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***Abstract**:* After adopting and extending the "test of truth as effective action" that Newell proposes in "A Theory of Interdisciplinary Studies," this article proposes "living well" as the goal of knowledge processes. With this in mind, it explores disciplinarity—the unspoken assumption underlying Newell's argument. Disciplinarity is discovered to be an historical and cultural phenomenon, demonstrating the partial and situated character of all knowledge formations, rather than a privileged site of especially valid knowing. Alternatives are offered to the notions of interdisciplinarity and discipline. Integrative praxes (the alternative to interdisciplinarity) are practices, informed by theory and differentiated by existential situation, aimed at living well. Knowledge formations (the alternative to disciplines) are both bodies of knowledge and processes of coming to know that contain within themselves dynamic patterns from which they have been generated and by which they will be transformed. They are ecological, developing in relation with other developing entities and composed in part of material and structures taken from them. The proposal is that living well is best served by seeking integrative praxes that learn from multiple knowledge formations and fostering ongoing conversation among these praxes.

Preface

THIS ARTICLE BEGAN as a paper responding fairly directly to an earlier draft of William Newell's "A Theory of Interdisciplinary Studies" which is the occasion of this number of *Issues in Integrative Studies* (*IIS*). I soon realized, though, that my real response to Newell's work was to explore a space of thought from which I had previously been working only in an inarticulate manner. This article explores that space of thought, attempting along the way to show how it connects to, diverges from, and reflects upon fundamental assumptions embedded in Newell's proposal.

Several existing literatures shed light in some of this space. Before I encountered Newell's ideas, I was only marginally aware of these literatures,

and although I am now investigating them, it will be some time before I am familiar with them, so my "traveler's reports" are more questions than conclusions.

I would like to begin by asking why we think, or at least why I think. There is, of course, the bio-genetic answer: we can't help thinking; that is the sort of animals we are. This is undoubtedly true. I imagine, though, that like bipedalism and neoteny, inveterate thinking has provided some evolutionary advantage to our species.[1] Here I am both Socratic and Whiteheadean. As Socrates would have it, people seek to do *the good*. For now, I will assume this means to thrive, a phenomenon that includes physical, emotional, and spiritual well-being and includes such qualities as vitality, joy, peace, social and cultural connection (in the present and from past to future), and an experience of personal meaning.[2] Whitehead (1958) puts it a bit differently. The function of reason, he claims, is first to live, then to live better, and finally to live well. My sense is that *living well* for Whitehead resembles Socrates' *good*. *Good thinking*, then, enhances our ability to live well, to do what it is good to do.[3] As Donna Haraway remarks, we need knowledge that, "offers a more adequate, richer, better account of a world, in order to live in it well" (1996, p. 133).[4]

Near the end of his piece, Newell asks how we can test "interdisciplinary integration," responding that "the proof of successful integration is pragmatic. . . . In general, can one act effectively " (p. 22)? As he goes on to point out, we live in a world that is both urgent and surprising. Our circumstances force us to act with an incomplete understanding of the context and consequences of our actions. In the face of this, Newell counsels humility (p. 22). I agree completely. But I would like to linger on the "test" of our work here at the beginning of our considerations. Perhaps this test is a place of departure, rather than a destination?

What does it mean that the proof of our thinking is effective action, remembering that doing nothing is action? Newell is working with the example of acid rain. Effective action would "help solve the problem," but because the world is surprising, our actions may "produce large and unexpected results" (p. 22). Implicitly, Newell foresees that the actions our understanding leads us to take today may create circumstances that call for new understandings and new actions tomorrow. We live in a changing universe whose changes are, in part, results of our actions.

Newell took two very important steps. First, in his test he abandoned the "copy theory of truth." Thought's test is not the accuracy with which it describes "reality," but its capacity to orient our action. This decisively puts to

an end any notion of "thought (or art) for its own sake." [5] Second, he understands thinking as an activity which participates in a process that it affects and is affected by. This helps us remember that Socrates' *doing the good* and Whitehead's *living well* are activities, not theories. Yet they require theory. Living well or doing good involve thoughtful practice and practical thoughtfulness. The marriage of science and art, as Wendell Berry (2000) reminds us, is in many ways an ordinary thing:

> "[S]cience" means knowing and "art" means doing, and . . . one is meaningless without the other . . . the two are commonly interinvolved and naturally cooperative in the same person . . . it is not possible to imagine a farmer who does not use both art and science. (p. 124)

The test of thought, then, is its ability to contribute to practices of living well. Because the universe is surprising, these practices cannot be static sets of skills, but must include the ability to respond appropriately in a dynamic context. Many factors contribute to the dynamism of the world, which appears wherever we look. Continents break apart and drift away from one another; huge sheets of ice flow over the now-temperate zones and retreat again to the polar regions; long eras of drought alternate with those of benign weather and good growing; new diseases (like AIDS) appear and challenge societies' resources for health care, public policy, private conduct, and discourse; economic and socio-political developments strengthen both globalizing and fragmenting trajectories; international terrorism provokes responses that affect a web of social, cultural, personal, and individual factors.[6] Our own actions are one dynamic element.

There is another source of ambiguity and openness inherent in knowledge processes, which Newell does not take into account. Newell acknowledges the nonlinear evolutionary path of complex systems (i.e., the world), so he sees that our actions may lead to unforeseen consequences. He does not explicitly acknowledge our inherent incapacity to know the world completely or adequately at any given moment. The insufficiency of our behaviors and our surprise at their consequences derives not only from the complex unpredictability of the world's process of development, but also from the fallibility and incompleteness of our ability to understand.

Our (partial) understanding guides us to act in ways that have unexpected results, to which we must respond in novel and unanticipated ways. For example, our use of antibiotics has created new risks, embodied in the growing array of antibiotic-resistant diseases. The actions our understanding helps

shape today will (sometimes) create circumstances that call for new understandings and new actions. Part of what we need to know is how to change. We must "make room for surprises and ironies at the heart of all knowledge production; we are not in charge of the world" (Haraway, 1996, 125).

So the test of thought is its ability to contribute to what I will call *integrative praxes*, by which I mean the sorts of dynamic and thoughtful practices and dynamic and practical thoughtfulness considered above. The plural praxes is significant here. We know that even *the self* is complex, internally contradictory, and affected by context. "The knowing self is partial in all its guises, never finished, whole, simply there and original; it is always constructed and stitched together imperfectly, and *therefore* able to join with another, to see together without claiming to be another" (Haraway, 1996, p. 119). [7]

This is one reason we need humility. Who is doing the integrating also makes a difference. It is one thing for me to integrate your insights into mine (to incorporate you into me). It is quite another for you to integrate my insights into yours (for you to incorporate me).

Nevertheless, integration, in the way I wish to use it, in a sense precedes rather than follows upon the work of thought. That is to say, there is really only one question, "How shall we live?" There is really only one test "the health and durability of human and natural communities" (Berry, 2000, p. 134). Thinking is integrative if it contributes to this health and durability. Of course, this formulation opens endless questions circling around these two: How can we recognize "living well"? And how can we act to realize it? Asking these questions, persistently and insistently, is, I believe, part of integrative praxes. Confronting our inability to answer them is one motive for the humility Newell urges upon us, and which is also, I believe, a necessary component of integrative praxes.[8]

How might an understanding of this "end" or "test" that Newell proposes and I adopt for integrative praxis affect how we think about interdisciplinary study? The subtitle of this article suggests we move away from thinking of *the disciplines* as unique sources or resources for knowledge and thought. We might instead imagine the disciplines as one sort of knowledge formation, of which there are several kinds, for example the knowledge of workers (carpenters, mechanics, website designers, farmers), the knowledge oppressed peoples have of those who oppress them, the knowledge West African immigrants have of "the system" and how it works in New York City (Stoller, 1997, pp. 91-118), the knowledge of Songhay sorcerers, the knowledge of statespeople and diplomats, the knowledge of mothers gazing into the eyes of infants, the knowledge of indigenous peoples for the places they tradition-

ally inhabit, the knowledge that Judy Baca calls "maintaining a relationship with the dust of one's ancestors [which] requires a generational relationship with the land and a respectful treatment of other life found on the land" (Baca, 1994, np). Any of these and other knowledges may be useful or even necessary to think well in a particular context or about a specific concern. This takes into account, for example, the varieties of local, vernacular, or cross-cultural knowledge that are sometimes critical for success.

The term knowledge formation intentionally embraces an ambiguity between noun and verb. Knowledge formations are both processes and entities. They are forms that contain within themselves dynamic patterns from which the form has been generated and by which it will be transformed, although knowledge formations are not monadic or self-generating. Like other entities, knowledge formations are ecological, developing in relation with other developing entities and composed in part of material and structures taken from them. What Newell thinks of as "interdisciplinary studies," I tend to think of as "learning from multiple knowledge formations."

Another benefit of the notion of knowledge formation is that it situates us (as knowers or thinkers) in a network that includes institutional structures, economic forces, social interactions, political considerations, historical influences, personal motivations and so forth. We are "in formation," both in the sense of engaging in a process that develops form and in the sense of being in a structured relationship with other entities in the formation (like migrating geese, for example). As we think about the disciplines, and about interdisciplinary or integrative study, we will need to keep in mind the importance of these formative relationships and processes.

The existence of multiple knowledge formations reminds us, as scholars, of what we so often remind our students: we do not know what we do not know. Part of what I want to say in this article is that we need to imagine the existence of knowledges we do not now know: new contexts and formations of knowledge, not just new contents of knowledge or transformations of our existing knowledge formations. Such an act of imagination is extraordinarily difficult, since our imagination is itself informed by our knowledge. In fact, imagining genuinely unknown knowledge formations may best be represented by a pregnant openness, a realm of possibility that can be lived into but not provided with specific contents. This makes giving examples a dicey task. Any example I provide below rests on and roots in the knowledge formations in which I participate, most of which belong to or are credible in the academy. Yet the knowledge formations I want to point toward are outside the penumbra of the currently known (though some may be known to those in

other cultures, sub-cultures, or classes excluded from the academy). So make use of examples, to the extent that they help to provide content to what otherwise may seem abstract, but remember that they are limping and halting pointers toward what remains to be discovered.

Introduction

Before we go further, it may be helpful to set this conversation in the context of knowledge formation. Newell's "A Theory of Interdisciplinary Studies," attempts to provide a rigorous conceptual rationale for interdisciplinary studies by defining its proper objects of study, its appropriate methods, and the hallmarks of what he takes to be its primary trope (integration).[9] It marks a significant step in the maturation of our shared enterprise, sometimes called "interdisciplinarity."

Newell envisions his ideas in the context of a momentous conflict over interdisciplinarity carried out within the AIS, as well as elsewhere. Against "a vocal faction . . . who caution against definitional closure for interdisciplinarity on the grounds that settling on any definition excludes as well as includes," he aligns himself with those who have been, "seeking credibility for interdisciplinary study through conceptual clarity and, ultimately, through standards for judging its quality" (p. 6). This is a contentious characterization. Is it true that those opposed to definitional closure for interdisciplinarity hold their position solely, or even mainly, on the grounds Newell states? Where is the warrant for this claim? Those who resist closure of definitions are not necessarily opposed to conceptual clarity and may have and apply standards for judging quality. Perhaps, too, *clarity* and *standards* have their own soft underbellies, as well. Wittgenstein remarked that a fuzzy picture of a fuzzy reality is truthful (1958).[10]

Then again, "seeking credibility" raises its own questions. With whom do we seek credibility? Why do we seek it? What are the consequences of having or not having credibility? How is this credibility related to the test of our thought—its contribution to living well? Who is credentialed to pass the judgment of credibility, and are these credentials primarily intellectual, or economic and political, or should they be understood in some other way? Perhaps some who resist Newell's path to credibility do so because they do not acknowledge the authority of the creditors whose approval Newell seeks. Perhaps they even believe that becoming credible in that structure of knowledge formation vitiates the impact or even falsifies the meaning of interdisciplinary study.

Newell has passionately and effectively pursued *credibility* by means of

writings, consultations, and his role as Executive Director of AIS. His paper may be seen as a culminating statement emerging from a long and distinguished career. Nonetheless, IDS's movement from wilderness to domesticity, however salutary from some perspectives, may have its attendant dangers.

Newell's essay is courageous in broaching key theoretical, methodological, and even metaphysical questions in interdisciplinarity, raising philosophical issues, surrounding its practice, which have been more observed from a distance than engaged. I hope it precipitates the deep, broad, and multi-voiced conversation from which genuine philosophies of integrative praxes might emerge. Entering into this conversation, it seems to me, requires us to shift our footing somewhat from the customary staging area for academic discourse. In some ways, this is a typical scholarly dispute. Experienced senior academics are contesting concepts of field-definition in a professional society journal. But this is also an existential disagreement. Ultimately, what gets to count as legitimate interdisciplinary work, and where and how it is housed within institutions, will have significant implications in the lives of individuals and of colleges and universities, as well as for the practice(s) of interdisciplinarity. Beyond that, if the results of our thinking work are in any way consequential, if they have some relationship to our ability or inability to live well, the adjudication of this question will affect the lives of many communities and individuals far removed from the academy. I want to argue that this is, in fact, always actually the case with questions of knowledge. Claims about knowledge make "claims on people's lives" (Haraway, 1996, p. 121). Claims about knowledge (such as Newell is making) have existential consequences. Given Newell's test of truth, these consequences are part of, not distinct from, the knowledge which is claimed.

The discourse involving Newell's article and mine is unusual because it centers around processes of discipline formation rather than around research agendas or findings and/or their theoretical explication (see, e.g., Lenoir, 1993). Because of this, the conversation inevitably inhabits arenas of passion and commitment which are usually hidden or effaced in the academy. Revealing these arenas may be salutary. Perhaps there are always questions of institutional, economic, and personal power embedded in knowledge production processes; perhaps they are more constitutive than we acknowledge; perhaps they should be more clearly evident on the surfaces of our discourses.[11]

Newell's main work has taken place primarily in the area of discipline formation. He has been concerned to clarify the appropriate nature of interdisciplinarity, to embed those clarifications in the literature, and to insti-

tutionalize them within the academy. He has served repeatedly as a consultant at colleges and universities seeking to formalize interdisciplinary structures, and he has played and continues to play a determinative role in establishing those persons authorized by the AIS to do such consulting. In this capacity, he has been perhaps the single most important person, nationwide, in shaping the official face of interdisciplinarity in the United States over the past thirty years. His work is one major reason that interdisciplinarity has grown in respect and resources over the past twenty-five years, and many of us, myself included, owe him a debt not only of gratitude, but in recognition of the economic and status rewards we have reaped as a result. Despite this, I fear that the most important potential contributions of interdisciplinarity are losing more than they are gaining through these victories.[12]

In what follows, I hope to open a conversation about integrative praxes, rather than to provide a conclusive interpretation that forecloses other possibilities. My goal is not that my theory should replace his in the position of gatekeeper for interdisciplinary study, but that the gatekeeping function be plural, complex, and subtle.[13] We are not accustomed to academic debates that require reflection on the institutional forms and structures within which the participants and their practices inhere. We do not usually include conversations about gatekeeping within academic journals or scholarly presentations. But these issues are, I believe, fundamental to this discussion, and we will need to keep them in mind.

We also will have to go beyond a close reading and careful response to Newell's text, as provided, because his argument rests on a hidden premise of tremendous power but limited credibility. This hidden premise is disciplinarity—the disciplines themselves taken as necessary preconditions for and foundations of interdisciplinarity—which leads to the notion of "integration of disciplinary knowledge" as the key unanswered question facing interdisciplinarity. (See, e.g., pp. 1-2, 13, 16.) The disciplines even provide Newell with criteria to evaluate interdisciplinary solutions. "The best solution minimizes the change in disciplinary assumptions" (p. 21).[14] Others make exactly the opposite claim: those solutions are best which confound and transform the disciplines (See quote below from Barthes, 1984). I would like to pursue this counter claim for a while, to question Newell's hidden premise.

"[T]he various disciplines," Newell claims, "have been developed precisely to study the individual facets or subsystems" of complex systems. (p. 2) This is not self evident, and Newell only states but does not demonstrate it. What if the so-called object of study is not the primary factor determining the coming into being, development, and primary content of a discipline?

What if disciplines and disciplinarity play a role in constituting the very objects they study? What if we explore the disciplines as knowledge formations—historical and cultural artifacts embodying, participating in, and regenerating a complex of factors tied to psychological, economic, structural, and intercultural developments in Western Europe and the United States over the past two-and-a-half centuries? [15] This may cause us to re-evaluate the *corpus* they present to us as knowledge. Understood this way, disciplines may be unreliable guides toward a knowledge capable of assisting human understanding and conduct toward personal and ecological well-being, individual and socio-cultural equity, or those most ineffable of human goods—wisdom and joy. From this understanding we might join Sandra Harding's call for a "successor science" (Harding, 1986). Such a science would acknowledge the situated, historical, contextual nature of all knowledge, the need for consistent criticism of the specific means by which particular meanings are made, "*and* a no nonsense commitment to faithful accounts of a 'real' world, one that can be partially shared" (Haraway, 1996, p. 113). [16]

There is a corollary to the contention that disciplines are artifacts. It is that interdisciplinarity has been subjected to normalizing pressures, working in and through academic institutions but reflecting the continuing operation of the complex of factors described above. The plurality of interdisciplinarities may have become less rich and the range of notions about interdisciplinarity may have become narrower, not as the result of increasing agreement among "experts" based on improved reasoning and evidence, but because of the structuring and limiting effects of the socio-cultural and economic field within which interdisciplinarity has had to function.[17] If disciplines are manifestations of social, political, economic, and other institutional forces, effective interdisciplinarities may imply new institutional forms more than any specific intellectual contents, methods, practices, processes, or theories. Integrative praxes may lead academic inquiry, embodied in interdisciplinarity, to participate in knowledge formations outside the academy (and, even, outside Euro-American culture). To the extent that interdisciplinarities come to resemble disciplines, they may miss their most important opportunities to contribute to genuine growth in knowledge and well being.[18] Perhaps we should be aiming at enhancing integrative praxes by connecting and transforming knowledge formations. This may or may not involve interdisciplinarity through integrating disciplinary insight.

None of this denies that disciplines generate knowledge. As Peter C. Reynolds says, we do not "dispute the factuality of scientific knowledge nor deny the physical existence of cosmic rays, isotopes, genes, atoms, or what-

ever" (1991, p. 207). Likewise, we do not doubt the usefulness of notions such as history, culture, socialization, or psychology. This paper could not be written without them. "However, science is a process of selection, not acquisition, . . . for every truth revealed by a technique, there are many others that have been systematically excluded" (p. 207). Ecological interconnection is a good example. Science did not *discover* ecology as a result of an accumulation of knowledge or a breakthrough in theory. Ecology, to the extent it has been discovered at all, was forced upon us by the effects of actions made possible largely by science and technology. Science did not predict these effects; they were imposed on us by our experience of the world. The scientific paradigm of the objective observer disconnected from the field of observation precluded a scientific discovery of the ecological embeddedness of the scientist. "Global pollution, habitat destruction, and the disruption of natural cycles are implicit in the industrial imagery of nature as an alien and untamed force that needs to be made productive by the application of technique" (Reynolds, 1991, p. 210). It is not clear whether "science" as currently practiced and understood, is capable of generating an effective response to our actual ecological relatedness.[19]

One task of integrative praxes may be to seek the excluded truths and to understand their roles in guiding human conduct and in tempering what is otherwise held to be knowledge. "Who gets to decide what counts as knowledge?" is a question worth keeping in mind. If knowledge is increasingly accurate observation, description, prediction, and manipulation of interactions of matter and energy, then science from 1500 to 2000 was a great engine of knowledge. If knowledge is increasingly satisfying existential experience in the context of harmonious (real and felt) relations with the community of beings, including but not limited to humans, then that same science may have done rather poorly.

Another good question is "who gets to ask the questions we will try to answer?" The United States spends vast amounts of money developing medical procedures, drugs, and machinery to extend the lives of the well-to-do. Many more people would be helped, and many more years of human life would be lived, if those funds were spent on simple public health and nutrition programs at home and abroad. What would happen if the poor set the medical research agenda, rather than the rich? We also spend vast quantities of energy, money, and technology on experiments meant to probe the micro and macro secrets of the Universe: on high-energy particle physics and Hubble telescopes. To what extent does this contribute to living well, compared, for example, to research on alternatives to violence, or on restoration of indig-

enous peoples to traditional lands, or on intercultural, interreligious communication? Advocates of *pure* research often point out that it may have applications in the future we cannot imagine today. But this applies to any research whatsoever: it does not direct our energies in any particular direction.

Yet another good question is "who benefits from the processes of asking and answering?" Who actually decides where the world's research focus will be placed? How are they (we?) linked with the flow of resources associated with that research? I believe it would take a good deal of digging and, perhaps, some soul searching, to answer that question. Is it the case, as Berry avers, that academic disciplines participate in "the culture of division and dislocation, opposition and competition, which is to say the culture of colonialism and industrialism" (2000, p. 122)? He claims that, "a conformity between science and the industrial economy is virtually required by the costliness of the favored kinds of scientific research and the consequent dependence of scientists on patronage" (p. 63). "[S]cience serves progress, industry, and the corporate economy, (while) the literary culture . . . gives its tacit approval to the program of science-technology-and-industry and, itself, serves nothing" (p. 68). Certainly, I know that the president of the state university I worked at until three years ago had begun to call it "Value Added University." The state of North Carolina justifies its expense on public education primarily because of its purported contribution to "the economy," which forces universities to support their own requests for funding in the same terms.[20] By this means, knowledge is defined as the information, concepts, theories, skills, and practices that enhance the operation of the current economic system and its enterprises, what Berry calls the conformity between science and the industrial economy.

As Donna Haraway says, "in traditional philosophical categories, the issue is ethics and politics perhaps more than epistemology" (1996, p. 113). This is an important point. It is, of course, true that scientific concepts coupled with technology "can do" many things. For example, it can build a bomb that uses nuclear power and detonate it anywhere. This is, however, a proof by power. And we should remember the long and complex relationship between science and technology, for existing scientific models rely on a history of instrumentation for their development. Certainly, those techniques and skills of perception give rise to an experience of the universe that supports the scientific model of it, and which validates that model through the powerful effects of its corresponding technologies. But what other experiences of the universe are possible? What other ways of being and acting in the universe could they give rise to? Among them, which are most conducive to human

well-being? If the answer given is simply that "the search for knowledge is valuable in its own right, and should not be impeded by any external forces," this is an appeal to the world of ethics and politics, not that of science. And, indeed, economic, political, and personal forces extraneous to the idea of science have shaped the movement of science and its technologies from the beginning, as I will discuss below. Thus the fact that scientific knowledge allows people to do things to other people and to our world is no validation of science, any more than the fact that a government can do things to other people and their world is a validation of that government.[21]

The remainder of this article is an attempt to bring ethics and politics into the "theory of interdisciplinarity" and to the notion of integrative praxes. Newell's theory rests, I believe, on two intertwined assumptions, neither of which has been critiqued: the notion of a consensus about interdisciplinarity, and the notion that disciplines are a necessary presupposition of interdisciplinarity. In what follows, I will probe both these assumptions, beginning with consensus and moving on to the disciplines.

In a short first section, I will claim that what Newell presents as consensus is actually an orthodoxy that should be unmasked and unsettled (for ethical and political reasons) rather than used as the cornerstone of a foundational theory.

Moving on from this claim, I will briefly explore an emerging literature on the nature of disciplinarity. This literature does not so much focus on any particular discipline, but on the very fact that disciplines themselves exist, and on the implications of that fact. This investigation of discipline formation, past and present, will support five major claims, considered as subheadings under the general heading of "discipline formation past and present":

1. the disciplines' objects of knowledge do not exist independently. They are brought into being, along with the (kind of) knowing subjects who know them, and the means by which they are known;
2. disciplinarity as a phenomenon is a historical and cultural artifact, and the broad outlines of its generation can be described;
3. human bodies are deeply implicated in all acts of knowing. Specific bodily disciplines are correlated with specific possibilities of knowing, and the rise of the Academy is linked with the development of particular bodily disciplines;
4. processes of discipline formation are ongoing and contemporary. Normalizing forces currently shape disciplinary activity and are in large measure responsible for the appearance of what Newell takes to be consensus

and which I critique as orthodoxy;
5. gatekeeping, or deciding what gets to be included in a field or domain, is at the heart of Newell's article and this response to it; it is a profoundly consequential issue for the future of "interdisciplinarity."

I end with a short section in which I try to imagine how to know the world differently, an imaginative project clouded by the fact that I can only perform my acts of imagination from within those knowledge formations I now inhabit, despite my desire and need to imagine beyond and outside them.

Consensus or Orthodoxy?

As I noted above, Newell's theory of interdisciplinary studies relies on the existence of a consensus concerning interdisciplinarity that, for example, allows him to define his subject in a single declarative sentence: "By definition, interdisciplinary study draws insights from relevant disciplines and integrates those insights into a more comprehensive understanding" (p. 2). By asserting such a consensus, he seems to be able to sidestep the thorny issue of what gets to count as interdisciplinarity, and proceed directly to a key unmet theoretical need: an account of the nature of interdisciplinary integration. Yet by uncritically accepting what appears to him as consensus, Newell may actually be participating in the production of uniformity, rather than the clarification of consensus. The essay that is the subject of this issue may abet a knowledge formation which requires ethical and political, as well as epistemological critique. From my social location in the Academy, and given my intellectual commitments, what Newell presents in this paper as consensus I suspect is the result of the normalizing influences of institutional pressures rather than of arriving at commonly held positions as the result of shared reasoning and evidence. Instead of being taken for granted and further cemented with "epistemological theory," the "consensus on interdisciplinarity" may itself need investigation.

In a first response, I note that this "consensus" notion of interdisciplinarity Newell presents diverges significantly from mine and from those of many of the colleagues with whom I work most closely. Within the Department of Interdisciplinary Studies at Appalachian State University, there is a range of opinions concerning the status and value of "the disciplines." However, I believe none of us would grant them the semi-ontological status provided by Newell, and many of us are unwilling to offer them the role as "starting points" Newell believes to be supported by consensus. Outside the department, many colleagues complain that interdisciplinary studies as a field has

abandoned its historic status by "turning itself into another discipline," thereby both ignoring and marginalizing important work that crosses, connects, and confounds disciplines but does not fit into the pseudo-disciplinary definitions now defended by "interdisciplinarity." Colleagues in, e.g., Latin American Studies and Women's Studies, argue that "rules and theories" for interdisciplinarity (such as Newell proposes) reify a concept (interdisciplinarity) that has no fixed objective referent. They would argue that the objects of study (e.g., women or Latin America) determine the form and structure of the work to be done and that there is no necessary correlation between the kind of knowledges and integrations needed to study one in comparison to those needed to study another.

In this respect, it is enlightening to compare Julie Thompson Klein's (1990) list of steps in the interdisciplinary process with Newell's redaction of it (pp. 14-15). Klein's second step is "*determining* all knowledge needs, including appropriate disciplinary representatives and consultants, as well as relevant models, traditions, and literatures" (1990, p. 188). Klein's notion is in harmony with the idea of learning from multiple knowledge formations, be they academic disciplines, vernacular discourses, practices and skills normally excluded from consideration as knowledge, or resources emerging from other cultural contexts altogether. Newell says his version of Klein's criterion "abstracts from messy issues of teamwork" (p. 14). His proposal is "determining relevant disciplines [interdisciplines, schools of thought]" (p. 15). Something more than "messy teamwork" has been dropped. Klein begins with the need to know. Her formulation (knowledge needs) is open to knowledge formations that are not disciplines, knowledge that must be developed either within or outside of existing disciplines, knowledge imported from outside the academy or from another cultural context, and knowledge that is needed but whose generation cannot now be imagined. Newell begins with existing knowledge, primarily as presented by the disciplines.

In 1984, Roland Barthes wrote:

> Interdisciplinary work, so much discussed these days, is not about confronting already constituted disciplines (none of which, in fact, is willing to let itself go). To do something interdisciplinary it's not enough to choose a "subject" (a theme) and gather around it two or three sciences. Interdisciplinarity consists in creating a new object that belongs to no one. (p. 97)

Contrast this with Newell's definition cited above: "By definition," he writes,

"interdisciplinary study draws insights from relevant disciplines and integrates those insights into a more comprehensive understanding" (p. 2).

Newell defines interdisciplinarity as a process of integration rooted in but going beyond previously existing disciplinary knowledge. Barthes, in contrast, defines interdisciplinarity as a process of bringing new objects of knowledge into being, a process of knowledge formation. With Barthes, and contra Newell, I understand "interdisciplinarity" as a search not only for new "knowledge" but also of new ways to know and of new "things" to be known, including new social relations that generate and validate knowledge, new spatial experience giving rise to new "knowing subjects," and new dimensions for knowledge. A bit earlier in his article, Newell glosses the motivations for interdisciplinary study, taking them from his survey with Julie Thompson Klein for the *Handbook of the Undergraduate Curriculum* (p. 5). In addition to the seven motivations listed there, I would add creative insurgency—a desire to change the structures through which knowledge is generated and disseminated by confounding, resisting, transforming, and replacing existing institutional forms (perhaps in perpetuity).[22]

In one sense, this may seem to be merely a semantic disagreement. Couldn't "interdisciplinarity" be reserved for Newell's meaning, and some other term be coined for what Barthes and I find to be important? But the dispute is not really semantic because there is more involved than a word. First, Newell is making a move to correlate an intellectual process (interdisciplinarity) and a domain of problem (what he calls "the complex"). In fact, Newell attempts to parse out domains and approaches. Objects with single facets require only disciplinary study; multi-faceted but incoherent objects correspond to a multidisciplinary approach, since no integration is necessary or possible. He refers to "widely accepted distinctions between interdisciplinarity and multi- or trans-disciplinarity. More to the point, those distinctions now emerge naturally from the epistemology of interdisciplinarity" (p. 6).[23]

Newell's epistemology leaves no room for "creating a new object that belongs to no one." I cannot give an example of such an object, precisely because it would be new, and would emerge in a domain of knowledge formation that does not yet exist. Nor can I denote it as single faceted, multifaceted but incoherent, or complex; nor can I know in advance if it is purely academic, not academic at all, or a hybrid of knowledges currently held within and without the academy: this is what it means to be a knowledge object that belongs to no one.

By eschewing the domains of politics and ethics Newell's proposal also fails to take into account positions and claims already set forth by women

(see e.g., Haraway, 1996), inhabitants of the internal colonies of the West (see, e.g, Carp, 1994), incompletely modernized denizens of Western cultures (see, e.g., Seremetakis, 1994), and people from other cultural trajectories (see, e.g, Stoller, 1997). Haraway asserts that all knowledge inheres in a specific human body, marked by gender, age, class, race, and personal history. Amalia Mesa-Bains (1994) invokes an inseparable relationship between spirit, land, and identity, revealing that Chicanos and Latinos in the United States, living as members of internal colonies, act to support their cultural survival by remembering a land buried under the asphalt, steel, and plastic detritus of the colonizing power. Nadia Seremetakis (1994) describes the power of reflexive commensalities: structures of sensory experience embodied in meals, journeys, gardens, ways of speaking (especially to and about children), and other sensory structures imbued with meaning. These meanings, and the understandings of reality linked to them, can only be communicated through the shared sensual experience of commensality. Stoller (1997) invokes the griots of Niger, who experience anthropologists who study them as griots-in-training. These anthropologists, "eaten" by (Nigerian) history and memory and charged to tell Niger's stories, return home and infuse the American cultural landscape with African tradition in a powerful act of reverse colonization. How might attention to these knowledge formations assist us in our attempt to live well?

Newell's exclusions necessarily make us numb to our own embodiment as well, even if that embodiment is male, middle class, and European. If knowledge is not linked to lived bodies in socio-cultural contexts, then my knowledge is not linked to my lived body. I am then destined to live as a disembodied mind and a mindless body. This experience (sometimes called the mind/body problem) is characteristic of academic knowledge formations. In *The Production of Space*, French metaphilosopher Henri Lefebvre reveals the social and historical links between the production of knowledge and the production of power-over others (colonialism), over natural forces (science/technology), and over ourselves (social science). But what, he asks is the justification, for assigning priority to what is *known* or *seen* over what is *lived* (1991, p. 61)? As Merleau-Ponty eloquently says, we behave "[a]s if bread and wine and labor were in themselves less grave and sacred things than history books" (1964, p. 4). Yet if I am to live well, it will be as a man, born in 1949, raised in the United States of America, with all the specific contexts by which I am informed and to which I am beholden; if you are to live well, it will be in and as the specific bodily circumstances that make up the very life you are living well. What we need are mindful bodies and em-

bodied minds—bread, wine, labor, what is lived are grave and sacred things.

Newell's theory, then, has four critical absences: it leaves no room for the creation of new objects; it leaves no room for knowledge objects that belong to no one; it leaves no room to learn from those who have not participated in the development of the Academy; and it leaves no room for our bodies. These absences enable the appearance of consensus on which Newell's theory depends. The appearance of consensus, in turn, allows Newell to overlook the role of the Academy as an institution in the knowledge formations on which he relies.

Nevertheless, institutional resources (and therefore the material lives of individuals and communities) are both at work and at stake in the debate. They are at work because allocations of institutional resources, exerting normalizing pressure over twenty-five or more years, are mostly responsible, I believe, for producing the appearance of consensus to which Newell refers, a theme to which I will return in some detail below. Institutional resources are at stake, for intellectual practitioners and practices that receive the stamp of academic respectability (publication, faculty appointments, journals, literature, lexicons, departments and centers, and so forth) attract further resources, while those that are marginalized fall further and further behind in competition for scarce resources. While *nature* may not be Hobbesian and Darwinian (the survival of the fittest having been replaced in evolutionary theory by the survival of those that fit), the Academy most surely is! If Newell's asserted consensus were to become academic dogma, a wide range of investigations and many interdisciplinary approaches and practices would be pushed progressively further from their own appropriate embodiment within a (transformed) academy.[24]

In general, we cannot specify, with any detail, what these investigations and approaches might entail, because their very coming into being would require institutional transformation; but we can imagine. What would a true pursuit of sustainable development look like in an academic incarnation? How could we envision a genuinely multi-cultural University, in which various tests of validity, drawn from multiple cultural sources, were used to test what counts as knowledge? What would the academy be if women and their experience were truly taken seriously? How might the Academy function if haptic knowing were primary and verbal insight were secondary? How would we inhabit a College in which individuals were held to be secondary to the traditions from which they emerged and with whose continuation they were charged? How would the sciences function if they were held to Newell's test, rather than the test of economics? Some people believe these sorts of inves-

tigations, approaches, and practices are important to knowledge production and to the well-being of the human community and the broader community of beings within which we inhere. Whether or not they will take place within the Academy is *significant*.

Discipline Formation, Past and Present

Surprisingly, Newell's essay does not refer to the increasing body of literature that considers the role of cultural, historical, and institutional factors in the formation and normalization of disciplines. This absence leads me to suggest that interdisciplinarians, in addition to needing an adequate understanding of the knowledges on which we wish to draw, need also an adequate understanding of critiques of those knowledges. As Newell himself has written (with William Green), "Disciplines are not natural species amenable to systematic characterization through a taxonomy, but rather social organizations whose origins and continued existence are as much attributable to educational politics as to the needs of scholarly inquiry. A discipline is perhaps best characterized as a socio-political organization which concentrates on a historically linked set of problems" (1982, pp. 23-30). In contrast, "A Theory of Interdisciplinary Studies" rests on the assumption that, "the various disciplines have been developed to study the individual facets or sub-systems [of phenomena]" (p. 2). Although Newell abandons the copy theory of truth in respect of the "test of knowledge," he has not yet abandoned it in respect of the disciplines, for "each discipline has been developed to illuminate a different, particular facet of reality" (p. 19).

For this essay only a few sources in the literature of discipline formation can be consulted, and those only incompletely.[25] Taken together these sources (e.g., Messer-Davidow, Shumway, and Sylvan, 1993; Clifford and Marcus, 1986; Foucault, 1973; Behar and Gordon, 1995) present us with the following claims, and a body of evidence and reasoning to support them:

1. The objects we investigate and about which we "know" do not exist independently,

2. but are brought into being by a complex economy of factors that also brings into being our investigation of the "objects of knowledge" and the knowledge we claim;

3. disciplinarity as a phenomenon is an artifact of a confluence of psychological,economic, political, and institutional factors characteristic of a phase of the development of modernist capitalism in Western Europe and the United States from the late eighteenth century to the present; this

confluence deeply marks the disciplines as gendered (male), ethnic/racial (European/white), and economic (middle-class, capitalist) phenomena, with respect to their objects of study, their methods of study, and their disciplinary structures;

4. disciplines in their current forms and day-to-day development are shaped by political and economic factors endogenous to the disciplines themselves and to their institutional instantiations but exogenous to their ostensible objects of study.

Disciplines, then, appear as knowledge formations.

If these claims are credible, they have important implications for our assessments of the disciplines and of the knowledge they present:

a. Disciplinary knowledge and the practices and institutional forms that generate and support it may distort, as well as reveal, important aspects of the world we wish to know. The world as it appears is already displayed through a disciplinary lens, so the fit between world and discipline is to some extent illusory. This illusion, pursued long enough and with enough dedication, could lead to a profoundly inadequate understanding. Two examples come easily to mind. The disciplinary structure of the academy divides the world into semi-autonomous realms, each with its own boundaries, internal structures, appropriate methods for investigation, and so forth. As a result, we tend to experience the world itself as composed of distinct, and largely disconnected, domains of existence, while ignoring those aspects of the world that are continuous, interconnected, confounding of borders, and mutually implicated. The second is that science, because it is built on the assumption that the "observer" is distinct from the "observed," systematically falsifies the relationships between human conduct and the other entities with which we share the globe. The ecological crisis is not an "accident" of cultural development; it is a necessary corollary of the metaphysics that underlies the scientific enterprise, and that views nature "as an alien and untamed force that needs to be made productive by the application of technique. . . . The social and ecological conditions that threaten the health and security of contemporary societies are not fortuitous events that could never have been anticipated, but the logical consequence of [an] image of the human species and its relationship to nature." (Reynolds 1991, p. 211)

b. disciplinary knowledge and the practices and institutional forms that

generate and support it may reflect and privilege social, political, economic, and cultural forces in the guise of disinterested, objective, and universal knowledge. Assuming disciplines as the starting places for knowledge and for action based on knowledge may (un)intentionally participate in and support processes of political, psychological, ecological, and cultural domination. For example, the Academy and its knowledges are implicated not only in ecological degeneration, but in colonial domination over other countries; processes of cultural destruction both in the United States and in other countries; and in the domination and degradation of women by men.[26]

c. Disciplinary knowledge and the practices and institutional forms that generate and support it may hide factors extraneous to knowing and acting (personal agendas, frameworks of social and economic reward systems, the quest for institutional prestige, and so forth) that seriously hamper the pursuit of adequate understanding and appropriate action and that are, in any case, irrelevant to and deforming of knowing.

These claims have important implications for our assessments of the disciplines and the knowledge they (claim to) present. In effect, these reflections suggest we may need to overcome, replace, or supplement disciplinary practices and their attendant knowledges, if they are to serve our aim of living well.

Although I am largely convinced by the claims presented by students of the disciplines, I am by no means arguing that interdisciplinarity should adopt these positions as a counter-orthodoxy to the consensus Newell puts forth. On the contrary, I believe we need to leave the door open for a long time to come (forever) for competing and contradicting understandings of our enterprise and its underpinnings. "Accounts of a 'real' world do not, then, depend on a logic of 'discovery,' but on a power-charged social relation of 'conversation'" (Haraway, 1996, p. 125). There is more than one valid pursuit of interdisciplinarity, and there is more than one helpful theory for clarifying these pursuits; an ongoing conversation about and among these may be the most helpful stance for interdisciplinarians to take.

The Objects We Investigate and About Which We 'Know' Do Not Exist Independently, but Are Brought into Being by a Complex Economy of Factors that also Bring into Being Our Investigation of Them and the Knowledge We Claim

Above, Barthes claims that genuine interdisciplinarity "brings into being a new object of knowledge." Although Newell believes that disciplines exist because they mirror (however imperfectly) aspects of reality about which we wish to know (see below), other epistemologists believe that disciplines are at least as much creators of their fields of knowledge as their creations. Below, we will briefly investigate *man*, *nature*, and *knowers* as they are implicated in disciplinary knowledge.

In *The Order of Things*, Michel Foucault spends nearly four hundred pages considering the emergence of the idea of man in Euro-American intellectual discourse. His arguments and data are much too complex to review here, but his conclusion is worth repeating:

> One thing in any case is certain: man is neither the oldest nor the most constant problem that has been posed for human knowledge. Taking a relatively short chronological sample within a restricted geographical area—European culture since the sixteenth century—one can be certain that man is a recent invention within it. It is not around him and his secrets that knowledge prowled for so long in the darkness. In fact, among all the mutations that have affected the knowledge of things and their order, the knowledge of identities, differences, characters, equivalences, words—in short, in the midst of all the episodes of that profound history of the *Same*—only one, that which began a century and a half ago and is now perhaps drawing to a close, has made it possible for the figure of man to appear. (1973, p. 386)

Foucault then claims that the "object of knowledge" of the human sciences *does not exist* but has been brought into being. Beyond that, he believes that the forces that made "man" appear are waning and it will fade from the scene, along with the sciences that study it. When this happens, new concepts and means for understanding human being will no doubt appear. Because these concepts and knowledge formations will bring into being "a new object," we can only speculate as to its actual content and structure.

Studies and claims have been made with reference, e.g., to *nature*, the object of study of the physical and natural sciences that resemble those Foucault makes with respect to man, the object of study of the social sciences.

Carolyn Merchant, in *The Death of Nature*, discusses how nature was constructed in large part through Francis Bacon's rhetoric of science and its connections with the sexual rhetoric of contemporary witch trials (1980, pp. 168-169). Bacon cast nature as a recalcitrant female deserving of and responsive

to the techniques of witch interrogation. Nature had to be "hounded in her wanderings" and her "holes and corners" should be "entered into and penetrated" by the man seeking truth (Bacon 1901, p. 296). She was to be "bound into service" and made a "slave," after she was "put in constraints," one should "torture secrets from her" in order to discover secrets hidden in her "womb" (Bacon 1901b, p. 20; 1901a, pp. 287, 294). Thus, nature and woman are constructed in relation to one another. Equally, they are constituted in relation to man, to sexual violence, to subjugation, and to bondage. They are linked to human nature (the subject of the human sciences) and to humanity (the subject of the humanities).

At the same time that man and nature were constituted, so too was the knowing self. Hume and Kant made it clear that Africans, and other people not derived from Europe, were "by nature" incapable of fully rational thought (Gates, 2001; Eze, 1997). The knowing self could only be male, white, and European. At its outset, disciplinary knowledge was marked as misogynist, racist, and ethnocentric. Nor have these marks been entirely effaced.

Although Newell uses the metaphor of a map to clarify the notion of different kinds of systems, he does not make use of Korzybski's famous dictum that the map is not the territory. Maps (or systems) are constructed in relation to specific constraints and assumptions (for example, those regarding woman, nature, and knowers discussed above). The factors that affect system formation likewise affect what appears as *reality* in the domain of that system, which is a mental formulation (a map), not reality (the territory). The constructed character of systems calls for a careful investigation of the factors involved in (but often effaced by) the generation of particular systems and for reflection on how those factors shape the systems and the apparent knowledge that emerges from them. It is evident that there must be other knowledges that will emerge from other systems linked to other processes of construction. These knowledges, too, aim at, and to some extent succeed in, describing a world in which to live. Again we are brought to the metaphor of conversation: a conversation among multiple, constructed knowledges (knowledge formations) that are necessarily partial, historical, cultural, gendered, and useful—in the sense of Newell's test—more useful in conversation than posing as all-sufficient monologues.

To the extent that disciplinary knowledge participates in creating the objects it knows and the knowers who know them, we must be careful when we found new knowledge on existing disciplines. Wendell Berry remarks:

It is a fact that the solutions invented or discovered by science have tended

> to lead to new problems or to become problems themselves. Scientists discovered how to use nuclear energy to solve some problems, but any use of it is enormously dangerous to us all, and scientists have not discovered what to do with the waste. (They have not discovered what to do with old tires.) The availability of antibiotics leads to the overuse of antibiotics. . . . Science does not seem to be lighting the way; we seem rather to be leapfrogging into the dark along series of scientific solutions, which become problems, which call for further solutions, which science is always eager to supply, and which it sometimes cannot supply. (2000, p. 33)

One task of integrative praxes may be to bring new objects and new knowing selves into being, to query the world and our experience of it in ways that generate new problematics, new questions, new objects, and new knowledges, some of which may challenge existing knowledges, or even be incommensurate with them. One task of integrative praxes may be to listen carefully to learn from the excluded knowledge formations of the dispossessed—women, the poor, the internal colonies, the external colonies, webs of cultural trajectories outside Europe and the United States. If so, integrative praxes cannot begin by presuming or incorporating the disciplines, and Newell's trope of integration will not be helpful.[27]

Disciplinarity as a Phenomenon Is an Artifact of a Confluence of Psychological, Economic, Political, and Institutional Factors Characteristic of a Phase of the Development of Modernist Capitalism in Western Europe and the United States from the Late Eighteenth Century to the Present

This claim both supports and is supported by the previous one. The ideas presented in this section, taken in relation to one another, indicate that both the disciplines and the objects they investigate are in part contingent historical and cultural artifacts. Actually, as we will see, they also suggest that the self-experience of the knower—the subjective, felt identity of the cognizing subject necessary to disciplinary knowledge—is itself such an artifact, and is in part generated by processes emerging from and feeding back into the creation of disciplinarity as an historical fact. If these claims are credible, neither the disciplines and their knowledges, nor the sense of conviction they create in us, as knowers, are reliable guides to an extra-historical, or even cross-cultural, reality. Just because we have a seemingly unmediated experi-

ence of the world, we have a subjective experience of knowing that is confirmed by techniques of knowledge production (e.g., empiricism, reason, experimentation), we may share both experience and knowing with a broad intersubjective community, this doesn't mean our knowledge escapes history and culture and reflects some more absolute reality.

Given the artifactual nature of disciplinarity, integrative praxes may need to resist, confound, transform, or otherwise creatively engage history and culture on behalf of the emergence of new possibilities of knowing, possibilities that may manifest as new practices and institutions for knowing, new realms to know, and new self-experiences of knowers. Haraway insists we need the "close touch of the fantastic element of hope for transformative knowledge and the severe check and stimulus of sustained critical inquiry [for] any believable claim to objectivity or rationality not riddled with breathtaking denials and repressions" (1996, p. 118). Neither the disciplines as they exist, nor an integration of them, may be adequate to this task.

Knowledges: Historical and Critical Studies in Disciplinarity is a collection of essays intended to explore disciplinarity as "a historically contingent, adventitious coherence of dispersed elements" (Messer-Davidow, Shumway, and Sylvan, 1993, p. 3). In the preface, the editors point out:

> For only two centuries, knowledge has assumed a disciplinary form; for less than one, it has been produced in academic institutions by professionally trained knowers. Yet we have come to see these circumstances as so natural that we tend to forget their historical novelty and fail to imagine how else we might produce and organize knowledge. (p. vii)

This text contains sixteen investigations into the character of the disciplines. Some focus primarily on a single discipline, while others span the concept of disciplinarity *in toto*. We can sample only a few below, highlighting some of their most important assertions.

1. Disciplines emerge from changes in educational practices that eventually transform both concepts of the self and normative self-experience.
Keith W. Hoskin argues that deep-level changes in the structure of knowledge emerge from coordinated changes in education systems. People do not simply learn different things, or even learn differently, but we learn to learn differently. Disciplinarity is thought to emerge from the coordination of three educational practices that were chained together near the end of the eighteenth century: "constant rigorous examination, . . . numerical grading of the

results of this examination, . . . an insistent process of writing by students, about students, and organizationally around students" (1993, p. 272).

After examining the development of the seminar in Germany (and its transformation of language via philology) and of the laboratory in France (and its transformation of the material world via experimental science), Hoskins moves on to the development of modern economics in England. Here the effect of this new educational technology is not only profound, it inscribes itself in the prose of the key player, Adam Smith. Redrafting *The Theory of Moral Sentiments* in response to various critiques, Smith finds himself redescribing the self as split into two persons (!) one of whom is an examiner or judge and the other that same person submitting to judgment.

> Thus the self was reconstituted as a double self, the spectator-examiner and the agent-examinee . . . self-interest is no longer necessarily doomed to degenerate into pure selfishness now that dispassionate impartiality has been relocated as an integral part of a self that is constantly engaged in the active examination of itself. (1993, p. 292)

The self is now engaged in continuous self education, examining, grading, and inscribing itself. In Bacon's terms, there is now in every self a male, or human (examiner, judge) and a female, or natural self (the recipient of judgment). The new system of education has become a new self-understanding.

One implication of this analysis is that in part, the self, to whom disciplinary knowledge is credible, is a creation of the very processes by which the disciplines were themselves created.[28]

2. Transformed self-experience lays the foundation for new understandings of the relationship between intention (planning), outcome (profit and loss), and judgment (evaluation).

Psychological changes lead to a new *universal* discipline (accounting, but also accountability) that makes possible the business revolution, which forms the context for academic disciplines, per se, to come into being.

Building on the thesis presented immediately above, Hoskin and Richard H. Macve (1993) argue that the new experience of the self provides the foundation for the development of modern accounting, which was itself a precondition for the large scale coordination of economic activities that characterizes modern and postmodern economic systems. The initial breakthroughs toward the business revolution, they write,

> are *invisible* technologies: technologies that work first on humans, not on machines. And more generally, the invention of modern business should be seen as part of the transformation to a modern disciplinary world, where disciplinary organizations dominate—such organizations as those that discipline their members but that also depend on and feed off academic *disciplinary* knowledge. (p. 29)

They hold up accounting as the key discipline for understanding modernity, giving it priority over both economics and psychology, because "it is centrally involved in constructing the world wherein modern economics and psychology are invented . . . part of the condition of their very existence" (p. 26). That is to say, disciplinarity in general follows upon sociocultural developments that transformed Euro-American culture into the culture of business, while accounting, the key to that transformation, itself followed upon a transformation of self experience and self understanding generated through new educational practices. Following Alfred Chandler, they argue that modern business is a "*disciplinary* breakthrough, with accounting playing a crucial role" (p. 28). The key to modern business is managerialism made effective through administrative coordination which "in large part depends upon the deployment of accounting and accountability systems" (p. 28).

Daniel Tyler, who worked at Springfield Armory, and George W. Whistler, who worked at the Western Railroad, were cadets at West Point when it was transformed via the chaining of educational techniques and practices, into a "modern disciplinary educational institution" (Hoskin and Macve, 1993, pp. 30-31). Herman Haupt, with Andrew Carnegie's Pennsylvania Railroad, came from the same institution a generation later. These men applied the new academic principles to economic activity at large: there was to be a constant process of writing, in which plans, work objectives, schedules, profit margins, and the like were to be continuously inscribed (memos, budgets, evaluations, directives, mission statements, strategic plans); all aspects of economic activity (including its human elements) were to be measured and assigned evaluative numerical equivalents (graphs, charts, merit evaluations, projections, demographics); these numbers were to be constantly evaluated against the goals and objectives articulated in the process of writing, and vice versa. The world of economic activity was subjected to the newly developed structure of the disciplinary academy.[29]

The mark is the invisible technology that lies beneath [the principle of

> calculability]. It does not just put a number on performance; it puts a value on you, the person. It provides for the first time in history an objective measure of human success and failure. Your desire is to be number one; your fear is that you are nothing but a zero. How do you prove yourself? Only by performing and being objectively appraised. Hence the emergence of the modern double-bind power of *accountability*. (1993, p. 32)

Not only does the modern disciplinary academy flourish in the new business culture, developing significant ties binding the two together, but also, the modern disciplinary academy is rooted in notions of accountability, beginning with measuring and ranking students but extending into every aspect of academic life. Entrance examinations and grading, merit rankings and promotions, but also departmental and other budgets, assessment, and accreditation are founded on notions of measurement and accountability.

Moreover, the modern disciplinary academy serves the new business culture. Historically, that culture has served the interests and in large part been the engine of colonialism and imperialism. It has led to the ideology of what Zoe Sofoulis (1988) has called *resourcing*, in which all elements of the natural world exist merely as resources (human and natural) to be transformed into something else. Just as money translates all things into a universal language, in which apples, yachts, and the hours of a human life are equivalent, so resourcing turns all things, including human beings, into equivalences: they (we) are "only the raw material of culture, appropriated, preserved, enslaved, exalted, or otherwise made flexible for disposal by culture in the logic of capitalist colonialism" (Haraway 1996, p. 124).

Professors, says Paul Feyerabend:

> serve masters who pay them and tell them what to do: they are not free minds in search of harmony and happiness for all, they are civil servants (*Denkbeamte*, to use a marvelous German word) and their mania for order is not the result of a balanced inquiry, or of a closeness to humanity, it is a professional disease (1987, p. 315).

Thus the modern academy and its disciplines may take root far from any integrative praxes, far, indeed, from living well.

3. "Disciplines are not natural unities but arbitrary classifications; they contain numerous fields, many of which have less in common with each other than they do with fields in neighboring disciplines" (Messer-Davidow,

Shumway, and Sylvan, 1993, p. 11).

In the same volume, Julie Thompson Klein's "Blurring, Cracking, and Crossing: Permeation and Fracturing of Discipline" (1993), investigates boundary-permeating activities, in contrast to the more customary research into boundary formation and maintenance. Disciplines in this essay, appear as socially-constructed and institution-bound strategies for controlling the flow of resources and managing the direction of intellectual change. Klein notes that "Since the 1960's permeations of the boundaries dividing the subfields of physics and other disciplines have displaced the notion of physics as a single, isolated discipline. . . . [Professional publications] depict a physics characterized by cross-disciplinary permeations in the arenas of both fundamental and applied science, though permeations are rendering that distinction more problematic" (p. 201). Yet institutionally, Klein notes, the disciplinary and departmental structure of physics retains significant force, what she, following Stocking and Leery, calls the "'inertial strength' of disciplinary formation" (p. 202).

Donald Preziosi's article "Seeing Through Art History," also in the same volume, proposes that art history is an artifact of filmic technology, which alone has made possible the astonishing taxonomy that enables the combination of attributed causality (artistic influence), location in histories of style and form, and relation of artifacts to other historical contexts (e.g., politics, religion), that we associate with the discipline of art history (pp. 220-222; see also Preziosi, 1989).[30]

If disciplines are not natural unities, but congeries of practices, instrumentations, knowledges, and resource flows, what epistemological status could they have as foundations for other (i.e., interdisciplinary) researches? If at least some disciplines are artifacts of technological or other cultural developments, what status does their knowledge have in relation to a world or reality supposed to underlie or precede cultural formation?

The works cited above present a set of interrelated metaphors for the phenomenon of disciplinarity and the disciplines: a psycho-social sediment of educational techniques that reformulate the experience of the knowing self; a socio-cultural manifestation of economic practices rooted in and rigorously regulating that reformulated self-experience; a convenient institutional fiction; an artifact of new media.[31] Other chapters in this book would provide yet other metaphors. Taken together, they provide a warrant for caution in treating the disciplines as the necessary starting points for guiding our ongoing search for adequate and appropriate knowing. Klein's "determine all knowledge needs" seems more *apropos* than Newell's "determine relevant

disciplines" (Klein, 1990, p.188; Newell, p.15). Actually, investigations into disciplinarity place even Klein's formulation into doubt. Before determining our knowledge needs, we will need ways to investigate, undermine, and transform our questions, for they, too, emerge out of a context thoroughly permeated by disciplinary practices, knowledges, and institutions. We shall have to abandon the copy theory of truth not only with respect of *interdisciplinary solutions*, but also in relation to the disciplines and other knowledge formations.

Disciplines and Bodies

Specific disciplines of the body correspond to specific experiences of the world. Academic thought is produced by a specifically disciplined body, one that can tolerate sitting for hours in sterile rooms buzzing with the sound of fluorescent lights, listening to word after word after word of lecture after lecture. These bodies have been taught to dissociate from themselves, trained to delay elimination (and even the experience of the need to eliminate), to repress the experience of sexual desire, hunger, and thirst, to still the urge for movement and kinesthetic expression for a slumberous physical stillness which is required not only for attending (conferences, classes, laboratories) but also for reading, writing, and computer work. Our willful unconsciousness of the academic body is literally senseless, and depicts a wishful fantasy of panoptical truth, of a *nowhere* where truth is not dependent on embodiment, situation, culture, or psychology. Yet we know that knowledges are tied to bodily disciplines. Yogic knowledge, for example, is the end of a long process of bodily training. The Academy can pretend to present universal knowledge only by claiming Academic bodies require no special discipline. The *anybody* of the Academic body corresponds to the *nowhere* of Academic space. Yet the universality of academic knowledge is premised on the universality of the academic body. How can we understand the depth and limits of our own knowledge without experiencing its links with our bodily disciplines?

The apparent universality of the body, along with the apparently universal applicability of disciplinary knowledge, participates in a characteristic quality of modernist and capitalist society: the production of seamless rationality, characterized by Lefebvre as *abstract space*. *Logic* as we experience and understand it, is produced within this space, and on its behalf:

> logic characterizes a double imposition of force: first in order to maintain a coherence and, later, in the shape of reductionism, in the shape of the strategy of homogenization and the fetishization of cohesiveness in and

> through reduction of all kinds. It is logic that governs the capacity—bound up with violence—to separate what has hitherto been joined together, to fracture all existing unities. (1991, p. 412)

Logic, that is, does not exist, any more than any other knowledge formation. Logic is produced through a process characterized by force; far from reflecting reality, it violates it. As we will see below, there are other logics that may work equally well to describe the world, and may work better to enable living well, but these logics cannot inhabit abstract space.

All spaces are the same in abstract space. It is the space of nowhere, which belongs, as we have seen above (note 11), both to transcendent objectivism and to radical relativism. But every person is always actually somewhere. Integrative praxes begin here, where one is. "The only way to a larger vision," writes Haraway, "is to be somewhere in particular" (1996, p. 123). Abstract space is the space of abstractions, the space of resources, where actual entities are reduced to their categorical being: not this tree, or this river, or this person, but merely trees, rivers, persons, or even more abstractly, natural and human resources. But as Berry points out:

> even scientists do not speak of their loved ones in categorical terms as "a woman," "a man," "a child," or "a case." Affection requires us to break out of the abstractions, the categories, and confront the creature itself in its life in its place. . . . [T]hings cannot survive as categories but only as individual creatures living uniquely where they live. (2000, p. 41)

Newell comes heartbreakingly close to escaping the domain of abstract space, for example in his call for humility, which approaches the affections that individualize and localize us. He seems at times to recognize the importance of local, differential, particular existence for knowledge. For example, he sees that, "if one is trying to understand the behavior of a specific place within a complex system, local knowledge matters" (p. 10), but he does not link this insight to Berry's insistence that all existence (and therefore all integrative praxis) is inevitably local. Finally, he applies the notion of local knowledge fruitfully only to justify his view of interdisciplinarity for work in the humanities. Thus, he misses an opportunity to acknowledge the inevitable localism of every articulated knowledge, to join Haraway in a sense of

> positioned rationality. [Whose] images are not the projects of escape and transcendence of limits, i.e., the view from above, but the joining of par-

> tial views and halting voices into a collective subjective position that promises a vision of ongoing finite embodiment, of living within limits and contradictions, i.e., of views from somewhere. (1996, p. 123)

Our finite embodiment can serve as a metaphor for locality. Abstract bodies are merely bodies, but all actual bodies are cultured bodies, and culture affects our overall, unconscious, automatic approach to the coherence of the world. "People reared in different cultures *learn to learn* differently" (Hall, 1959, p. 53). "*Culture has always dictated where to draw the line between one thing and another*" (Hall, 1977, p. 230). Bodies (not just human bodies, but the body/boundaries that define entities) are produced, not given. "[B]odies as objects of knowledge are material-semiotic generative nodes. Their *boundaries* materialize in social interaction. Boundaries are drawn by mapping practices; 'objects' do not pre-exist as such" (Haraway 1996, p. 127).

Differences in where to draw the line between one thing and another are a matter of bodily learning, e.g., discipline, manifest in experience. For instance, in the West we experience a human surrounded by a skin and supported by bones and a nervous system and experience it as a single and individual thing, a person. But for the Pueblo Indians, a kin group resembling a lineage is experienced as the single individual, and the people are experienced as parts (Hall 1980, pp. 231-232).

As a result, cultures enact different logics, which are conscious or semiconscious explications of the tacit structures which shape their worlds (see, e.g., Motokawa 1989). Says Hall:

> Having had a number of experiences in my lifetime with cultures as disparate as the Japanese and the Navajo, neither of which finds the Western system of logic effective, convincing, or acceptable as a way of arriving at a decision, I am not at all convinced that there is anything sacred in logic. I find nothing wrong with the mental processes of either culture. Both have highly reliable ways of arriving at correct decisions as well as testing the validity of those decisions. (1977, p. 213) [32]

In 1990, Lawrence Sullivan, now Director of the Center for the Study of World Religions at Harvard University, published a review article titled "Body Works: Knowledge of the Body in the Study of Religion." His remarks have salience for all forms of study.[33] He begins by asking what the body knows and what value the body's knowledge may possess, and reflecting on cultural others, who have served "as data to be explained, rather than as theoretical

resources for the sciences that study them" (p. 87). Yet these cultures and their members have their own "elaborate anthropologies, including subtle construals of the body and its processes of knowing" (p. 87). Moreover, these anthropologies are, from time to time, universal in their scope, addressing the human *per se*. "Just as Greek philosophers did in their day and French deconstructionists did in the 1970s, so the members of these societies wish to offer comment and reflection upon the human condition in our day" (p. 87).

Often they do so:

> in a bodily experience—rather than through the transmission of narrative doctrine or discourse. In other words, the knowledge of the body that we wish to study and understand is itself often transmitted through culturally shaped experiences of the body. (p. 87)

Yolmo healing knowledge is transmitted from one body to another, as the healers say, "by heart" (Desjarlais, 1992, pp. 26-27). Yogic knowledge, too, must be learned in the body, and not from discursive formations. Actually, much of Western science works in this way, too. One must, for example, learn how to see through a microscope—a bodily knowledge some cannot master. Knowledge of many kinds in many cultural contexts is transmitted primarily through disciplines of the body and the experiences attendant upon them. As Sullivan notes, this is not a fact from which one can remain detached, for it impinges on our own self-understanding, as well as the status of our systems of knowledge (1990, p. 88).

The rudimentary issue is not the role of any Western discipline in understanding body knowledge, but, rather, the role of body knowledge in the Western disciplines. "As both Michel Foucault and Pierre Bourdieu have urged, attention to discipline is not merely a concern about institutions and professionalization; it is above all concern about bodies—human bodies. Disciplines are institutionalized formations for organizing schemes of perception, appreciation, and action, and for inculcating them as tools of cognition and communication." (Lenoir, 1993, p. 72)

Since the body is so often demonstrated to be a primary instrument of knowledge, and since the understanding of the body can vary markedly from one culture and epoch to another, we may have to add to our customary list of hermeneutical reflections yet another question: What kind of challenge is our own bodily existence? (Sullivan, 1990, p. 99) [34]

Like the knowledge they generate, bodies are intrinsically political and ethical. There is a politics of the senses that we ignore to our peril (Seremetakis,

1994, p. 13). Abstract space effaces our awareness of the politics of the senses, for

> [t]he structure of modern sensory experience is inherently ironic. The sensory sphere is experienced in such a manner that profound transformations occurring in it or imposed on it are rendered imperceptible. (p. 19)

Seremetakis tells a story, beginning with her recollection of a peach, the *rhodhákino*, or "breast of Aphrodite" (*a mastós tis Afridhítis*). It is a peach that can no longer be found, whose taste, scent, color, and texture can no longer be relished. Tied to the sensual experience of this peach, as Seremetakis unwinds her tale, are a whole set of understandings that extend into the personal (her childhood), familial (her grandmother), cultural (Greece, stretching back to the archaic age), generational (her grandmother's relationship with herself and her parents), philosophical (the value of stillness vs. that of speed), historical (the destructive impact of modernization), and political (the role of the EU in sensory processes), all of which have been partially effaced by the disappearance of Aphrodite's breast, and which have been further obscured by other sensual erasures and displacements.

Disciplines belong to the apparatus by which this vanishing act is accomplished. The *methods* of the disciplines belong to and integrate with the various technologies by which academic knowledge is produced. "These technologies are ways of life, social orders, practices of visualization. Technologies are skilled practices" (Haraway, 1996, p. 119).

Perception, too, is a skilled practice, engendered from early infancy through culturally induced processes.[35] David Rubin (1988) admonishes us to focus on skills and process models, rather than on structures and formal models, in our description of perceptual and cognitive abilities. Perception and cognition are things we do, actions emerging from skill. The everyday world of cultural normalcy and the specialized world of academic knowledge are coproduced from a shared set of skills embedded in our bodies and their technical and technological extensions. Thus, "struggles over what will count as rational accounts of the world are struggles over *how* to see" (Haraway, 1996, p. 120).

As I noted above, the point is not to deny the factuality of scientific knowledge, but to insist on its incompleteness, to contest its adequacy, to dispute its appropriateness, to assert its partiality, to reveal those who benefit from it and those who do not, to discover the subjectivity to which it belongs, and to insist on the embodied, situated, limited, engaged character of all knowing. I

cannot know the world in the way it is known by those whose perceptual skills differ deeply from mine, nor is there any rational reason to assume that the world as I experience it is uniquely more suited for human life than the worlds known by those other ways of experiencing. There is, in fact, every reason to expect a richer and fuller account of the world (and a richer and fuller life in the world) to emerge from our respectful, hopeful, and critical conversation than from any monologue, no matter how poetic or brilliant.

Contemporary Normalizing Forces Shaping Disciplinary Activity

Discipline formation and the maintenance of disciplinary boundaries are not merely historical facts. They are active today, and play an important role in our daily lives as members of academic institutions and the larger machinery of professional validation that makes up the Academy.

Writing Culture (Clifford and Marcus, 1986) provides a useful discussion of disciplinarity in the context of contemporary academic life. It is the result of an intensive set of discussions at the School of American Research in Santa Fe, New Mexico, in April 1984. Ten participants met over a week, after having previously circulated papers, to discuss "the making of ethnographic texts" (p. vii). In the introductory chapter, "Introduction: Partial Truths," Clifford identifies "at least six" ways ethnographic writing (and other academic enterprises including interdisciplinarity) are constrained, including contextually (drawing from and creating meaningful social milieu), institutionally ("within, and against, specific traditions, disciplines, audiences"), and politically ("authority to represent cultural realities is unequally shared and at times contested") (p. 6). [36]

In "Representations Are Social Facts: Modernity and Post-Modernity in Anthropology," in the same volume, Paul Rabinow considers the politics of writing about anthropology. His reflections are relevant to our considerations, as well. "[T]he stakes," he writes, "are not directly political in the conventional sense of the term. I have argued elsewhere (1985) that what politics is involved is academic politics and that this level of politics has not been explored" (1986, p. 252). Rabinow goes on to refer to Pierre Bourdieu's work on the notion of *habitus*, which leads to a sociology of cultural production that

> does not seek to reduce knowledge to social position or interest, *per se* but, rather, to place all of these variables within the complex constraints .

> . . within which they are produced and received. Bourdieu is particularly attentive to strategies of cultural power that advance through denying their attachment to immediate political ends and thereby accumulate both symbolic capital and "high" structural position. (p. 252)

> My wager [he continues] is that looking at the conditions under which people are hired, given tenure, published, awarded grants, and feted would repay the effort. . . . How are careers made now? How are careers destroyed now? What are the boundaries of taste? Who established and who enforces these civilities? Whatever else we know, we certainly know that the material conditions under which the textual movement [in our case read interdisciplinary movement] has flourished must include the university, its micropolitics, its trends. We know that this level of power relations exists, affects us, influences our themes, forms, contents, audiences. We owe these issues attention—if only to establish their relative weight. (pp. 253-254)

Disciplines in general, and interdisciplinarity in specific, have an obligation to self-reflection, a responsibility to incorporate situation and situatedness into accounts of ourselves. However, despite its expressed intent to reveal the processes by which disciplines, specifically anthropology, take the shape of the political and institutional forces that surround them, *Writing Culture* was itself revealed in its own generation to have hidden and participated in those very processes.[37] In 1995, twenty-three women wrote, *Women Writing Culture.* No two pages in the history of anthropological writing have ever created as much anguish among feminist readers as did James Clifford's uneasy statements justifying the absence of women anthropologists from the project of *Writing Culture* (Behar and Gordon 1995).

> [W]e have become all too aware that not only were women anthropologists excluded from the project of *Writing Culture* but so too were "native" and "minority" anthropologists. In the words of the African American critic bell hooks, the cover of *Writing Culture* "hid the face of the brown/black woman" beneath its title, graphically representing the concealment that marks much of the writing inside. (pp. 7-8)

Even while unmasking the impacts of social location and interest in discipline formation, the authors of *Writing Culture* concealed the effects of their own social locations on their process of unmasking! (No doubt my own so-

cial location marks this essay, too . . .)

Taken together, these and numerous other works not cited here undermine Newell's notion of discipline. Rather than corresponding, however roughly, to *actual* domains in the *real* world, disciplines may be far more arbitrary and ephemeral. They may arise from and rely upon a culturally constructed and historically unstable experience of the self. They may correspond to objects which arise simultaneously with themselves and with which they both generate and are generated by. They may be instantiated in institutional forms that reflect local and global economic and political factors more than intellectual distinctions. They may be shaped and controlled by their own internal politics and the *habitus* of institutions, departments, and professional associations. They may reflect a gendered and cultured history of power. They may, therefore, not be the best bases on which to develop a complexly interrelated knowledge of the world (including ourselves) whose effects are pragmatically beneficial to human and ecological well-being or whose imagery leads us deeper into the heart of the world.

Gatekeeping

I have dwelt at length on disciplinarity and discipline formation because I believe that is the central issue at stake in Newell's "A Theory of Interdisciplinarity" and our responses to it. We are considering what activities and practices get to count as interdisciplinarity, what institutional forms are congruent with them, and what their appropriate literary and other forms of expression may be. Newell's piece would in effect close the gate and define the password for admission.

In *Creativity: Flow and the Psychology of Discovery and Invention* (1996), Mihaly Csikszentmihalyi writes about the importance of gatekeepers in creativity. Gatekeepers "decide whether a new idea or product should be included in the domain" (p. 28). Gatekeepers comprise what he calls *the field*. He comments:

> In my view of the situation, if the systems model of creativity is accurate, then it follows that creativity can be enhanced just as much by changing the field—by making it more sensitive and supportive of new ideas—as by producing a greater number of creative individuals. Better training, higher expectations, more accurate recognition, a greater availability of opportunities, and stronger rewards are among the conditions that facilitate the production and the assimilation of potentially useful new ideas. (p. 336)

Interdisciplinarity is involved in an attempt at field formation. Actually, the project may be yet more radical, the formation of a new domain—what Csikszentmihalyi calls, "a set of symbolic rules and procedures" (p. 27). Under these circumstances, gatekeeping is a fundamental concern.[38]

As I noted above, Newell's career has primarily taken its shape in the context of discipline formation: field or domain creation. He has played a powerful role in developing the institutional reality of IDS in the United States, serving as Executive Director of the Association for Integrative Studies for some twenty-eight years, and visiting campuses to consult about interdisciplinary studies for two decades or more. He has affected the distribution of rewards to interdisciplinarians, by evaluating faculty members for appointment, tenure, and promotion and responding to inquiries concerning candidates to chair interdisciplinary departments. He has also trained aspiring interdisciplinarians (via a FIPSE grant) and published a book aspiring to present the key extant literature on interdisciplinarity. He has been a force in the field.[39] These activities perform the function described by Mihaly Csikszentmihalyi as gatekeeping: deciding "whether a new idea or product should be included in the domain" (1996, p. 28, see below).

I believe that the appearance of what Newell calls consensus and I call orthodoxy represents institutional control—over publication, appointment, and other decisive academic machinery—by one of the sets of competing voices within the community of interdisciplinarians. Newell's theory is the next step in a process by which this voice might become "normative" and institutionalized. Not surprisingly, this faction is the one which views interdisciplinarity as at once most like the disciplines and least dangerous to them, at once easiest to incorporate into the university and least likely to seriously disrupt it.[40]

What is needed is not "an epistemology of interdisciplinarity" (Newell, p. 15), but a sociology, or perhaps an anthropology, of knowledge that grounds the disciplines in their historical and cultural moments. Following on a review of then contemporary critiques of epistemology, Paul Rabinow, in *Writing Cultures* (1986), provides four "initial conclusions and research strategies" that follow from these critiques: first we should understand that epistemology is an historical event, "a distinctive social practice, one among many others, articulated in new ways in seventeenth century Europe." Second, we should eschew a "theory of indigenous epistemologies or a new epistemology of the other," rather being wary of "our historical practice of projecting our cultural practices onto the other." Third, "we need to anthropologize the

West: show how exotic its constitution of reality has been," and fourth, "we must pluralize and diversify our approaches" (p. 241).

To this we should add Haraway's insistence that "ethics and politics covertly or overtly provide the bases for objectivity in the sciences as a heterogeneous whole, and not just in the social sciences" (1996, p. 125). Therefore, we need "a doctrine and practice of objectivity that privileges contestation, deconstruction, passionate construction, webbed connections, and hope for transformation of systems of knowledge and ways of seeing" (p. 117). "It is," she says, "precisely in the politics and epistemology of partial perspectives that the possibility of sustained, rational, objective inquiry rests" (p. 117).

Newell asserts that disciplines persist because their assumptions reflect principles governing facets of reality. We have encountered good reasons to doubt that this is the case. As Timothy Lenoir (1993), writing in *Knowledges*, puts it, "disciplines are *political institutions* that demarcate areas of academic territory, allocate privileges and responsibilities of expertise, and structure claims on resources" (p. 82). That is to say, they are fields governed by gatekeepers.

We can also query Newell's claim about the persistence of disciplines from a cross-cultural perspective. All cultures may be said to have disciplines, or, in terms of this paper, knowledge formations. That is to say, cultures involve organized means for developing, testing, and maintaining knowledge. These means require mastery of practices, and one may engage in them only after approval by qualified authorities. For example, Paul Stoller (1997) has written at some length about witchcraft among the Songhay of Niger (pp. 4-43). This ancient and well-established discipline requires learning, apprenticeship, and diligence. It results in capacities and abilities, as well as both practical and theoretical knowledge.[41] Will Newell affirm that Songhay witchcraft, like physics, persists because its assumptions mirror some facet of reality? What shall we say about Navajo curative sings with sand paintings, or the practice of Ayurvedic medicine? The Western academic disciplines are less than two centuries old. Many other knowledge formations have endured far longer: to what do we attribute this persistence? If we acknowledge their however imperfect correspondence to a relevant arena of reality, how shall we deal with their incommensurability with our own disciplinary approach to knowledge? How would we move toward integrative praxes across these boundaries? What roles do political, economic, and military power play in the ascendancy of one set of knowledge formations over others? These questions, it seems to me, compose a necessary component of integrative praxes.

Concluding Projections

Let me end by first recapitulating, and then anticipating. I have attempted to demonstrate that what Newell presents as consensus is actually an orthodoxy that should be unmasked and unsettled (for ethical and political reasons) rather than used as the cornerstone of a foundational theory. We have discovered that the disciplines' objects of knowledge do not exist independently. They are brought into being, along with the (kind of) knowing subjects who know them, and the means by which they are known. We have also discovered that disciplinarity as a phenomenon is a historical and cultural artifact, and the broad outlines of its generation can be described. Because human bodies are deeply implicated in all acts of knowing and specific bodily disciplines are correlated with specific possibilities of knowing, the rise of the Academy is linked with the development of particular bodily disciplines. Therefore, we are called upon to acknowledge and take into account the role of our own bodies in our knowledge. We must acknowledge that processes of discipline formation are ongoing and contemporary and that we are enmeshed in them. Normalizing forces currently shape disciplinary activity and are in large measure responsible for the appearance of what Newell takes to be consensus and which I critique as orthodoxy. Finally, gatekeeping, or deciding what gets to be included in a field or domain, is at the heart of Newell's article and this response to it.

I have proposed that we abandon altogether the metaphor of "interdisciplinarity" and its dependence on the image of the disciplines, replacing it with an image of integrative praxes that learn from multiple knowledge formations.

How might we then move toward integrative praxes? We will have to begin by recognizing the incompleteness and insufficiency of any knowledge formation or set of knowledge formations to fully meet the test of knowledge—that we live well. This means there will always be a complex conversation among competing and cooperating nexus of knowledge formations. Further, we will have to acknowledge that living well is not self evident, but essentially and necessarily contested. So we must imagine an ongoing and perpetual conversation about the very test by which we will assess the validity of our knowledge. Finally, given their implication in so many of the problems that threaten our very life, much less the goodness of that life, we must acknowledge that the Western sciences in large measure fail that test today.

There are virtues we need to face the future well. Newell names one: humility. There are others: courage, openness, creativity, and genuine interest

in others. That is, simply strengthening and developing the dominant knowledge formations is unlikely to ameliorate our life, to meet the test of knowledge. More of the same is unlikely to bring us anything but more of the same. Yet how can we, in the context of the same, imagine what is different?

Lefebvre provides one metaphor in his notion of *differential space*:

> By seeking to point the way towards a different space, towards the space of a different (social) life and of a different mode of production, this project straddles the breach between science and utopia, reality and ideality, conceived and lived. It aspires to surmount these oppositions. (1991, p. 60)

As Jana Carp and I (In Press) have written:

> The crux of the matter is that "logico-mathematical space" is used by professional and academic experts as "the locus of a 'theoretical practice' which is separated from social practice and which sets itself up as the axis, pivot or central reference point of Knowledge " (Lefebvre, 1991, p. 6). This abstract *praxis*, because it is conceived/experienced to be separate from both ideology and non-knowledge (lived experience), "creates an abyss between the mental sphere on one side and social spheres on the other" (p. 6).
>
> For Lefebvre, "differential space" responds to abstract space as both diagnosis and aim; a theorized new space that is both liberatory and transforming, emerging out of and in contrast to the dominant space of global capitalism. Abstraction itself is not demeaned in differential space. . . . The point is rather that "the truth of space" emerges in a relation of mental and sensory experiences and knowledges that characterizes differential space, while "true space" (the false "Truth" of abstract space) results from repressing the sensory and imposing homogeneity on lived experience.
>
> [A]bstract space is quintessentially the space of the Academy, which propounds ever more adequate systems theories, ever more complete data sets, ever increasing "correspondence" between what is thought and what is. This ultimately excludes, silences, what is sensed: knowledge that is self-reflectively partial (and therefore incomprehensible), embodied in particulars, fluid and relational, both integrating and sustaining social and other differences. Thus abstract space is also the space of models while differential space is not: for this reason Lefebvre refuses, adamantly, to provide a template for differential space. To do so would be to enclose it within abstract space, to clip its transformative promise. (1991, pp. 398-

399)[42]

Here Lefebvre diverges from Newell, for whom knowledge is characterized by the creation of models of ever greater adequacy and efficacy. But how might we think about the world except with the use of models? If this is posed rhetorically, it evades the challenge of integrative praxes; the potential of interdisciplinary thought escapes us. If this is posed as a creative challenge, we begin to encounter a great opportunity. How, indeed, might we imagine the world so that our imaginings reveal us to be in that very world we are imagining? How might we create faithful images of the world in which we are implicated (both in the images and in the world imagined)? There would necessarily be many different such images; their interrelationship would necessarily be differential, not transcendent, for our inherence in the world is multiple, complex, *different*.

This brings us back to Donna Haraway's work, and the notion of situated knowledge. The idea is quite simple. Knowledge claims are always claims by someone. That someone inhabits a body, instantiates a culture, enacts a sex and gender: is situated. As we have seen above, every situation is permeated with skills and technologies that shape bodies, with acculturated perceptual systems that teach their possessors how to divide the world into entities. A knowledge claim that pretends to be unmarked by the situation of the claimant is a claim from nowhere. This "position" (which is really no position) characterizes both transcendent objectivism and relativism, as we have seen above. Both rely on abstract space for their credibility.

> Positioning implies responsibility for our enabling practices. It follows that politics and ethics ground struggles for the contests over what may count as rational knowledge. That is, admitted or not, politics and ethics ground struggles over knowledge projects in the exact, natural, social, and human sciences. (Haraway, 1996, p. 119)

> Partiality and not universality is the condition of being heard to make rational knowledge claims. These are claims on people's lives; the view from a body, always a complex, contradictory, structuring and structured body, versus the view from above, from nowhere, from simplicity. (p. 121)

> [W]e do need an earth-wide network of connections, including the ability partially to translate knowledges among very different-and power-differentiated communities. We need the power of modern critical theories of

> how meanings and bodies get made, not in order to deny meaning and bodies, but in order to live in meanings and bodies that have a chance for the future. (p. 113)

Newell approaches both Lefebvre's and Haraway's insights when he writes: "In short, place matters. And if one is trying to understand the behavior of a specific place within a complex system, local knowledge matters" (p. 10). Place matters! This could be a simple formulation of differential space. Places differ; they matter; thus awareness of what matters must be attuned to difference, must be differential. "Local knowledge matters." This could be a simple formulation of situated knowledge. When is one not concerned with a specific place? This person. This forest. This stream. This group of people living in this place speaking this language enmeshed in this matrix of cultural trajectories. If the test of knowledge is its ability to assist us to live well, each application of the test is local.

Wendell Berry may help us to focus again on the disciplines. "The disciplines," he writes, "are different from one another, each distinct in itself, and rightly so. Science and art are neither fundamental nor immutable. They are not life or the world. They are tools. The arts and the sciences are our kit of cultural tools" (2000, p. 121).

The purpose of these tools, he boldly states, "is our dwelling here on earth . . . the proper work of culture . . . a diversity of dwellings suited to the diversity of homelands" (p. 122). Only in collaboration might these tools possibly be used to accomplish this task. Only in collaboration might we discover what tools we lack, which needful acts we cannot perform. As the proverb goes, "With only a hammer, the whole world becomes a nail."

Berry entices us to imagine the results of a genuine conversation among the disciplines. What would it be like if, along with "art criticism" we taught and avidly practiced criticism of "farming or forestry or mining or manufacturing" (p. 112)? Or physics and chemistry, I might add. He remarks, "in universities, one discipline is rarely called upon to answer questions that might be asked of it by another discipline" (p. 129). Here is a vision of "inter" disciplinarity that carries within it the seed of political, ethical, economical institutional change, though, like Berry, I am at a loss as to how to engender it. But it is a vision that reminds me of the insurgent, transformative impulse at the root of some versions of interdisciplinarity, an impulse not only hinted at in Newell's vision of our task.

The world we study is the world in which we live, and our studying of it is one component of our living in it. But the end and goal of all our studying is

our life. To be right if one is dead is little solace; to be right if one's knowledge has killed one's fellows is less. We are multiple, complex, contradictory; in ourselves as individuals, amidst one another as bearers of culture; among ourselves as inhabitants of varying networks of cultural trajectories. The world we study and in which we live is not the passive object of our inquiry and recipient of our actions. We did not create the world; the world created us. This is an objective, not a theological claim, in the sense that integrative praxes allow for objectivity. The world existed before I did, and before homo sapiens, as well. The world's processes, whatever they may be, whether divinely authored or materially random, brought us and me into being. The world is active, not passive, and it is a tricky place, where not even the boundaries between things are given or fully fixed. As Haraway suggests, learning about the world is like talking with Coyote: interesting, powerful, dangerous, and ironic.

We live in this world. That living provides both the motive and the test of our knowing. We think to live, and to live well. The "we" that lives in this world is deeply multiple, differentiated by age, gender, culture, history, and other contexts and affinities. This multiplicity is either a great strength or a great stumbling block. In the face of the dream of universal, unassailable, absolute knowledge, it is a scandalous obstacle that must be overcome. Every difference must be rendered insignificant in the face of Truth. But our differences make up our identities; our specificities comprise our lives; when they are rendered insignificant, so are we. How can such a Truth serve the end of living well? Perhaps, then, the world is vast, inexhaustible, and mysterious. Perhaps the rich diversity of our experiences of this world offer us ever increasing opportunities to learn from one another in a conversation without end. This conversation can link our knowledge formations, without subjugating one to another, engendering dynamic and thoughtful practices and dynamic and practical thoughtfulness-integrative praxes-as we pursue the art of living well, each living well as the specific, embodied, situated human being we are.

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tion to General Integrative Theory," *Issues in Integrative Studies*, 1999, "Sensory Questions," Arts and Learning Research; "Beyond Schutz: Absence Face-to-Face," in *Wish I Were: Felt Pathways of the Self*; and "Perception and Material Culture: Historical and Cross-Cultural Perspectives," *Historical Reflections/Réflèxions Historiques.* He is also the photo editor of the book series*, Life of Religion.*

Notes

1. Of course, as Gregory Bateson points out in *Mind and Nature* (1979), this could change. Thoughtfulness (or any other adaptation) enhances natural selection until it no longer does, after which it becomes a liability, rather than an advantage.
2. *Personal* is not synonymous with *individual*, although they tend to be conflated in the mainstream of Euro-American cultural trajectories. The person may be understood and experienced as profoundly communal. For example, Margaret Miles (1985) writes extensively about the historical and cultural strangeness of our current experience of the person. See also Hall, 1977, pp. 231-232.
3. I have begged the question of what constitutes "doing the good" or living well. One of the roles thought should play is to help us engage that question.
4. I am indebted to Caroline Haynes who responded to an earlier version of this paper by insisting that I account more fully for the gendered nature of the disciplines. This insistence sent me to Donna Haraway, and to other sources now integral to my thinking.
5. For some useful reflections on the damaging character of "art for art's sake" and its possible replacement with an art aimed at integrative praxes, see Gablik (1984; 1991), Lippard (1983; 1990), and Lacy (1995).
6. I have taken the idea of cultural trajectories from Robinson and Koester's *Trajectories through Early Christianity* (1971).
7. For this reason, I considered using the term (dis)integrative praxes, to emphasize the inherent processes of splitting and the realization of multiplicity. However, the difficult neologism of the term and its raucous postmodernism dissuade me. Nonetheless, I am not satisfied with "integrative praxes."
8. This indicates that there are affective as well as cognitive components to thinking well. Paul Stoller, in *Sensuous Scholarship*, has some lovely things to say about the role of humility in academic life (1997, pp. 135-137).
9. I agree with Julie Thompson Klein ("Complexity: The Tests of Theory") that Newell's piece falls short of the formal requirements of theory.
10. See, e.g., Wittgenstein, 1958, p. 36.
11. Insisting on the partial and situated character of all knowledge does not imply the absence of a real world in which we (must) live and toward which our knowledge aims. Actually, *radical relativism*, like transcendent objectivism, denies the significance of the knower's actual location. If transcendental objectivism claims "to be everywhere and so nowhere, to be free from interpretation" (Haraway, 1996, p. 122), relativism presents itself as "nowhere while claiming to be everywhere equally. The 'equality' of positioning is a denial of responsibility and critical inquiry. Relativism is

the perfect mirror twin of totalization in the ideologies of objectivity; both deny the stakes in location, embodiment, and partial perspective . . . promising vision from everywhere and nowhere equally and fully . . .” (Haraway, 1996, p. 117). See also Carp (1991, pp. 287-288) on what I have called *cheap relativism*.

12. Newell and I both agree, as a matter of principle, that it is a cardinal sin of interdisciplinarity to work with an impression of material emerging in a discipline, rather than with the material itself. Unfortunately, I believe that Newell is inadequately grounded in complexity theory to use it in the fashion he attempts in this paper. However, I, too, am not competent in dynamical systems theory, so I will leave this critique to others more qualified than I to make it. See for example, J. Lynn Mackey’s article in this issue.

13. In *Creativity* (1996), Mihaly Csikszentmihalyi proposes that gatekeeping is the critical function for understanding creativity as it actually manifests in the sociocultural field. He believes that there is a significant amount of *individual creativity*, but that those advances are not integrated into various symbolic domains because of the inability or unwillingness of the gatekeepers of those domains to acknowledge the creative advances. If we want a more creative society, he says, it would be better to improve our gatekeeping than to invest in increasing individual creative acts.

14. It is not clear how this is integrated in Newell’s mind with the larger test he proposes and I have articulated as integrative praxis.

15. We shall have to understand interdisciplinarities in the same manner. This is coherent with the suggestion above that we uncover the institutional, political, economic, and personal dimensions of our processes of knowledge generation.

16. Of course, as Jay Wentworth, editor of this publication, pointed out in a note to me, ignorance may sometimes promote well-being.

17. This is especially important because Newell often makes an appeal to a purported consensus in relation to which some aspect of this theory can be understood. For example, he claims that the exclusions of work from interdisciplinarity entailed by the theory, “correspond to widely accepted distinctions between interdisciplinarity and disciplinarity and multi-disciplinarity” (p. 6). And we find, “There is widespread agreement that interdisciplinarity is a process. Likewise, there is general, but vague agreement on the steps in the process.” (p. 14). Like disciplinarity, *consensus* is a hidden assumption, one I will discuss at some length below.

18. Andrew Abbott (2001) argues that interdisciplinarity as it has been practiced since 1937 is a conservative, rather than a transformative, force in academic life. He maintains that “problem centered” interdisciplinarity can never replace disciplinary structures, for a variety of primarily sociological rather than intellectual reasons. I agree with his analysis, but there are other ways of imagining interdisciplinarity that he does not consider.

19. Other examples could be generated from other knowledge domains. There is, for example, the way in which anthropology has attempted to understand cultures by projecting European forms, or the way in which the arts have imagined the art of other peoples (as if “art” were a concept that applied anywhere outside European and

American trajectories).
20. The headline of P. Schmidt's article in the March 29, 2002 issue of *The Chronicle of Higher Education* reads, "States Push Public Universities to Commercialize Research: Conflict-of-interest fears take back seat to economic development." The article cites concerns expressed by, e.g., Virginia A. Sharpe, Director of the Integrity in Science Project of the Center for Science in the Public Interest concerns that such policies might tempt universities to "neglect research that benefits the public in favor of research intended to help particular companies." (p. A26)
21. Or, as Reynolds (1991) says, "The efficacy of the atomic bomb no more proves the truth of physics as a system of thought than the invention of gunpowder by Chinese alchemists proves the truth of Taoism" (p. 209).
22. Creative insurgency is not, I think, linked to complexity in the ways Newell has in mind, although it certainly is a complex undertaking!
23. One would think by now most scholars would be somewhat leery of such natural occurrences. The appearance of naturalness in a cultural production is by now a well-established hallmark of bourgeois culture and, clearly, thought systems are cultural productions.
24. My work, of which this article is an example, is not rooted in a set of disciplinary contexts, although it makes use of knowledge generated in disciplines.
25. Querying a text with respect to its "obvious absences" is one method of "deconstruction." For an especially brilliant effort in this direction, see Jacques Derrida's "Plato's Pharmacy," in *Disseminations* (1981).
26. We should of course also note that the Academy is implicated in the positive contributions of the culture to which it belongs, such as individual self-determination, personal liberty, greater equality of status for women, improved public health and medical care, and so forth.
27. There is an important difference between the metaphor of "listening and learning" and the metaphor of "integration." When I "listen and learn," the other from whom I learn remains other to me. When I "integrate," what was other becomes incorporated into the same, becomes part of me or what is mine, is "integrated." Listening and learning keeps the conversation open, forever. Integrating absorbs potential conversation partners.
28. The question of the plasticity of culturally-based experiences of the self is too complex to enter into here. However, see, for example: Hall (1977), Desjarlais (1992), Seremetakis (1994), and Carp (1997).
29. It is interesting to reflect how much of Newell's argument rests on the metaphor of accountability.
30. This raises the broader question of the impact of technologies, especially media, on processes of knowing. I have suggested elsewhere both that interdisciplinarity owes its origin in part to the electronic revolution, and that the most appropriate expressions of interdisciplinarity involve hybridization of media (Carp, 1999). As McLuhan expressed it, "Separateness of the individual, continuity of time and space, and uniformity of codes are the prime marks of literate and civilized societies" char-

acterized by phonetic writing, in which meaningless symbols are used to refer to meaningless sounds that refer meaningfully to the world (1964, p. 84f.). Each of these proceeds by identification and repetition of uniform parts. According to McLuhan, "The breaking up of every kind of experience into uniform units in order to produce faster action and change of form (applied knowledge) has been the secret of Western power over man and nature alike" (1994, 85). The printed book, he says, coupled with vanishing point perspective, generates the illusion that "space is visual, uniform and continuous" (p. 172), the very qualities Lefebvre discovers in abstract space which both dominates and characterizes our moment in history. Lefebvre notes that economic activity, social life, symbolization, and formal intellection, especially in the academy, all take on the character of abstraction and, therefore, assume the appearance of universality (Lefebvre 1991, p. 49). "Perhaps it would be true to say that the place of social space as a whole has been usurped by a part of that space endowed with an illusory special status - namely, the part which is concerned with writing and imagery underpinned by the written text . . . a part, in short, that amounts to abstraction wielding awesome reductionist force vis-à-vis 'lived' experience" (p. 52).

31. Interestingly Marshall McLuhan predicts the rise of interdisciplinarity as a result of the creation of electronic media. See *Understanding Media*, e.g., pp. 35-36, 71 (1998).

32. These logics, because they address what goes with what, can also be considered as *aesthetics* as Yi Fu Tuan (1993) does in *Passing Strange and Wonderful: Aesthetics, Nature, and Culture*.

33. We should first note, though, that any notion of *the* body itself presents some difficulties. Surely a human body is one of the species-specific characteristics of human beings. In this sense, it can be affirmed that every person has a human body that resembles every other human body more than any other species' body. Taken strictly in this sense, talk of the body makes sense. But our species body is a plastic one; moreover, ours is a spectacularly developmental body, radically incomplete at birth and profoundly affected by the context in which it develops. Even *in utero* bodies may display some plasticity. Therefore, the body of another may well be in important ways other than our own body, despite the residence of both these bodies in our shared species body.

34. Nadia Seremetakis asks: "if modern-western embodiment has been desensitized, in what form can perceiving subjects from that context perceive the senses of the cultural other? Will that particular act of perception merely replicate the very violence against the senses that the western commentator seeks to escape from, to rectify and compensate" (1994, p. 125)?

35. For a review of data supporting this contention, see Carp (1997).

36. Julie Thompson Klein's reflections on disciplinary constraints on contemporary science are relevant here (1993, pp. 202-203).

37. Yesterday I was talking with our university's math department chair. "How," he asked, "are we going to get rid of departments. They aren't that old, you know. It was a noble experiment and we learned some things, but the experiment failed." Although

departments and disciplines are not identical, the production of knowledge would change rapidly and dramatically in the absence of institutional supports provided by departments.

38. In conversations at Northern Illinois University in spring, 1998, Csikszentmihalyi further described the key role of gatekeeping in creativity and acknowledged the fundamental difficulty involved in extending the creative potential of the field. In general, he believes there is no dearth of individual creativity; it is at the level of the field that creativity diminishes.

39. Institutional politics are never totally absent from the scene, even as I write this. What if someday I want or need to seek another position? Isn't it likely Newell would be consulted concerning my qualifications? Is it possible this critique might affect his reply? Probably not in this case, but it certainly could with different people involved, especially if one were vulnerable.

40. Let me reiterate that there is no question of bad faith. It is the responsibility of the field (and therefore of the readers of this journal) to maintain creative gatekeeping. It is the responsibility of each individual to pursue what appears to be true.

41. As Stoller learned to his dismay, it "carries with it real consequences—bodily consequences" (1997, p. 14).

42. This analysis includes and critiques scientific truth as much as any other. The notion that "scientific (logico-mathematical) truth" is "real" is part of the network of stories and rationales that makes "abstract space" appear natural and inevitable.

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