, therapeutic, heritage, and identity-expressive benefits and "goods" provided by nature/landscape/environmental settings/place (call it what you will)—are just as tangible as the provisioning, regulating, and supporting services of ecosystems and environments, and no less material than water or timber. We can promote recognition that no environment exists outside history and culture; that all environments are more or less human creations.

And yet my final thought is to wonder whether we should already be thinking beyond the environmental humanities. After all, some scholars and activists identify humanism (and a postmodernist disdain for material reality) as a fundamental reason for, or even the root cause of, the increasingly unproductive and overbearing relationship of many human groups with the rest of the natural world—an anthropocentric *Weltanschauung* generated by a narrowly humanist perspective, as reflected in the title of David Ehrenfeld's 1978 book, *The Arrogance of Humanism*. Isn't it time to start thinking in terms of an *ecological* humanities, even of an ecological *post*-humanities?

Edward Murphy

## Critique, Practice, and Ecologies of the Future: A Vision for Environmental Studies in the Humanities

In whatever guise or name they take, contemporary cross-disciplinary projects are a curious species. Perhaps beyond all else, they are attractive, seducing scholars and funding agencies with the promise of engaging broader publics and integrating specialized fields of study. They seem transformative, even edgy: they offer the possibility of confronting the embedded power of academic disciplines and transcending their often hidebound practices and constrained frameworks. For the solitary—if socially committed—humanities scholar, cross-disciplinary projects might even fulfill dreams of collaboration and public outreach. These projects offer to make such a scholar not only relevant, but important.

Such attractiveness has contributed to the proliferation of cross-disciplinary projects. If this development has provided openings for productive work, it is also part and parcel of knowledge production in the contemporary age of global capitalism. This production is increasingly specialized and fragmented, giving birth to both new disciplinary formations and, ironically enough, cross-disciplinary projects themselves. As David William Cohen observes in describing the North American academy, "interdisciplinarity has gone viral."[1] One basic characteristic of the academy today is that it provides a space for the coexistence of cross-disciplinary endeavors and traditional disciplinary fields. Any major university or research center seemingly needs to have both. Scholars in environmental studies generally engage in cross-disciplinary pursuits while simultaneously occupying a subfield of their home disciplines.

The situation that emerges out of this context is rife with contradiction and paradox. Cross-disciplinary projects promise integration and transformation, yet they are also a part of standard operating procedures. Such activities can thus suffer from the same diseases they are meant to cure. They can be little more than sites of professional reproduction and obligation. In the design and implementation of cross-disciplinary

1 David William Cohen, "The Pursuits of Anthrohistory: Formation Against Formation," in *Anthrohistory: Unsettling Knowledge, Questioning Discipline*, ed. Edward Murphy et al. (Ann Arbor: University of Michigan Press, 2011), 11–36.

projects, actors from more powerful disciplines or funding agencies often disproportionately determine the intellectual agenda. Such actors can relegate the perspectives of other academics and outside stakeholders to a secondary status. Cross-disciplinary projects can also be superficial—sites where academics from different disciplines ostensibly share a topic or a problem but do little to engage or unsettle the perspectives of the others involved. Cross-disciplinary projects thus do not necessarily offer a fundamental challenge to any one disciplinary perspective or practice. They may even validate the pre-existing approach of disciplinary experts.

As a neophyte to the field, but as an environmentalist and anthropological historian concerned with both the fate of the planet and the limits of academic formations, I believe cross-disciplinary pursuits in environmental studies continue to be of the utmost importance. Yet such pursuits face challenges posed by institutionalized cross-disciplinary work, not to mention the entrenched interests, established practices, and constrained understandings at odds with an environmental ethos in the wider world. Given this state of affairs, cross-disciplinary projects alone are not necessarily up to the tasks demanded by environmental studies in the humanities. There is no simple solution to this problem. Nonetheless, certain animating principles within environmental scholarship can serve as guides for the critical work that needs to be done. These principles unite critique and the production of knowledge with an engaged practice. They draw inspiration from a sense of transformation, in which possible ecologies of the future will transcend the troubled and destructive paths of the past and present.

Academic categories are far from the most important part of this pursuit. But transdisciplinarity, at least as I'll define it here, offers the kind of deeper and more reflexive engagement I envision. In transdisciplinary projects, scholars work with other disciplines or sites of knowledge production in order to critically assess and transcend the shortcomings of their own positions. They build on the insights and approaches of their respective fields, while discarding the problematic ones. In this sense, transdisciplinary projects are restlessly aspirational. The goal is not disciplinary validation or professional reproduction per se. It is instead to create active and engaged knowledge, responsive to the intertwined ethical, political, and intellectual demands of the object of study. When the object of study is the environment, and especially a topic such as human-induced global warming, the demands and challenges are all the greater.

Scholars in environmental studies have already risen to meet some of these challenges, although much work remains to be done. Adopting a socially and ecologically engaged ethic that seeks to recognize and care for the earth, environmental analysts have broken down disciplinary conceits and assumptions. Historians of the environment, for example, have long adopted the idea that, as William Cronon has written, "human acts occur within networks of relationships, processes, and systems that are as ecological as they are cultural."[2] Among others, cultural geographers, spatial ethnographers, and actor-network theorists have adopted this overall perspective.

Yet even if this insight is acknowledged in certain circles, it remains radical and compelling, not synthesized into the approach of most scholars and much of the general public. In the field of history, this insight has generally not changed the assumptions and epistemologies of historians who are not in environmental studies. In important respects, environmental history is thus a contained subfield of history, seemingly irrelevant to other historians. In practice, most historians continue to write narratives in which the natural world is a separate and largely taken-for-granted background to human activity and thought. The environment is a tableau upon which human history is written and humans act, a supposition lurking in much of Western thought.

Dipesh Chakrabarty has demonstrated that this has been the case even among historians and other academics who have adopted the critical and politically engaged approaches of postcolonial and subaltern studies.[3] Scholars in these fields have launched restless and wide-ranging critiques of a host of issues central to the formation of the modern world. Guided by a desire to expose structures of hierarchy and violence, these scholars have generally sought to realize radical forms of democratic politics and produce what Edward Said called non-dominative forms of knowledge.[4] In important ways, these scholars practice the very best of transdisciplinary work. They are reflexive and politically engaged, dedicated to exposing power dynamics and the limits and consequences of knowledge production. Yet for all of the ambition and insight in their critiques, such analysts have tended not to take into account how human activity has fundamentally altered the workings of the planet, most prominently in global warming. Such a critical insight has simply not been a part of the narratives

2 William Cronon, "A Place for Stories: Nature, History, and Narrative," *Journal of American History* 78, no. 4 (1992): 1349.
3 Dipesh Chakrabarty, "The Climate of History: Four Theses," Critical Inquiry 35, no. 2 (2009): 197–222.
4 Edward Said, *Reflections on Exile and Other Essays* (Cambridge, MA: Harvard University Press, 2000).

they have produced. Even for these scholars, environmental critique has not reached professional practice.

Environmental scholarship, like any scholarship, is of the world. But it also needs to be for the world, operating at different levels and engaging with varied publics. This can include forums for the most sophisticated of specialized debates, in addition to pedagogy and community outreach. Environmental movements are today widespread and diffuse, but they too require a deeper understanding of what they hope to transform. They can also benefit from reflecting critically on the limits of their own origins and trajectories. Environmental historians and analysts offer crucial perspectives in such pursuits.

Environmental studies need, perhaps more than any form of knowledge, an ethically engaged politics that can provide the tools with which humans can work together to realize alternative ecologies of the future. If this critical work is to have any chance at success, something more than standard academic procedures is needed. Cross-disciplinary projects in environmental studies need to realize the inspiration and promise of work between and beyond the disciplines.

Poul Holm

## Can Environmental Humanities Help Make a Better World?

What a strange question to ask, you may think: of course research helps change the world. Or maybe your response is: what a naive question, the world does not listen to academics—least of all humanists. I believe that the humanities do change the world and that environmental humanities are urgently needed both for intrinsic interest and for their contributions towards a better world. My recommendation is blindingly obvious but curiously neglected by most humanists: in order to have an impact we need to improve the language we use to describe our results and the implications they have.

At the 2008 conference of the Australian Historical Association, a roundtable of historians asked: "Can environmental history save the world?" The panelists called for more interdisciplinary and socially and culturally inclusive approaches that could engage with policy, connect people to place, and understand the complex processes that have led to the present.[1] Such statements of inclusive discourse and critical understanding are probably uncontroversial and will have almost universal support amongst academics.

The question becomes controversial if we ask how the humanities may concretely contribute to the shaping of future societies. Some people will argue that the role of the humanities is not to contribute to the construction of the world, but rather to be a critical voice against established truths. Other may say that while it would be wonderful to contribute, the world does not want to listen to academics in general and humanists in particular.

I believe such statements are unwarranted and self-fulfilling. This is not merely a question of giving up on public engagement; it is about the epistemology of the humanities. At the heart of the controversy about the role of humanities research is the question of whether the academic pursuit is fundamentally about a search for truth—forever imperfect as it may be. The postmodernist historian Ankersmit says squarely that the historian is not committed to the truth, but solely to narrative power. It's a radical position and one

1 Sarah Brown et al., "Can Environmental History Save the World?" *History Australia* 5, no. 1 (2008): 03.1–03.24.

that I reject: we cannot renounce the search for reality and truth without giving up our academic position and assuming the role of the artist.

The humanities are indeed a powerful source of change. We humans are motivated by what we believe, and humanistic thinking is one of the main sources of ideas and narratives that inform social action—for good and for bad. Paradoxically, postmodernist thought provides a striking example of the social impact of the humanities. The linguistic turn of the late twentieth century demolished positivist innocence and naïveté in the social and human sciences, and permeated the film and computer industries. In the twenty-first century popular thinking is characterized by design rather than tradition; we are no longer so preoccupied with how the world is but with how we can create something entirely new and unbound. The linguistic turn was therefore one of the humanistic world's most important discoveries in the last generation. The problem is that the humanities in the postmodernist interpretation may become entirely self-reflecting: scholarship may be a question only of how I choose to look at the world, how the world is reflected in me, or how can I look deeper into myself. Instead of just being critical of this development in the humanities and harking back to the positivist epistemology, we must recognize that there is no turning back. Humans have no tool other than language to comprehend the reality that is around us. The only thing we have as researchers are sensations and perceptions, empirical data and models, whether we are researching nanoparticles or dance. In this way both science and the humanities have taken the linguistic turn.

So if we must seek truth while knowing full well the contingent character of our results, how can we speak up with confidence in order to help make a better world?

The language of the expert is crucial to an audience of politicians and stakeholders. They want to know what is crucial new knowledge, how this expert knowledge may call on us to re-interpret and change our assumptions, and with what confidence they may build upon the knowledge. Such expectations may seem simple enough but many historians are loath to respond directly. Often we prefer to talk around a phenomenon, expand on context, and criticize assumptions. While such groundwork is vital to understanding a problem, it does not bring out what may be learnt from our research. Of course, sometimes our research only helps bring confusion to a higher level but every so often we succeed in clarifying our field of study. As researchers we may, however,

be so engrossed with the intrinsic value of our research that we are tempted to end our pursuits when we reach this happy moment of insight. Unfortunately, the request by our audience is often the embarrassing "so what" question—or, more positively put: What do we learn from this?

It is precisely the embarrassment of the question that shows that we need to hone our language as experts in environmental history. The question is completely legitimate, and finding it difficult or embarrassing to answer is an indication that we have not thought hard enough about what it is that we do. Most of us choose our occupation by circumstance and inspiration, and we pursue research questions out of curiosity. But most other people are curious about other things and if we want them to appreciate our research we must be better at articulating the social value of what we do—even more so if, as in the case of environmental humanities, we believe that our subject matters.

One way forward is to improve our ability to talk of *findings* as in other scientific fields of inquiry. Findings are what you expect from an expert—not necessarily rock-solid evidence but an articulation of the best-informed evaluation of a problem and the implications of this insight. Findings come in many forms. It is a humanistic finding that children's reading abilities are positively influenced by parents' reading aloud to them. The finding is a result of researchers' comparing parents' practices and school children's linguistic abilities in several countries and combining statistics with theories of learning. It is important to recognize that the humanities produce findings because this enables us not only to criticize the world but to help create a better one.

A finding is a different thing from a find as it involves comparison, interpretation, contextualization, and consequence. The find needs to be *compared* with similar finds in order to identify its unique character, and there is always an *interpretation* involved in a discovery, whether of a cultural marker or a microscopic life form. The archeologist identifies changes in soil layer as the remains of a king's stronghold only by combining knowledge of building construction, dating, and typologies with theories about past societies. Contextualization builds on the finding. The identification of an earthen object is a find, the identification of the earthen object as a hill fort is a finding, and to understand hill-fort society we need contextualization. *Consequence* is what follows in intra- and extra-academic contexts: Do we need to revise our theory (in this case of Iron Age society), do we learn anything new (say, about the articulation of power

across time), and what does this require us to do (for example, revise conservation policy)?

Environmental humanities help us understand how and why we choose to act like we do. We therefore also need to enhance our ability to draw lessons from our research. My simple point is that we can only do this when we articulate our findings as expert knowledge of specific relevance.

Gregg Mitman and Rob Nixon

## A Dialogue on Form, Knowledge, and Representation

**Gregg Mitman:** Disciplines impose a certain form and structure on the world. When we see calls for multidisciplinary, interdisciplinary, or transdisciplinary work, what is the impulse behind it? Is it, perhaps, that the forms of knowledge are so stagnant that they are out of sync with, and unable to adapt and respond to, dynamic processes at work in a changing world? Forms are sedimentations of processes that have already been. Indeed the whole question of disciplinarity seems to raise an age-old question in the life sciences: which comes first, form or function?

I think it is useful to remind ourselves that the individuated self, which is core to a neoliberal frame of the world, is in fact contested, even within the life sciences. As a recent article in the *Proceedings of the National Academy of Sciences* notes, genetic identity is hardly a foundation for the biological self. Organisms, including humans, are complex assemblages of interspecies interactions and communications. Symbiosis, once thought of as an aberration in biology, is turning out to be more the rule than the exception. The biological is social all the way down.

It is useful to remind ourselves that a number of biologists at the turn of the twentieth century, such as Charles Manning Child, whose views were influential in the development of ecology as a science, adhered vehemently to such a symbiotic view of the world, gaining traction once again in biology. Working on highly plastic organisms like *Planaria*, Child regarded the individual not as "independent and self-determining in its origin" but instead as an outcome of the "relations between living protoplasm and the external world." Echoing John Dewey's suggestion that "it is through association that man has acquired his individuality and it is through his association that he exercises it," Child and his colleagues argued that "living goes on in and because of an environing medium." Form, in other words, is an artifact of function. Or, in Donna Haraway's language, partners never precede their relating. Such a view has important philosophical and pragmatic consequences for questions of agency, representation, and activism in the arena of environmental studies.

I've been borrowing from contemporary biology and the history of twentieth-century life sciences to challenge questions of individuation and structure upon which disciplines

rely. Rob, I know literary studies have a lot to say about form and the individual self as subject. Is there anything in this biological debate that resonates with recent moves in ecocriticism and postcolonial studies?

**Rob Nixon:** Thanks, Gregg. Scholars like yourself and Donna Haraway have done such essential work in drawing to the surface these earlier lines of inquiry within the life sciences, lines of inquiry that maintain that "the biological is social all the way down." Absolutely, there are resonances in terms of postcolonial and indigenous studies—two fields that are in increasing conversation with each other. These resonances span questions of agency, representation, and activism. We are witnessing across much of the Global South and among indigenous peoples of the North a pushback against the neoliberal assumption that the individual consumer (even more than the individual citizen) is the building block of society, the foundational unit of "development" and "growth." Many indigenous struggles are animated by very different cosmologies, antithetical to any idea of atomized selves that, when aggregated, constitute society. More often these cosmologies embrace porous, symbiotic relations among the human and the more-than-human.

Marisol de la Cadena's insightful work on the resurgence of indigenous cosmopolitics in Ecuador, Bolivia, and Peru is pertinent here. She notes how some indigenous activists, opposing a mine in Peru, did so primarily because they feared the wrath of the mountain in a way that's not reducible to the non-indigenous environmentalist position that the mine would poison pastures. And when in 2008 Peru's neoliberal president Alan Garcia sought to deregulate Amazonian territories to admit more mining, timber extraction, and dam building, an indigenous coalition went on strike, proclaiming "We speak of our brothers who quench our thirst, who bathe us, those who protest our needs—this brother is what we call the river. We do not use the river for our sewage; a brother cannot stab another brother."

De la Cadena notes how "the indigenous-popular movement has conjured sentient entities (mountains, water, and soil—what we call 'nature') into the public political arena" as neoliberal deregulation encourages extractivist interests to push into indigenous territories. The presence of such *tirakuna* or earth beings as political actors is now acknowledged in Chapter 7 of Ecuador's 2008 constitution, which affords rights to Pachamama (Source of Life).

All this has profound ontological and epistemological consequences for the ways we delimit being and partition knowledge. The coexistence of multiple cosmologies within a community calls to mind the rural Irish woman who, when asked by a visiting US anthropologist whether she believed in the "little people," replied: "I do not, sir. But they are there anyway."

This returns us, Gregg, to the question of symbiosis that you raised in relation to the way the categories "human" and "nature" are organized, a critical issue for the environmental humanities. Just as neoliberalism is premised on the civilizing mission of creating ever more consumer individuals—individuals free to "choose"—so the neoliberal university is premised on the apparently self-evident categories of disciplines and departments, which can be mixed and matched, freeing them from their disciplinary shackles. Yes, startling work can emerge from transdisciplinary encounters, but we should remember what forms of knowledge and being continue to be marginalized or misconstrued by the lingering impress of that hegemonic tradition of disciplinary rationalization.

Pertinent here is Linda Hogan's essay "Department of the Interior" in which she notes: "As American Indian people in the political body of the U.S. we are overseen and located under the governmental offices of the Department of the Interior, along with the rest of wilderness, forest, animals, fish. Like them, we are held in low regard." The bracketing of Indians as "low lifes" with "lower" creatures resulted from settler racism. But ironically, that bureaucratic conflation was apposite for peoples who refused a categorical distinction between human and nonhuman sentience, including the sentient landscape itself. "Department of the Interior" brings together the existential question of interiority with both the Euro-American settler project of bureaucratic classificatory control and the geographical interior as a hostile, blank space of wildness (native, creaturely, and topographical) across which manifest destiny needed to be inscribed.

This brings us back to the issue of form and function that you raised, Gregg, a critical bridging issue that links the life sciences to the environmental humanities.

We've talked a bit about the relation between biological and bureaucratic forms, but what about creative form in the environmental arts? Among environmental activist-writers from the Global South the memoir has become a particularly favored form. But the memoir is premised on the exceptional individual life, whereas many Global South

writer-activists have emerged from hybridized cosmologies that are not easily reducible to the kind of selfhood that the Western-based memoir industry expects. Nor are their forms of collective mobilization easily reducible to the exceptional individual story. Let's ground this in the example of Wangari Maathai and the Green Belt movement, a movement that planted over one hundred million trees in Kenya and beyond.

Maathai's first book, *The Green Belt Movement,* has lots of "we's" and almost no "I's." But by the time her memoir (*Unbowed*) appeared in 2006, Maathai and the Green Belt Movement had been awarded the Nobel Peace Prize. So, under pressure from her US and European publishers, she wrote an "I" book in which none of her cofounders or fellow organizers feature as textured characters with historical agency. She does make the point that the movement's successes were collective, but that remains an abstract, largely unpeopled assertion. What the reader remembers is Maathai the exceptional individual who has triumphed over adversity, a story that fits the mold of Age-of-Oprah celebrity selfhood. This idea of celebrity selfhood feeds into the whole "yes-you-can" ideology of heroic individual possibility that belies the deepening disparity, under neoliberalism, between the überrich and the ultrapoor, the latter treated as disposable by neoliberal development ideologies, alongside the disposable ecologies on which they depend. The Green Belt Movement arose among rural Kenyan women, the outcast poor, in opposition to forces of neoliberal globalization and national authoritarianism that were ravaging their environments. Yet their story, in Maathai's memoir, morphs into a story much more compatible with a neoliberal developmental ideology. Thus we see how together the financial clout and dominant narrative traditions of the wealthy nations deeply skew the available forms of public memory.

I am wondering, Gregg, about your own experience—not only as a historian of science, but as a filmmaker, which must give you a whole different relationship to the question of form.

**Gregg Mitman:** You offer some telling examples, Rob, from different parts of the world of how dominant forms of knowledge and representation, sustained by global capital, set the rules of engagement. I wonder if history can be of some help here. Because we need to remind ourselves that disciplinary structures, literary forms, even scientific objects, have histories. They came into being by virtue of their power to do some type of work in the world for good or ill. But, as you so eloquently point out, other ways of being became

marginalized or disappeared as those conventions took hold. What stories might we find of being in relation to the world that once were, might have been, or still exist, as your anecdote of the rural Irish woman so evocatively conveys? We need such stories to disrupt entrenched patterns of thought, challenge the comfort and complacency of our hyper-professionalized disciplines, and bring us closer to the lived realities of people whose livelihoods, cultures, and traditions are rapidly being consumed by our voracious appetite as future-eaters. We need stories, because we desperately need to listen, not out of a nostalgia for the past, but out of a sense of urgency for the future.

Film is an important form in this regard. It does, of course, participate completely in and reinforce the standardized conventions of celebrity selfhood that you so compellingly describe. Even among non-human animals. One of my favorite examples is the killer whale, Keiko, the star of the film, *Free Willy*. When the US public learned the plight of this animal star, languishing in a tank in a Mexico City amusement park, the checkbooks opened up. Green philanthropy and consumerism is the measure of US environmentalism these days. In his time of need, Keiko attracted $8 million in corporate and financial contributions. Warner Brothers kick-started the campaign to rescue and rehabilitate the whale with a $4 million seed grant, a paltry sum compared to how much the animal star made for the studio as an unpaid actor. An elementary school in Kodiak, Alaska, raised $3,000, while the United Parcel Service donated a C-130 Hercules plane to transport the killer whale from Mexico City to the Oregon Coast Aquarium, where he was returned to health and trained in the ways of the wild. He died in December 2003, off the coast of Norway, one year after he joined the company of wild whales. Imagine mobilizing that kind of media attention and financial support for any one of countless indigenous struggles over resource extraction on sovereign, tribal lands throughout the globe. Not likely, unless Bono comes to their rescue. And Keiko is just the tip of the iceberg. Dolphins, penguins, wolves, elephants, and pandas are just a few of the species today that trade in celebrity status, and have been made into stars through a long history of their interaction with the film industry.

But film can also challenge narrative conventions, make visible relations not easily seen, and bend entrenched perspectives of the Other. I am particularly intrigued and heartened by the creative work of indigenous communities in the US, Canada, Australia, and elsewhere to harness the power of film to tell stories that represent their traditions, meanings, and needs and to bring different voices to the struggle for intergenerational

equity. Film is a technology of time; it can both compress and expand the time scales through which we comprehend and see the interaction and lives of human and non-human beings. Isuma TV, for example, a network of Inuit and indigenous communities based in the Canadian Arctic, are using multimedia platforms "to express reality in their own voices: views of the past, anxieties about the present and hopes for a more decent and honorable future." Their "goal is to recognize and respect diverse ways of experiencing" the world, and to "honor those differences as a human strength." Films like *Atanarjuat: The Fast Runner, Before Tomorrow* and *Inuit Knowledge* and *Climate Change* trade in and work against the conventions of mainstream Western cinema. Similarly, in films like *Ten Canoes*, Australian aboriginal communities have appropriated scientific photographs and films taken of their people in the colonial era to reclaim the past and tell stories on their own terms and in their own voices across deep time. Viewers from Western traditions find ourselves forced to confront our expectations of fast-paced stories and hyper-energetic editing that accompany the increasing speed of capital's movement across the globe. Such films give us alternative worlds in which to comprehend and ponder past realities and possible futures that shape our environmental narratives of the present moment.

It is important to remind ourselves, especially after the science wars of the 1990s and the postmodern turn, that film, along with other forms of storytelling, including science, has material effects on the world. It matters, literally, what kind of stories we tell. Your own work, Rob, has wrestled with bringing materiality back into literary studies. Where do you think this impulse for new materialisms arises from? Would you agree that it is being driven, perhaps, by a recognition of the need for the academics, particularly in the environmental humanities, to "dirty" their hands and make their work useful and meaningful to the high-stakes struggles of environmental justice being fought across the globe?

**Rob Nixon:** I'm glad you've emphasized the upsurge in cinematic creativity arising from indigenous communities in North America, Australia and elsewhere. What we desperately need are other times, other ways of representing suppressed or forgotten pasts and futures, alternatives to the rampaging forces of what Idle No More writer Leanne Betasamosake Simpson calls "extractivist time." Together, the theology of unregulated growth (guided by the "invisible hand" of the "free market") and the creed of consumer individualism have left us stranded in the short-lived, shortsighted present. Often when

one mentions indigenous visions of alternative times, one is accused of romanticizing the archaic. But I stand by an observation made by Daniel Wildcat, the author of *Red Alert*, an account of native responses to climate change. For sheer romanticism, Wildcat remarked, nothing indigenous activists have advocated can compare with the neoliberal delusion that we can persist with business as usual. Essentially, the extractivist position is: let's just kick the can down the road until we run out of road.

How does all this impact the relationship between the environmental humanities, community stakeholders, and policymakers? As we have been emphasizing in our exchange, storytelling—scientific, cinematic, digital, literary, and historical storytelling—has material effects, but also emerges from material circumstances. Out of this frictional dialectic, new possibilities are constantly emerging. Within the environmental humanities, the materialist turn is, I believe, partly a response to changing social pressures. One of the defining stories of the twenty-first century is rising, unviable levels of disparity, within societies that range from Spain and Italy and Russia to the US, South Africa, Nigeria, China, and India. In environmental justice terms, we're witnessing increasingly skewed access to resources and increasingly skewed exposure to risk. This has heightened the need to connect the kinds of stories we tell and analyze in the humanities to the stories emanating from embattled communities and policymakers, stories that are often not easily aligned. Certainly in the US, post-9/11 we're inhabiting a different intellectual world from that of the 1990s. Back then—during the dot-com Clinton years—there was far less bridgework between the environmental humanities and societal concerns with inequality, empire, militarization, and climate change. In fields ranging from postcolonial studies to science studies, we are witnessing a new materialism that rejects the rarefied extremes of a constructivist tendency that was often narrowly professional, willfully opaque, and sealed against worldly pressures.

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Today more than ever, academics are encouraged to work across disciplines. But what is the value of such endeavors, and how can they be facilitated? This volume of *RCC Perspectives* presents the experiences of a range of scholars in the environmental humanities, all of whom have contributed in various ways to cross-disciplinary projects. The essays consider what it means to work across disciplines, what kinds of obstacles prevent cross-disciplinary work, and how universities might react to changing demands.

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