UnderCurrents

boundaries

divisions

territories

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Founded in 1988, *UnderCurrents* is an independent non-profit journal dedicated to the publication of critical work in the broad field of environmental studies. Produced by graduate students at the Faculty of Environmental Studies, York University, the journal publishes work by writers from a wide variety of experiential and academic backgrounds. The journal seeks to make explicit and contest the destructive political and cultural conceptions of natural and built environments that have precipitated the contemporary ecological crisis.

UnderCurrents is produced annually by an editorial collective, employing principles of non-hierarchical consensus building in the editing and publishing process.

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editorial essay

As a journal of critical environmental studies, *UnderCurrents* provides a forum for ideas which challenge traditional conceptions of nature and/or the "natural." Contributors are accordingly encouraged to question disciplinary boundaries in search of new ways of presenting these ideas. Published by graduate students in a faculty which struggles to find the spirit of interdisciplinarity within the official mantra of "thinking, learning and acting environmentally," *UnderCurrents* has historically embraced a working philosophy which engages this spirit in a variety of ways. The Editorial Collective, which challenges the hierarchical model of decision-making traditionally employed by journals, has attempted to promote the free interplay of voices and ideas between journal participants, raising the product of consensus above the individually-crafted initiative even as it demands a high level of tolerance, patience and responsibility. This effort is mirrored in our submissions policy which, inviting work of every form and description from a variety of disciplinary and experiential backgrounds, presents a challenge of balancing the editorial demands of thematic focus with the hectic plurivocality often represented in interdisciplinary approaches to environmental learning.

The absence of hierarchical stability and continuity at *UnderCurrents,* coupled with the very breadth of its mandate, invariably generates a recurring scenario; each fall, a gathering of students with different backgrounds and interests come together to "reinvent" *UnderCurrents,* fuelled by those issues and feelings which impelled them to pursue interdisciplinary studies. And each fall, following from a combination of individuals and circumstances, a Collective emerges with a unique question or idea

which animates the journal. This year, amid a flurry of chalkmarks and furrowed brows in the inaugural sessions, the Collective at *UnderCurrents* came together around a discussion which featured a uniquely recurring phenomenon. Every idea for which there was some interest, when framed in terms of a possible theme, precipitated its opposite: concerns about "nature," predictably, emerged opposite those about "culture", "human" opposite "non-human," "natural" opposite "artificial," and so on. Patterns of semantic divisions, conceptual boundaries and disciplinary territories multiplied around these dualisms, inviting us to consider how a truly interdisciplinary journal might engage these lines of fracture without reinforcing the dualisms in which they remain pervasively grounded. We have attempted to draw this theme together in the title: "Divisions, Boundaries, Territories."

Crossing boundaries with Instinct, her canoe, Zabe MacEachren's reflections are spirited from "a travel journal that was never written, but was felt through the callous hands after the arrival home." Through the myths and ceremonies of canoe culture, she finds herself drawn into a participatory relationship with the Northwoods, a journey fuelled, not divided, by ritual exchanges across boundaries. In the following paper, Yolanda Wiersma considers the physical, structural and curricular divisions which separate ecological communities from school communities. Her discussion moves us toward an understanding of ecological education that "blurs the edges" represented in and reinforced by the central divisions within Western educational pedagogy. Fiona Coyle turns our attention to the social construction of scientific knowledge in complexity theory and Alife (artificial life) narratives. The appropriation of geographical terms like space and landscape to ground these narratives, she argues, not only threatens the spatial territory of geographers, but disturbs the oppositional duality of "natural" and "artificial."

In his essay "Doors," Steve Slavik takes a broad, yet intensely personal approach to the perceptual dichotomy of "inner" and "outer" experience, exploring images and metaphors which transcend this dichotomy by engaging the participatory character of experience. Derek Teevan takes us to the Arctic National Wildlife Refuge in Alaska, where the indigenous Gwich'in, the "People of the Caribou," are engaged in a battle with Alaskan oil interests and Republican politicians over the future of the 1002 lands. As Teevan argues, however, the terms of the debate and diverse political, social and geographical constituencies of its participants are challenging the boundaries – and territories – of environmental decision-making. Revisiting Coyle's concern with the social construction of scientific knowledge, John Sandlos examines how the scientific effort to "liberate" nature from purple loosestrife in North American wetlands involves us in the "larger mythic battle for control over the universe." Operating at the conceptual margins of nature and society, he argues, the scientific manager plays the role of the "sane assassin," protecting a sanitized and socialized natural world from the transgressive violations of "uncontrollable wildness."

As this volume of *UnderCurrents* came together, the topical and stylistic "gaps" which appeared between contributions yielded a creative space in which both poetry and visual interpretation could take hold. In this light, the poems of Sheila Hassell Hughes, John Sandlos and Lisa Richardson might be considered thematic touchstones for the pieces which appear on their borders and at a greater distance. In crafting a visual dialogue across these gaps, Lesia Olexandra has also played an integral role in the production of this volume. As a representative rather than exhaustive effort to engage the lines of fracture in a non-binary universe, we hope the reader feels invited to participate in the "space of possibilities" which has opened up between these covers.

David Pauls
for the *UnderCurrents* Editorial Collective

crossing boundaries with instinct

by Zabe MacEachren

> The mythtellers understood that the natural world is full of discrete beings, each entity differentiated from the rest of the world. They knew, probably better than we do, that a living thing acquires its energy by means of exchanges across a boundary, so that the living thing remains distinct from its environment, yet interacts continuously with it. The lining surrounds the cell; bark surrounds the tree; skin surrounds the animal. These membranes act in a selectively permeable way, allowing nourishment in, keeping poisons out, expelling wastes or, in the case of the nursing mother, expressing food. Wherever there is an exchange, there is the crossing of a boundary... Boundaries are the magic points where worlds impinge... Boundaries can also be crossed invisibly. They are crossed by words, by thoughts, and spirits. (Kane 1994, 103)

Canoes are made to cross boundaries. They are designed to live at the border between air and water. I have been asking questions of canoes since I was a child and to discover some answers I have travelled to distant shores. My canoe, *Instinct,* has crossed borders both seen and unseen. She has carried me over boundaries just as I have carried her over portages. We need each other to be who we are: citizens of the Northwoods, travellers, at times wounded beings with scars, followers of a flow, entities looking both forward and backwards, seekers of bearings to where we came from and where we are going. My stories of crossing boundaries with Instinct are a written translation from the old oral tradition of crafting, seldom recorded in words or an actual log, but felt by every sinew strand that pulls on a knife carving a paddle. They are passages from a travel journal that was never written, but was felt through the callous hands after the arrival home. We have a kinship, Instinct and I. It is not spoken of through words as much as through the rhythm of paddling strokes and the pleasure of floating on a cloud's reflection. I can best absorb the loon's echo which shimmers across ripples of air when I am seated in the belly of a canoe, nestled between Instinct's ribs.

I do not remember my first time in a canoe, nor the first time I wondered how the canoe came to be, but early on these questions intrigued me. Who made the first canoe? Where did the idea for a canoe originate? How was a canoe birthed into a culture? Such questions guided me into the terrain marked "unknown territory;" a landscape of invisibility, unlike the bold lines on topographical maps that designate country borders down the middle of lakes and give canoeists little bearing as to where they are. Maps made of questions guided me to a way of travelling which did not always depend on one dimensional explanations on paper. I began to find support and guidance only when I absorbed the land and culture from which the canoe emerged. I found my bearings in the beliefs and myths of canoe culture.

crossing cultural boundaries

After a wide variety of canoe tripping experiences, I arrived in an isolated Anishinabe First Nation where no roads connected me to stores and hospital services. Trips to town required a seven day paddle one way or an expensive plane fare. I had often worked alongside Native friends as guides, but in this community I came to be labelled a "teacher," although I often felt more like a student. It was in such a setting that my trickle of questions turned into a flow of pondering. When does a tree cease to be a tree and become a canoe? Did rinsing deer ribs on a shoreline influence canoe makers? Did someone get the idea of making an enlarged basket that one could climb into after watching a blueberry basket float? It was among people whose ancestors' lives were transported through time by canoes that some answers began to appear.

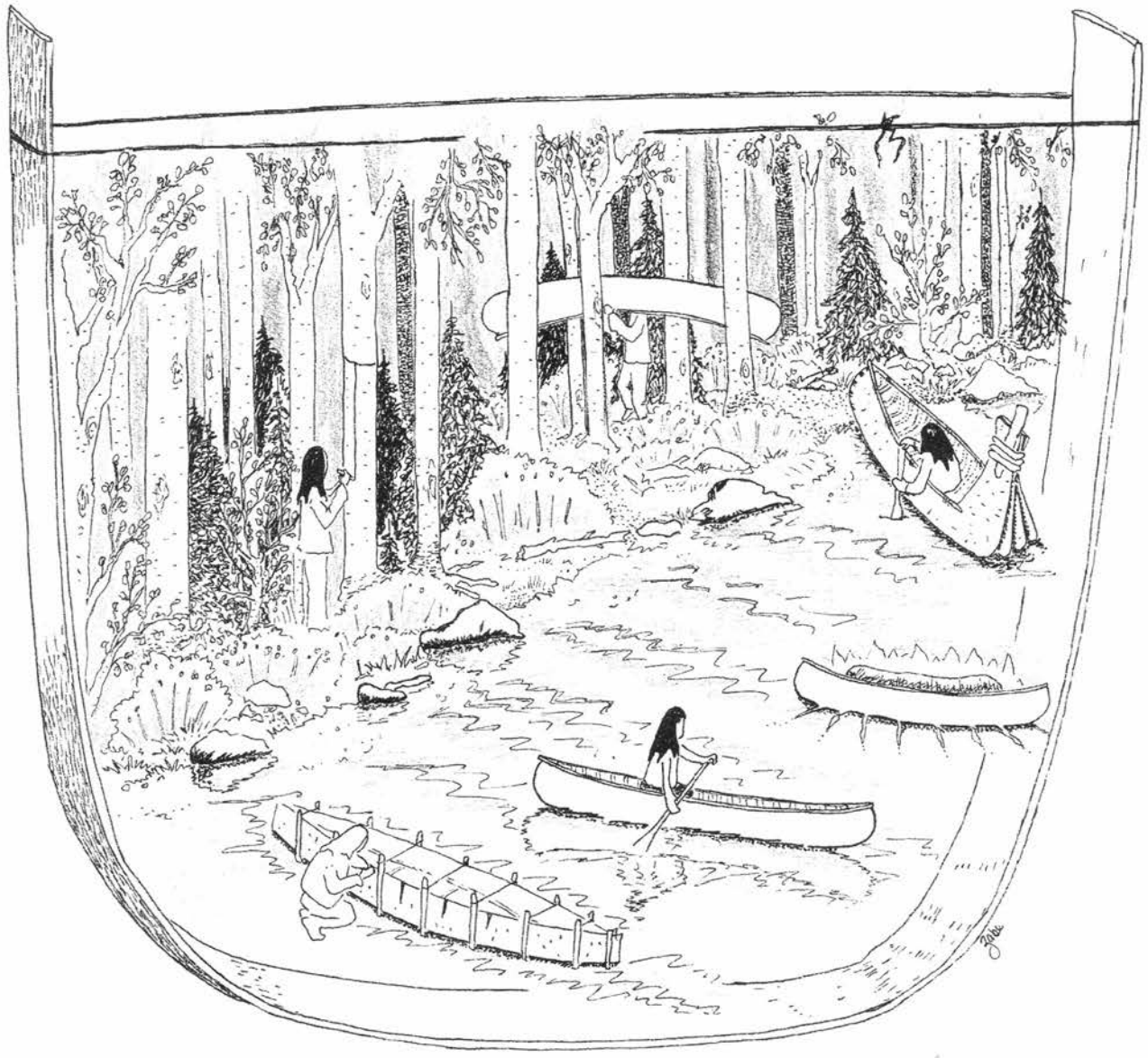
Each spring after break-up, I would begin to mark the opening of canoe season with a small ritual that is common in the Anishinabe culture. A small offering is placed on the water before the first spring paddle. I learned how this ceremony acts as an ancient offering to the spirit world. The more I practiced it, the more it served to gently remind me to be respectful of all that has been given to me whether seen or unseen. It recognizes how winter has been survived and how the flowing waters of springtime will rejuvenate. If I forget this ritual, I never feel complete until I perform it. I have become accustomed to the seasonal transition from frozen water to flowing water, from snowshoe travel to canoe travel, and feel I must formally address this occasion through such a ritual. Such a simple ritual practice allows me to enter the sacred time of the seasonal changes and at the same time to acknowledge my own personal psychological transformations associated with the seasonal cycles that affect my travels.

Desert regions have their solstice rituals, but the Northwoods has break-up and freeze-up: the two times of year when many seasonal activities are acknowledged through ceremonies. The sound of change is copied from the floating, clinking ice crystals into the swish of the hundreds of jingles on a traditional Anishinabe women's dress. The first jingle dress originated from an ill woman's dream. She described the dream to her husband who then made the unusual dress she saw in her dream, sewing on many jingles from cut metal cans. Despite her illness the woman wore the dress to a pow wow and soon thereafter became well. Other women began to make their own healing dresses each with the sounds of transformation stitched into them. Often ice crystals tinkle and chime on the side of Instinct, when I take her out of the water for the last time in the fall or when I leave an offering on the shoreline in the spring. My resonance with this seasonal cycle of transformation is reenacted when I dance in a jingle dress, listen to ice crystals and make a spring time offering. My offering is placed on a shoreline to celebrate a seasonal border crossing. It floats on the surface of a boundary where a canoe is at home.

crossing into dreams

Immersion in canoe culture is a subtle process that engulfs you like an invisible map of gray mist or dances about you like a campfire shadow. For over seven years I had lived in remote roadless locations, paddled in and out of these communities, aided others in making paddles out of local cedar wood, retraced many routes of the courier des bois, read historical journals and worked as a voyageur interpreter. I listened to yarns from old canoeists, taught the paddle dance to groups across North America and even attempted making a birch bark canoe after learning birch bark basketry. Yet it was only after returning one summer from Maine where I had crafted a canoe with Jerry Stelmok (master canoe builder of the E.M. White cedar canvas canoes), and was completing the final shellacing stages of Instinct that an answer to a long asked question finally appeared.

After years of asking how the canoe first came to be, I awoke one night with an image in my mind of the back of someone with long hair, paddling away from shore in a birch bark vessel that was like a canoe in one end and a folded basket at the other end. Here was my answer of how the canoe came to be: a dream. My campfire chats with Anishinabe elders had informed me that dreams were like messages that came from the



canoe rib-strung and drying

Earth and were to be listened to and lived out like the image of a healing jingle dress. Perhaps in the time of the Blackduck culture or even earlier, a person could have had a similar dream of a form of transportation well adapted to the many water routes of the region. They would have lived out their dream by making such a water craft. They would have created a canoe by turning a dream into reality, their life, their story. The Northwoods spoke to me that night. It allowed me to become atavistic and see the birthing of a canoe as a natural extension of the fit between culture and nature. A canoe as a means of transportation is so well adapted to the Northwoods that explorers readily copied it. Through this dream I experienced how the land of the Northwoods can speak and be heard. To live out such dreams is to acknowledge the transparent boundary between dreamtime and reality; it is to live life as the unfolding of a mythic adventure rooted in place.

crossing by making

Traditionally canoes are born from the earth. They were not plastic, un-recycable, in-organic or potential landfill problems as canoes are today. They were crafted from an indentation in the ground that served as a birthing canal. In order for a canoe to be conceived, care and consent had to be established from its many ancestors. Before store-bought lumber and power tools were readily available, a canoe builder, through the process of making a canoe, became intimate with the land: a region that supported his/her life, what is referred to today by some as a bioregion. James Dina decided to learn about himself and history by building a birch bark canoe using only stone tools. He named his canoe *Ant,* and when discussing his canoe building he writes, "My first concern was finding materials, all from the natural environment. I wanted to act as part of the system, not a detached harvester, and this affected how and where I searched" (Dina 1989: 44). Canoe builders had to know their bioregion in order to be able to birth a canoe from it. The way one travels through the land seeking suitable trees becomes a sort of courtship dance. This region of flexible borders fits Jerry Martina's definition of a bioregion as "the distance you would walk to see a lover" (Martina 1993).

Canoe builders must learn the art of wooing by carefully observing the water conditions of their region so they know which canoe design and canoe material are appropriate for the local aqueous dance floor upon which canoe and paddler will flow and flex together.

Birch was referred to as the tree of life among the Anishinabe because its many offerings: food, shelter, transportation and warmth. A sweet sap, lodge coverings, canoe skins, snowshoe frames, firewood and tinder were all gifts from this one tree alone. Suitable canoe trees needed to be located; in the process of searching, many hundreds of trees were considered and each examined for their qualities. Individual trees were sought for their "personalities" (plantalities). Where does a spruce tree stand alone in a bog which will allow for the easy collection of roots for lacing? What markings on a birch tree indicate that it will crack frequently? These will result in many seams requiring sealing pitch, which makes it a very heavy canoe. A crafter must know an area well to be able to birth a canoe into being. Such a sensitivity to the land is desirable in order to reduce the time spent working with wood that does not want to become a canoe and will split or break.

Gathering supplies for a canoe is made easier through a sense of connection with the trees and an understanding of when it comes time to mold the form and bend wood grain. Crafters must extend their sense of kinship into the trees and gently guide the transformation of muscle flex into grain bend. A sense of commonhood with materials, whether of animate or inanimate origin, helps a crafter to feel compassion for the more-than-human world. Such compassion is necessary in the crafting process and is encouraged through acknowledging the kinship with other life forms that can occur through many boundary crossings. Canoe makers seek to know their bioregion so intimately that they can serve as both matchmaker and midwife, birthing canoes from and into the region of the Northwoods culture they are best suited to.

Unless a canoe maker has this intimate understanding of how to seek supplies which are suitable to being transformed into a canoe, wood will crack and split when bent. A crafter intuitively knows how to transfer muscle sinew fiber to plant grain when bending a cedar rib. A knot in a paddle shaft can act like an arthritic pain and interrupt the flow between water and canoe every time a paddle stroke is taken. Bending wood is best accomplished when the tree it is gathered from is believed to have status and rights of comparison to human needs. Status and rights given to a non-human life form acknowledge a sense of deep understanding and relationship in the idea of commonhood. One must enter the cedar's grain and feel its body to ensure it is willing to bend itself into a canoe. Without such extended body awareness or sense of commonhood with the more-than-human world, it is next to impossible to hand carve through hardwood grain or bend cedar ribs.

Talking to a tree before cutting it down is the first attempt that one can make to ensure that a tree's spirit consents to the transformation of boundary crossing: from being of the forest to being of the water's reflection. Kirk Wipper, founder of the Canadian Canoe Museum, states "No wonder in many parts of the world, the people thank the land for allowing its spirit to be transferred to the canoe" (cited in Raffan & Horwood 1989: iv). If you avoid this step you may spend a lot of time trying to bend wood that just will not bend. Approaching trees respectfully is the old timer's first lesson for a crafter. As a Koyukon elder from Alaska explains, "I don't care how smart a guy is, or how much he knows about birch. If he acts the wrong way – if he treats his birch like it's nothing – after that he can walk right by a good tree and wouldn't see it" (cited in Nelson 1989: 55). To understand a canoe is to understand that it is born of the forest, and to treat it with all the respect every forest dweller deserves.

ceremonies of crossing

After completing my canoe I crafted with some white cedar, spruce, ash, and cherry trees. I asked a medicine man to perform a traditional canoe launching ceremony for her. Friends were invited, prayers spoken, and food shared. Offerings were made to the land in recognition and acknowledgment of her role in creating Instinct. I then placed an offerring on the water and put Instinct on the water's surface for the first time. This ceremony marked the transition of tree to canoe. The boundary crossed in this crafting process was acknowledged in a ritual that confirmed the coming together of nature and culture. Bert Horwood writes, "By primitive I mean a state of affairs in which humans know themselves as part of the natural world. Primitive persons see their inventions and creations, their pots, their clothes, their tools and weapons, their stories and dances, not as artifacts, but as natural extensions of the world" (Raffan & Horwood 1989: 128). Similarly, I feel I have reclaimed my primitiveness by making a canoe. I became part of all that Instinct knew as soon as I placed her on the water. I ask, what can represent a land full of lakes and rivers better than a craft that can float on the boundary of water and air, rest at the border between land and water, and be carried across the portage trails that link the borders of a vast network of shorelines?

crossing from past to future

In the middle of Canada, as measured by canoe travel only, lies what is considered by paddlers to be a distinguishing portage. In the time of the fur trade brigades and the Great Rendezvous, this portage marked those travellers who had spent at least one winter in the interior. The interior was the land which remained civilized by wildness; it rested beyond the developed territory of Eastern villages or the gates of Fort William and Grand Portage. There were actually two portages that, if crossed, entitled you to *winterer* status. The first was the long enduring nine-mile grunt of Grand Portage and the second was the physically demanding climb of Kakabeka Falls. Although I had spent many of my previous winters west of this mark I never felt like I was truly part of the Northwoods culture; I needed to properly claim the right to be a winterer by crossing this trail which my Northwoods ancestors had also traversed and marked in the narrations of their journeys.

At the age of 33, with sweat on my back and Instinct above me, I crossed the boundary marker and became a true "winterer". A cedar bough dipped with fresh water was laid upon each shoulder by a friend and in true Northwoods fashion I was knighted into the world of the winterer. I had crossed the divide of historical time and enacted the old ritual which would allow me to live out another myth of the old-timers. I was truly an initiated winterer now, I had taken another step into Northwoods reality by claiming to be part of a continuing canoe myth. I had embarked on a journey into a land of metaphor. The canoe marked how both my inner world and invisible spiritual realm would relate to the Northwoods through the culture of the canoe. The canoe became a metonymy for the Northwoods and my being.

her wooden ribs will flex like lungs expanding for a breath of air as her belly rubs and

boundaries dissolve

On the shores of Lake Superior, Instinct and I rest. We watch clouds of white float by like the froth and spray of waves and water crashing on the rocks nearby. I have heard Instinct's voice when she has danced on such waves. Her wooden ribs will flex like lungs expanding for a breath of air as her belly rubs and frolics upon this incredible expanse of blue beneath her. Waves crest just inches from her gunwales as she dances and pivots with such wild aqueous partners. The temperature of the water dictates whether we go out to dance. Today, Instinct rests safely under spruce boughs, her grey colour well blended with the tones of the Canadian Shield.

Instinct was painted the colour of mist and fog on purpose. Northwood guides often painted their canoes grey because they sometimes had to poach to support their families and were aware grey was an easy colour to hide in the Canadian Shield country. Tom Thompson painted his canoe many times to obtain the particular colour of gray he desired. I too paint my canoe grey because there is nothing so tantalizing to me as being part of the ebbing and moving of the mist on a fall morning. At such times when I travel I feel camouflaged in this "grey area," as if I could easily slip between the world of darkness and light, or between the border of life and death. Such times seem dense with superstition and alive with unpredictability. They need to be respected. Instinct's grey reminds me to travel with respect for the boundaries and what lies beyond the boundary in the world of the invisible.

On those misty mornings I travel with Instinct sneaking in and out of visibility. My bow and stern are not distinguishable. I can paddle either forward or backwards into the mist and travel to the center of my being or a peripheral border. Within the ebbing mist I feel safe, nestled between cedar ribs and canvas skin. Paddle, canoe and I move as one in a world that penetrates beyond my vision. I do not always see where I go, but I relish this feeling of groundlessness. Air, water, Instinct and I all become gray nebulous flowing movement.

On sunny days, the water reflects the clouds and Instinct stretches this surface membrane. The canoe becomes part of my body as my shoulders absorb the flex of a paddle, transfer it through my arm down into my back, belly, then out into the canoe. We all move together, selfless and as one. Perhaps it is because the Northwoods is so full of biting bugs whose itchy welts interrupt my blade's rhythm and make me conscious of my whole body while paddling. I see them as miniscule immunization shots against the asphalt plodding disease which afflicts me in the urban world.

Once while paddling I had a vision that I was just like a small microorganism living on the skin of the earth. My world was all that was before me. Trees became like long hairs that I needed to crawl around. I enjoyed the way this vision extended my mind into the land, so I now practice it regularly while paddling. It was like a canoeist's meditation toward an ego-less self. It allows me to live more fully in my body, and even to extend my body out into the canoe ribs and to all beyond. I humble myself down into this microscopic creature that crawls along the surface of another living form – Gaia. The water, land, and portage trails become the skin upon which I travel and my skin acts as the membrane through which I sense things. The belly of the canoe picks up each tiny undulation, and my mind floats away as I become transformed into a sentient insect that is fully aware of its own membrane and the skin it depends upon. This is my practice, to extend my skin into the canoe's, and out into the world we are part of so that I feel compassion for the world that includes the humblest of creatures.

final crossings

I have had enjoyable conversations with others about appropriate ceremonies for the occasion of making the final boundary crossing. What is the most fitting manner to make the "final river crossing," as death is sometimes called? I like the ideas involved in a Norse-like funeral service when acknowledging a crossing over into the shadow world. According to custom, one's body was placed in a boat that they had built in their life time and then set adrift. From shore all your friends and family members shot burning arrows onto the craft until it caught fire and cremated your last remains at sea. Except for the uncertainty of my friends' and family's aim with a bow and arrow, or the likelihood of a fire ban during canoe season, this funeral service has merit and appealing quality. A final trip in a canoe as coffin. Old Fort William actually has a canoe graveyard where old birch bark crafts rest until they return in their own organic time frame back to the land they were born from.

> While it is true that, to the aborigines, the canoe and its various adaptations were considered "an extension of their home," their perception of being at one with the environment would include the canoe as an extension of oneself, a link to the natural world. As such there was an attendant spiritual connotation. This was particularly highlighted among cultures which used the canoe to transfer their dead to the burial ground, or as a coffin on the premise that, in death, "a spirit canoe" would carry them into another life. Thus to the many indigenous peoples of northern Canada, the canoe or kayak was identified more with individuals or families rather than with the physical environment (Raffan & Horwood 1989: 9).

I want my body to rest in the land which nurtured it, and likewise I want Instinct to rest in the land which gave her life, not a leaching landfill site. We must not be cut off and removed like a clear-cut log. I want us to be allowed to grey and rot like the remnant of an old tree in a forest. My body needs to be returned deep inside the Earth. I wish the same for the body and spirit of any canoe that has travelled with me.

My body has taken so much pleasure from canoeing, my spirit has been fed so much by canoe culture, that I can not think of a traditional canoe like Instinct as inanimate. In the Anishinabe language, a language sprung from the land of the Northwoods, many things normally considered inanimate are termed alive. A drum has a heartbeat, a stone breathes in a sweatlodge, and a guitar sings. To me a canoe swims like a fish, floats like a duck, has ribs and skin like a person, and has grain like a tree. When I cross the boundary of believing that canoes are alive I also extend my concept of self. Instinct is my travelling companion and dancing partner. I ask her questions and she responds in a language that is as old as the Northwoods. For this reason, I am guided by her ability to teach me how to move on both ripples and waves. I treat her with respect, I want her to journey with me my whole life. Canoes are the true Northwood's guide;

frolics upon this incredible expanse of blue beneath her

I hold my paddle, I sit in the lap of a canoe and I float in an amniotic fluid that supports my life. When I am intensely aware of this participation I feel a centre of energy in me that identifies with this image as Nature. Symbolically it's a form of intercourse: The paddle serves as a phallic symbol, the canoe as Northwood's goddess which carries in her belly the offerings of the hunt and gathering, all that I need to survive on my journey. Power and strength are supplied with each blade stroke, sustenance and shelter are offered within canoe ribs. I, the paddler, create the bridge between the two which allows them to move and dance. We all travel as one. Only when united can canoe and I travel through such boundaries, leaving only ripples and our journey's narrations. This is how it should be when travelling throughout the rituals and ceremonies of the Northwoods, through divisions, over boundaries, across territories.

they show us how to travel across divisions and eliminate boundaries between wilderness and culture. Canoes are like family members who act as guides to our discovery of the Northwoods which lie within us, as well as beyond our paddling arm.

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Mattering

I am not empty
a place abandoned
and subject to squatters' rights

my flesh is solid, solid
resisting crowds and all
that would move through me

my skin is browned and sloughed
in the furnace of the sun
but never melted or consumed

my bones, erect, deliberate
support this fortress frame
their marrow, substantial as bread

my vapours are an atmosphere
not to be staked and claimed as galaxy
by any but what my breath invites

the impenetrable depth of my waters
will capsize all who voyage recklessly
across the surface of my insides

Sheila Hassell Hughes
1991-93

Originally from Vancouver, Sheila Hassell Hughes currently lives in Atlanta, Georgia, where she is currently finishing a PhD in Women's Studies at Emory University. She describes her research as "interdisciplinary and creative," exploring feminist poetics in American women's literature and in theology. Her poetry has been published in the Lullwater Review.

Photo by David Pauls

ecological communities,

edge effect: "the line that connects the pointsof accumulated or abrupt change... is a stress line or ecotone" (Clements 1907: 297)

introduction

Ask most children about their favourite subject in school, and they invariably reply "recess". One doesn't have to think too long about elementary school days to remember the agony of watching the clock tick towards that magical time when the bell rings and a collective sense of relief rises from students and teachers alike. Recess is naturally any child's favourite subject. It is the only time of the day when children can run around, stretch their legs, talk to friends and play. Recess represents a fleeting freedom that ends each time the bell rings and summons everyone back into the classroom.

The division between recess and the rest of the school day is profound, marked by bells, whistles, on-duty teachers and rigidly defined play spaces. Although there are many physical and psychological benefits of recess for both teachers and pupils, the boundaries between recess and the school day reflect a wider and more problematic division. Education at all levels has failed to bridge the gap between the world of the human and the world of the non-human. In so doing, it has failed to educate our young people about the "real" world, that is to say, the natural world. As a result, students graduate ill-equipped to face the challenges of the current global ecological crisis.

In this paper, I will outline some of the hidden and not-so-hidden divisions that exist between the school community and the ecological community. The notion of a division between communities will be used as a metaphor for describing the current state of education about the environment. In ecological jargon, the term for this division is "edge effect," which describes the dynamic boundary between two distinctly different ecological zones (or biological communities), such as a forest and an open field. In the natural world, the boundary is not a definitive line, but a zone of transition, where the characteristics of both communities meet in a climate of interspecies tension and competition. This ecological phenomenon is a useful metaphor for the tension that exists at the boundaries of the school classroom and the ecological community.

According to the generally accepted scientific definition, an ecological community comprises a group of organisms of different species types along with the abiotic elements of soil, air and water which surround them. These "community members" interact with each other within a prescribed physical space, for example a field or a forest. Similarly, students and teachers interact with each other within the physical space of the classroom as one level of a human community. Although it is problematic to oversimplify the definition of community (human or ecological), it is not my intent within this paper to discuss the implications of the androcentric values implied within the broadly accepted scientific definition. Rather, I wish to use the metaphor of tension between communities to explore where some of the conflict between the human and non-human worlds has occurred. More importantly, if we consider human beings as *part of* the wider, global ecological community, why then are we incapable of actively participating within this community for its greater good? One reason for this lack of participation may be due to the divisive way in which education, particularly education about the environment, has been implemented in the Western world.

school communities: blurring the edges

by Yolanda Wiersma

> "we've got lots of grass but we can't use it ever.
> teachers won't let us go on it because we'll make a mess."
> —elementary school student (Titman 1994: 34)

I will discuss the division between the human/school community and the non-human/ecological community in the context of physical spaces, structures and curriculum. I will subsequently present some current educational innovations which attempt to bridge this gap. Although the discussion will focus on the elementary school structure, the philosophical concerns behind creating and breaking down boundaries between the classroom and the natural world apply to education at all levels, and indeed, have implications for society as a whole.

what boundaries?

Educators are of a general opinion that the school playground is reserved for the students' recess space, and should not be utilized for other school purposes. However, children view the yard as an important part of the school, and their outdoor time as an important part of the day. For children, the out-of-doors is a place that can be filled with adventure, wonder and discovery with respect to the beauty and diversity of the natural world. They do not generally view the natural world with disgust or revulsion, as such responses are often taught to children by adults. As Rachel Carson (1984) puts it,

> a child's world is fresh and new and beautiful, full of wonder and excitement. It is our misfortune that for most of us that clear-eyed vision, that true instinct for what is beautiful and awe-inspring is dimmed and lost before we reach adulthood (42-43).

The boundaries between the school community and the ecological community are boundaries created and enforced by the adults responsible for educating our young people. By continually reinforcing this gap, adults are not fostering this "true instinct," which may have already been lost. Paul Shepard believes that this instinct is a vital part of ontological development in humans. He describes human development as a sequence of bonding events; first to mother, then to nature and finally to cosmos. According to Shepard, the bond to nature is "the least understood. It embraces the child's fascination with nature, his spontaneous enthusiasm for the names and natural history of plants and animals, and the soaking-in-a-place which makes it the basis of the intuition of an orderly universe" (1982: 111). Without this bonding to nature (or true instinct), Shepard feels that the child cannot grow up to feel any meaningful relationships to the wider world. Similarly, Edith Cobb (1959) writes about the importance of childhood experiences in nature which she feels help formulate a basis for a high level of adult development: "there is a special period, the little-understood, prepubertal, halcyon, middle age of childhood...when the natural world is experienced in some highly evocative way, producing in the child a sense of some profound continuity with natural processes" (540).

Not only are childhood experiences in nature important for psychological well-being in adult life, bonding towards nature can also stimulate strong emotional reactions when environmental degradation occurs. For example, John Livingston (1981) recalls the strong emotions which the amphibians of a nearby pond evoked for him during his childhood:

> there were frogs and toads and newts. If you lay very quitely in the grass at the water's edge, you could observe them. The longer you looked, the more deeply you were mesmerized... possessed. There was no world whatever, outside that world... nothing beyond shimmering light on water, smooth clean muck, green plants, trickling sounds, flickering tadpoles, living, *being*... (101).

Livingston's feelings of wonder and affinity for the pond creatures turned to feelings of rage and helplessness when he discovered that the pond was to be destroyed by a development project. Similarly, when school children's out-of-doors space becomes littered, paved over, denuded of trees and generally neglected, children feel that their space and their experiences within that space are not important to their teachers. Thus, the hidden curriculum of the school yard carries important lessons of which educators may not be aware.[1] Similarly, when teachers do not take their classes into the school yard (which only happens in the odd physical education class, when weather conditions are right and equipment needs are met), the lesson for the students is that the only important learning takes place inside the four walls of the school building.

Yet, as we have seen, children possess a sense of wonder and curiosity about the world around them, a sense of wonder which aids in promoting healthy ontological development. It is therefore essential to foster an eagerness to learn about ecological communities if we are to be successful in fostering a new sense of community which transcends human created boundaries. Although classroom curricula do teach separate units about "Plants," "Insects," "Trees," and "Weather," these topics are generally taught heedless of the context of processes which occur just outside the classroom window. Instead, "ecological education" is carried out through pictures, videos, CD ROMs and controlled indoor experiments. With such an abstract presentation of "ecological" themes, is it any wonder that these students grow up to be adults who cannot equate their purchase of paper products to the crisis of deforestation?

The educational theorist Chet Bowers (1994) has suggested that an understanding of the relationship between culture and the environment is essential for an understanding of how Western cultural norms have contributed to the ecological crisis. These norms are embedded in our attitudes, thought processes, and language, all of which are manifested in the educational system. Indeed, Bowers takes the architecture of our school buildings to be a kind of language, suggesting that "classrooms without windows, or rooms with one-way windows" or those that have "fences, and door entry ways are further examples of sign systems that define and regulate relationships" (32). According to Bowers, these expressions of cultural norms contribute to the disconnected Western cultural experience of wild nature, a set of relationships which are implicitly passed on to students through the subtle sign systems of the immediate school environment.[2]

curriculum guide*lines of division*

Physical barriers between the school community and the ecological community are not the only problem facing an education movement that attempts to address the ecological crisis. Pedagogical attitudes and curriculum content reflect similar boundary problems. As educational theorist and environmentalist David Orr (1994) states, "We have fragmented the world into bits and pieces called disciplines and subdisciplines, hermetically sealed from other such disciplines" (11). The current educational culture of discipline-based curricula, teaching specialists and subject experts has left our schools completely unprepared to teach basic ecological concepts that demand an interdisciplinary understanding. Thus, instead of fragmenting the curricula, ecologically sensitive educators should attempt a more holistic, cross-disciplinary approach to learning. As Orr says, "all education is environmental education" (1992: 90), a statement that suggests that all aspects of the curriculum should focus on connecting students with the natural world and on increasing awareness of their dependence upon ecological processes. Steve Van Matre (1990), a practitioner of environmental education, echoes this sentiment. He argues that environmental education should not be a supplemental part of education, but rather should exist as *"focused, sequential* instructional *programs"* and "as a regular, integrated part of the whole curriculum" (1990: 4). Throughout their discussion of curricula, Van Matre and Orr propose a blurred edge between the classroom and the ecological community, thus creating an environmental education that is a part of *all* learning. In so doing, educators help to produce citizens who are capable of understanding their inevitable connectedness to the earth's life-giving systems and the impact which their activities have upon these ecological processes.

A unified curriculum, where the ecological community becomes part of the school community will guide students toward what Bowers calls "ecological intelligence". According to Bowers, this "ecological view of intelligence would be [the] long-term sustainability of the Earth's ecosystems as the primary criterion [for intelligent behaviour]" (1994: 132). A societal shift in perception towards a valuing of ecological intelligence is therefore a precondition for an ecologically sustainable culture. As Bowers further suggests, a curriculum that promotes ecological intelligence provides a new way of looking at the relationship between culture and nature, one which includes the principal characteristics of natural ecosystems. Citing Capra's basic principles as a model, Bowers proposes a curriculum which includes "interdependence, sustainability, ecological cycles, energy flows, partnership, flexibility, diversity and coevolution" (1994: 132). These basic principles closely mirror the key elements of Van Matre's elementary school Earth Education programs.

However, Orr takes these arguments a step further, and feels that in order for educators to foster ecological, or "real" intelligence, they must provide first-hand knowledge of nature. This takes us back to the issue of physical boundaries, particularly when the provision of experiences in the natural world "means breaking down walls made by clocks, bells, rules, academic requirements, and a tired indoor pedagogy" (1994: 52). In order to achieve a new kind of intelligence, our educational system needs new kinds of learning environments that unify rather than fragment a student's experience of the world.

Fragmented experiences lead us to a further division, which is the boundary between the individuals within the modern education system. As Bowers points out, current discipline-oriented curricula are individually-centred instead of focused on the culture as a whole. Such relativism leads to a situation where "the process of learning becomes more important than what [is] actually learned" (1994: 133). Thus, the question of which learning strategy (i.e. memorizing the reproductive organs of a flower from a textbook diagram and observing seeds sprout in a controlled indoor experiment) is most appropriate becomes more important than knowledge concerning the fate of the plants growing just outside the window. It is little wonder, then, that our "clever" students graduate incapable of grappling with issues such as monoculture cropping or the links between pesticide use and groundwater contamination.

when teachers do not take their classes into the school yard, the lesson for the students is

As a response, educators such as Bowers, Orr and Van Matre feel that environmental education should become part of a wider cultural consciousness rather than a separate subject entity. They suggest that environmental education must go beyond teaching individuals about separate elements of the natural world, and should move towards teaching culturally-based models of sustainable relationships within an ecosystem.

eliminating the edge: new educational opportunities

As we have seen, the current educational system is rife with divisions, barriers and boundaries which divide the school community from the ecological community. However, there are a few innovative programs which break these

Photo by David Pauls

barriers and teach children in a holistic, creative manner. Although this is not the place to go into the curricular detail and practical aspects of these programs, I will present a brief outline of three unique and innovative programs.

The Institute for Earth Education, founded by Steve Van Matre, provides a series of structured three to five day programs for elementary aged children. These are generally carried out at camps or outdoor centres, and have been adopted world-wide. The program's strengths lie in their comprehensive and focused explanations of the basic ecological processes that sustain life on our planet. The programs are highly imaginative, presenting a type of outdoor education that is unique within the field. Unfortunately, the programs still largely maintain the field trip approach, and the experience at the Centre can be isolated from the classroom experience. Moreover, Earth Education programs are isolated from the cultural context of the ecological crisis.

A program that does attempt to place ecological learning within a cultural context is the Common Roots program, based in rural Vermont. Participants in the program learn the fundamental connections between food, community and ecological stewardship through hands-on experiences within their local bioregion. Learning is modelled on historical themes and, as students progress from kindergarten to the sixth grade, they trace the historical connections between various cultures, communities and their systems of food production. They also study natural systems around their school, blurring the physical boundary between the school

that the only important learning takes place inside the four walls of the school building

community and the ecological community. The added strength of the Common Roots program is that it promotes both community-based ecological sustainability and a sense of place for its students.

As a final example, the Learning Through Landscapes program (based in the United Kingdom) combines school yard naturalization with out-of-classroom learning and community sustainability initiatives. The program also promotes the idea that the school yeard is an important place that must be cared for. The program helps individual schools design and implement school yard naturalization plans which best suit the local community. This may involve simply planting trees and flowers for aesthetic effect, or more ambitious projects such as habitat restoration. Other schools involved in the Learning Through Landscapes program have created vegetable gardens and, in a few cases, curricula that are strikingly similar to the Common Roots program.

conclusion

Regardless of the specific model, a strong argument can be made that the future health of planetary ecosystems is dependent upon raising a generation of children who are sensitive to their place within the wider ecological community. Unfortunately, as I have suggested, most practitioners within the current educational system have created boundaries between school communities and ecological communities. This zone of tension is manifested through physical, pedagogical and curricular "edges" that represent the central divisions and contradictions contained within Western pedagogy and culture. These edges must be blurred, like their ecological counterparts, if our educational system is to meet the global ecological crisis. Some innovative programs have engaged the challenge of crossing the classroom/ecosystem boundary, but many more are necessary. Nothing short of a radical shift in educational theory and practice is required. Only then will we have a contiguous learning environment with which to understand the infinitely rich and complex connections between the human and non-human worlds.

notes

1. See Titman (1994) for a detailed, practical examination of these ideas.

2. Not all learning is completely devoid of contact with the ecological community. Many schools attempt to give their students a meaningful outdoor experience through trips to the local Outdoor Centre. Although such centres are important places in that they provide learning experiences within the ecological community, field trips do not adequately blur the edge between the school community and the ecological community. This division may be partly due to the nature of the field trip itself; students are away from their habitual surroundings, and hence perceive what they learn to be removed from their everyday experiences. Thus, despite well-intentioned efforts to provide students with ecological learning, the Outdoor Centre experience often becomes no more than a break from the classroom routine.

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bargaining with boundaries: the social construction of the emergent spaces of antichaos

by Fiona Coyle

deconstruction and reconstruction

spacethefinalfrontierthesearethevoyagesofthestarshipsciencetoexplorestrange newworldsandseekoutnewlifeformstoboldlygowherenoonehasgonebefore

The seemingly amorphous form above represents a shapeless geography of letters to someone unfamiliar with the grammatical nuances of the English language. Nevertheless, almost unconsciously, in our search for patterns (of meaningful letters, phrases and familiar symbolism) we organize this jumble, 'pun-chew-ating' it into a more digestible form. In other words, a recognizable order emerges from what appears to be disorder. Chaos is rendered intelligible as it is transformed into antichaos.[1] Hence, the insertion of empty spaces and small black markings conjures up the following prologue to *Star Trek:*

Space, the final frontier. These are the voyages of the starship [science]. To explore strange new worlds and seek out new lifeforms. To boldly go where no one has gone before.

In this paper, I seek to explore the social construction of the process outlined above, popularly known as self-organization, a branch of the science of complexity theory. It is a mindset which "complexifies, diversifies, pluralizes and temporalizes the old views of what we call 'reality'" (Best 1991: 201).

Complexity theory opposes static, clear-cut Cartesian boundaries, for its metaphors tend to emphasise mobility as we move from "root" to "route" descriptions of the world, which can challenge the notion of fixed identities (Pile and Thrift 1995: 10). Firstly, continuous, fluid shifts from chaos to order and back again indicate that boundaries are dynamic, as they continuously dissolve and reform. Secondly, when researchers in artificial life (colloquially known as Alife or A.L.) argue their computer-based simulations to be representative of the "real" world, the imposed boundary between the artificial and natural is challenged.

Katherine Hayles (1996) contends that the attempt to shake the long-standing boundary between the natural and artificial has been undertaken through story-telling; narratives of Alife are employed in an attempt to redefine life, nature and what it means to be human. In order to naturalise these narratives, scientists have intruded into inherently geographical territory, with the appropriation of words such as "space" and "landscape" into their vocabulary. Although these words are ambivalent in meaning (Duncan 1995; Simonsen 1996), within popular understanding they have relatively natural connotations, providing Alife researchers with a vocabulary to "ground" their theories.

complexity theory opposes static, clear-cut Cartesian boundaries, for its metaphors tend to

In order to explore these claims, I shall firstly offer a brief explanation of the underpinnings of complexity theory and the medium through which it is currently being explored. In doing so, attention will be drawn to the dynamic boundaries implied by these worldviews. Secondly, after a brief overview of the theoretical basis for the social construction of scientific knowledge (S.S.K.), there will be a discussion of the construction of complexity theory, primarily through the work of Alife researcher Stuart Kauffman. This discussion applies the framework of Katherine Hayles (1996), in an exploration of the use of Alife narratives to em-body computer codes into conceivable life-forms. As a cultural geographer, my particular focus will be upon the appropriation of the geographical terms space and landscape to ground these theories. Finally, I wish to ask, what impact do these alternative life-forms have on the tentative boundary between the natural and artificial? And what feedback effects have the "artificialization" of the *naturalized,* and the scientific appropriation of space and landscape had on geographical discourse?

identity as a process of self-organization

In the scientific community, there has been much debate over the space encompassed by the term complexity theory (Horgan 1995), for like its predecessor – chaos theory – different schools of thought, the overlap with popular culture and the metaphorical nature of language have resulted in the pluralization of its meaning (Goldstein 1995). Nevertheless, one widely held definition of complexity theory is "the study of the behaviour of macroscopic collections of simple units (e.g. atoms, molecules, bits, neurons) that are endowed with the potential to evolve in time" (Coveney and Highfield 1995: 425).

Consider the image of a flock of birds in flight, and hold it in your mind for a moment. In this aggregate, there exists a non-hierarchical organization, for the birds do not cluster around an individual leader. They gather in a ragged oval, which maintains its form, in continuous motion, like a living organism. This flock is more than just a "big bird", for the behaviour of its constituent individuals is noticeably different from the behaviour of the collective body (Resnick 1994). Or, translated into technical rhetoric, this image portrays "the spontaneous emergence of non-equilibrium structural organization on a macroscopic level due to collective interactions between a large number of simple, usually microscopic, objects" (Coveney and Highfield 1995: 432). Self-organization.

Computers have taken centre "screen" in the field of complexity, with their performance of computational ecologies. As well as the evolution of patterns through the interactions between machines (Lewin 1993), the interactions of cells within a matrix displayed on a computer screen can also give rise to unpredictable patterns from simple rules. Thus, we have the emergence of artificial life; it was from explorations within this realm that the flock of birds metaphor described above emerged.

Exploration takes place in the artificial space of cellular automata (C.A.), a virtual world composed of grid cells. In a C.A. simple transition rules determine how the cells change over generations, based on the states of their neighbours. In more general terms, cellular automata are "a grid of switches that can be set to a number of different positions... a kind of general-purpose programmable factory, that, when provided with a blueprint, can build anything" (Cohen and Stewart 1994: 212; 214). Various types of cellular automata exist (Wolfram 1986), although those deemed class IV exhibit the most complex behaviour. Appropriately, one particular form of class IV C.A. has been named the Game of Life.

Figure 1. Example of a Two-dimensional Boolean Lattice, where each Binary Variable is Coupled to its Four Neighbours. Source: S. Kauffman (1995) At Home in the Universe (1995: 89).

A closely related approach makes use of Boolean N-K networks, consisting of "N elements linked by K inputs per element" (Kauffman 1991a: 80). They are a high dimensional network of binary digits, which can be turned on or off (active or inactive), and have been utilized by Stuart Kauffman as a basis for the (re)creation and evolution of space. One possible configuration is depicted in figure 1.

Although more aesthetic forms of C.A. exist, this two-dimensional array of binary digits is visibly different from the world in which we live. Nevertheless, researchers invite the awaiting audience into the space of possibilities: a voyage into the imagination. In the next section I will investigate the narrative techniques Stuart Kauffman and his associates use to close the gap between the realm of mathematics and the experiential world. Before doing so, I will provide a brief theoretical background on the social construction of scientific knowledge.

myth-making (which is to explain the (re)creation of space)

Since verbal representations of scientific theories are said to be contextually "routed" in the space of social, political and economic concerns (Clocksin 1993), supporters of S.S.K. ask what actually comes to count as scientific knowledge and by what processes does this come to count? According to David Demeritt, empirical studies on the leading scientific representations of the world offer insight into the mediated and embodied knowledge within the research community. Scientific knowledge is dependent upon local conditions and practices, which cannot be translated into general laws and theories. It is acts of use which create and determine meanings, and self-referentially explanatory metaphors construct the nature of the world (Demeritt 1996: 491).

Narratives about the world are discussed and transformed into facts through the local dialect of the laboratory community. As argued by Bruno Latour and Steve Woolgar (1979), when enough supporting statements from a variety of narratives are gathered together, the relationship between representation and reality can be inverted: a statement about the world can be transformed into a fact. Correspondingly, there is a focus on the interactive and interpretive work within the scientific community which leads to this transformation. For Karin Knorr-Cetina (1983), the social construction of nature rather ironically occurs in a highly preconstrucuted *artificial* reality. It is this environment upon which I will now concentrate.

land/slide

for my father, who saw me across this border
before crossing another

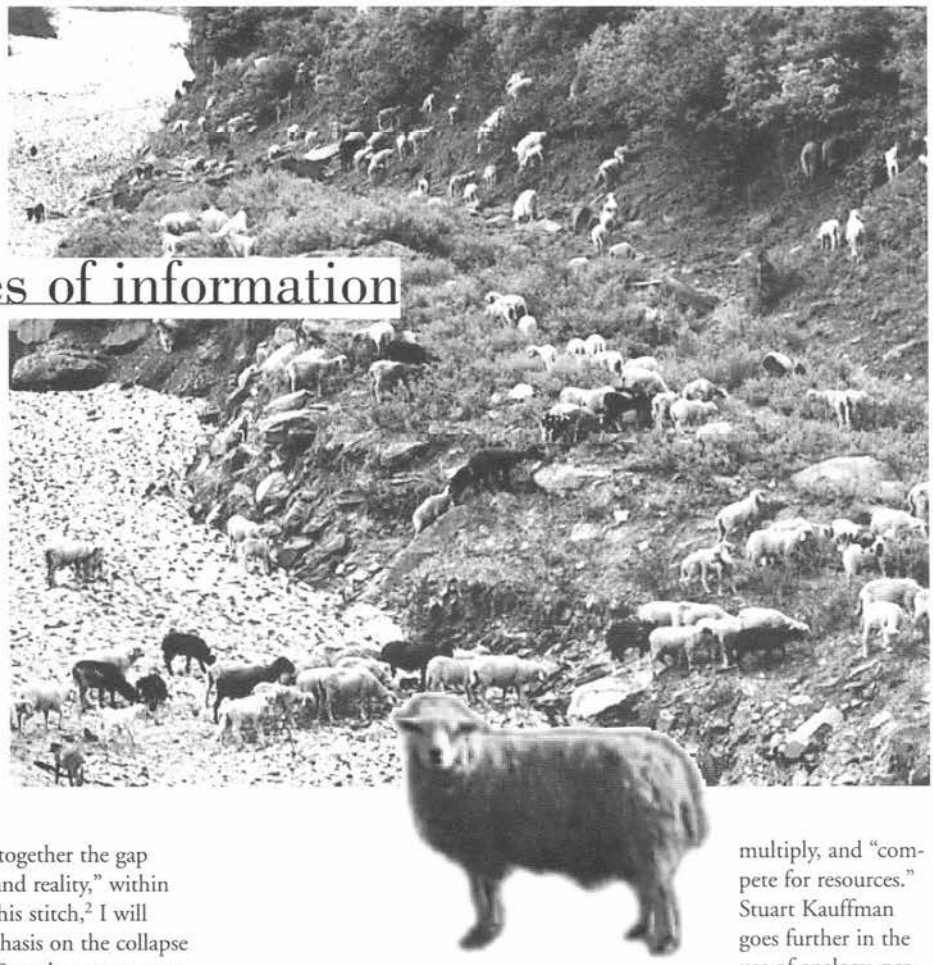
headin' down
head first
over heels
shedding
laddered stockings
(rungs long
out of reach)

tanned legs
don't run
but
slipping south
slither
through
green
brush
riding
the
asphalt
snake

Sheila Hassell Hughes
1992

emphasize mobility as we move from "root" to "route" descriptions of the world...

The arena of Alife is one example of a prefabricated space. Suffering from what Jack Cowan calls the "reminiscence syndrome", researchers exclaim "'look, isn't this reminiscent of a biological or physical phenomena!' They jump in right away as if it's a decent model for the phenomenon, and usually of course it's just got some accidental features that make it look like something" (cited in Horgan 1995: 104). Whether correspondences ring true or not, scientists are confronted with a more pragmatic political



dilemma. Faced with an audience who proclaim, "what good is it?" and see Alife as "a solution in search of a problem," practitioners have little choice but to persuade a skeptical public that their research is more than a mere simulation (Hayles 1996: 156). Thus, their cutting-edge explorations of Alife not only have to be translated into comprehensible terminology, but also have practical, economic applications in a capitalist society. Rather than any results being simply an artifice of the modelling process, they must *become* the underlying properties of natural systems. Thus, by drawing on the similarities to real-world processes and embedding them into explanatory narratives of complexity theory, researchers have conjured up a defense against their critics.

But is this process of naturalization merely stitching together the gap between what Horgan (1995) describes as "rhetoric and reality," within the science of complexity? In an attempt to unpick this stitch,[2] I will draw upon the work of Katherine Hayles. With emphasis on the collapse of the artificial and natural via the work of Thomas Ray, she attempts to "demonstrate how the narrative field in which [Alife projects] position themselves is constructed and how it works to encode premises, authenticate inquiry, and interpolate scientific research programmes with larger cultural narratives" (Hayles 1996: 162).

Traditionally, within scientific discourse the pre-requisite for life has been the presence of organic matter, yet it seems that even before protein began to replicate, there existed a primitive form of life within silicon crystals, which also possessed this capacity for reproduction (Hayles 1996: 157). Coupled with this is a desire to animate the silicon world,[3] for in the opinion of Thomas Ray, the objective of Alife is the introduction of "the natural form and process of life into an artificial medium" (cited in Hayles 1996: 146). Thus, we have the contrived dissolution of the division between the natural and the artificial.

Chris Langton takes this case further and suggests that a complex information dynamics is embedded in living systems, and accordingly, the primary indicator of life should be a behaviour based upon this phenomenon (Langton 1991: 42). Thus, he re-defines "aliveness" as a system capable of spontaneously organising into entities that have the ability to eat, reproduce and evolve (Horgan 1995: 107). For Langton, silicon life should be taken as silicon life and he makes no attempt to extend his narratives into the human world.

multiply, and "compete for resources." Stuart Kauffman goes further in the use of analogy, personifying his narrative with terms like "hill-climbing on rugged fitness landscapes" to describe evolutionary processes.

According to Hayles, these analogies are not contingencies or mere afterthoughts, but an integral part of the artifactual design of the programme. More than merely contriving parallels between the carbon and the silicon, the narratives expose scientific intentions to create a suitable (and natural) environment for the emergence of evolutionary processes. Another example is the transformation of C.A. cells into turtles, which then take on multiple identities, according to the space they inhabit (Resnick 1994). For instance, these turtles can mutate into frogs, artificial ants, slime mould cells or cars. Their reconstructed identities are bolstered by "fairy stories," such as the "storm on a lily pond" narrative employed to set the scene for the reorganization of a community of turtles and frogs.

In all narratives, the concept of a story is implicated, or rather a tale of "epic" proportions, for life is portrayed on a genealogical scale through multiple cycles of birth and death. We have the inscription of centuries of battles, struggles for survival, extinctions, reproduction and adaptation (Hayles 1996: 149). Notably, Stuart Kauffman seizes upon the most revered of all epics: Darwinian evolution. Kauffman's underlying purpose is to challenge and reconstruct the narratives of classical Darwinian evolution. Natural selection was said to act upon what were thought to be ran-

it would appear that in the attempt to validate complexity theory, various boundaries have

Nevertheless, Hayles notes that even though self-organization permits Alife forms to replicate within the virtual environment, there still seems to be an irreconcilable discrepancy between these entities and living organisms. Consequently, she asks, how have scientists attempted to counter this problem? The gap is closed somewhat through evolutionary narratives; programmes are mapped into "evolutionary scenarios traditionally associated with the behaviour of living creatures" (Hayles 1996: 148). Within the landscape, "populations" of organisms interact and

dom variations, reducing history to a hasty work of bricolage. Did it stumble forward against all odds to create order, or as Kauffman contemplates, was that order already at hand, ready for selection, as a result of "a spontaneous self-organized property of complex, genetic systems?" (Kauffman 1991b: 76). Based upon Alife research, Kauffman' s answer rules out natural selection as the only, or indeed, most important source of order in the world. His theory is necessarily geographical and pivots around the "edge of chaos."

Consider the edge of chaos to be a very weak form of chaos (another name might be fractal), in comparison to the strong chaos of stochastic, indeterminate systems. It signifies a type of space where "the components of the system never quite lock into place, yet never dissolve into turbulence, either" (Waldrop 1992: 293). These systems are said to self-tune into the edge of chaos, sensing and reading the pre-installed rules, before decoding them into an unpredictable life-form: creating a space where they have the highest potential for productive change.

As aforementioned, the Boolean lattice on which this takes place is strikingly different from the experiential world in which we live, yet Kauffman invites us to follow his imagination, as a fellow explorer of a polar landscape. Thus, furthering the transformation of analogy into fact is the power of the image, whether visual or a textual representation. Kauffman utilizes a partially inverted theory of island biogeography, in combination with a glacial metaphor,[4] making reference to "frozen components," "isolated islands," "percolating walls of constancy" and a "liquid transition phase" to describe the landscape of interacting numbers. Rather than a screen of binary digits, we have a vivid image of the Arctic/Antarctic, allowing us to literally *see* Kauffman's argument.

Following from this, Kauffman asserts that evolution does not act alone and attempts to place this glacial transparency over a mountainous terrain, injecting a flat image with dimensionality. Thus, systems co-evolve,[5] on what he terms, "deforming rubbery fitness landscapes," a dynamic, hybrid form of the artificial and natural. These fitness landscapes may be "smooth and single-peaked, with the peak corresponding to the desired minimum target [of optimum performance] or may be very rugged and multipeaked" (Kauffman 1990: 136).

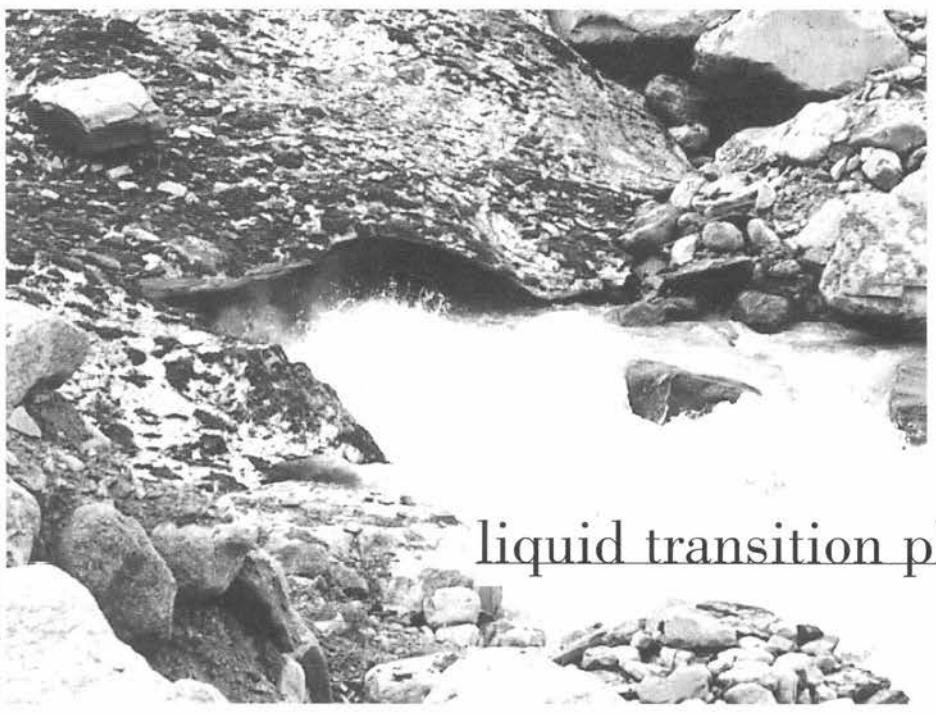
Although Kauffman's landscapes are fairly modest and are reliant on the imagination, they still fall under the criticism focused upon the visibly "pastoral" landscape of Thomas Ray's "Tierra" program. Basically, Hayles attempts to undermine the reality of representation, for the creatures inhabiting the imagined space represented on the computer screen are at best, only metaphors, their bodies being "bodies of information." In this world, there is no distinction between a genetic code and its corporeal form; the organisms *are* their codes and the codes are the organisms. As Hayles puts it, "the seamless transition between the [computer's interior architecture and the lifeworld of the creatures] elides the difference between the material space inside the computer and the imagined space that, in actuality, consists of computer addresses and electrical polarities on the computer disk" (Hayles 1996: 150-51).

Once grounded, this technological model can become the means to comprehend the inherently human. We can understand the evolution of the carbon through the evolution of the silicon... or so it is implied. Thus, Stuart Kauffman directs his commentary at the evolution of social systems, focusing on political regimes: the frozen order of the "Stalinist regime," the chaotic instability of the "Leftist Italian limit." Finally, he suggests that the edge of chaos is achieved in a democratic system, governed by the "rule of the majority" (Kauffman 1995: 270). Accordingly, if democracy exists upon the edge of chaos, and the edge of chaos is accepted as being a natural condition for evolving organisms, then Kauffman's argument *naturalizes* American democracy at the expense of all other political outlooks. Although Kauffman and some of his peers tread carefully by informing their readers that Alife analogies are extremely loose, widespread societal acceptance of these explanations of reality is ultimately dependent on a correspondence to, or redefinition of what reality is. And as I have suggested, this alternative delineation has shaken a number of boundaries.

bargaining with boundaries: the great, non-linear map in the sky

It seems that in combination with spatio-ecological narratives of Alife, a redefinition of life has resulted in the intersection of the natural and artificial. If life is characterized by form and the ability to (re)form, then silicon-based (artificial) creatures are encapsulated into the description, hence animated. By denying the traditional importance of matter (notably carbon-based) as a pre-requisite for life, the social construction of aliveness is revealed. Thus, it would appear that in the attempt to validate complexity theory, various boundaries have been transgressed: statement-fact, representation-reality, nature-society, natural-artificial and also the boundary defining the spatial territory of geographers.

been transgressed: statement-fact, representation-reality, nature-society, natural-artificial and also the boundary defining the spatial territory of geographers



Photos by David Pauls, Scott MacPhail

liquid transition phase

Consequently, I wish to focus upon the feedback effects which the "artificialization" of the *naturalized* and the scientific appropriation of space and landscape have had on geographical discourse.

Complexity theorists have invaded social and geographical space in an attempt to ground and consequently naturalize their concepts. By first appropriating geographical vocabulary to inscribe Alife with meaning and subsequently using Alife models to describe the natural world, the metaphor, "mathematical algorithms as landscape," becomes "landscape as algorithm," when the analogy is *justifiably* reversed. By referring to life as the transfer of information, this not only permits the validation of Alife, but the very concept of living systems is widened to incorporate

societies and cultures which are endowed with characteristics such as the ability to grow, evolve and learn (Plant 1996: 210). The apparently mystical concept of James Lovelock's superorganism, Gaia, is revitalized when it is perceived as a complex system existing on the edge of chaos (Lewin 1996). Furthermore, a "vocabulary traditionally applicable to living systems, such as adaptation, freedom, interconnectedness, spontaneous growth and self-determination" is also expanded to the examination of society (McKie and Bennett 1995: 790).

Additionally, the arguments of scientists become stabilized; by naturalising processes within society, the social construction of knowledge is subsequently naturalized. Complexity theory *becomes* nature as we enter a self-referential loop of "truth by correspondence." Mathematics can now be said to underly the formation of space and landscape, as statement evolves into fact. Alife is grounded, but its existence as an imaginary space (Shurmer-Smith and Hannam 1994: 61) somewhat undermines the materiality of space itself and contributes to the movement away from the conception of space as a material entity (Simonsen 1996).

Photo by David Pauls

Naturally, this has potential consequences for geographical discourse. A naturalized, geographical territory has been colonized by artificial "space invaders." As Alife is granted the power to colonise space, it is injected with dynamism through the use of concepts such as the "space of *possibilities*" and "rubbery, *deforming* fitness landscapes." Consequently, geographical space has become "abstractified" and "artificialized," yet by taking on the attributes of complexity theory, has also been reconceptualized as a dynamic entity with shifting boundaries. "Say a prayer 'to the great nonlinear map in the sky'," reads the ending to Stuart Kauffman's text *At Home in the Universe* (Kauffman 1995: 304). Complexity theory has been mapped, and in doing so, the world is (re)mapped in its image. "The hills are alive" (Resnick 1994) replaces the conception of the landscape as a static theatre stage, awaiting players to bring it to life.

Thus, a questioning of oppositional dualities has led to the construction of "decentred, partial and fractured identities," rendered dynamic through the emergence and dissolution of differences (Simonsen 1996: 502). We are left with an opening for the dissolution of artificial and natural space into a post-colonial hybrid space[6] where the seeming paradox of artificial life can co-evolve with organic lifeforms. Perhaps it is fitting to leave you with the words of the character, Tork, from the novel *Miss Smilla's Feeling for Snow,* who discovered an ancient meteorite preserved under a glacier. A through-flow of energy endowed it with the *appearance* of being alive.

> The true reality of things is not important. What's important is what people believe. They will believe in this stone. Have you heard of Ilya Prigogine? A Belgian chemist who won the Nobel Prize in '77 for his description of dissipative structures. He and his students have been working nonstop on the idea that life originated from inorganic substances through which energy was flowing. These ideas have paved the way. People are waiting for this stone. Their belief and anticipation will make it real. They will make it alive regardless of the true nature of the stone (Hoeg 1995: 403-404).

acknowledgments

I would like to thank Roger White for his comments on the final draft of this paper.

notes

1. Antichaos is defined by Stuart Kauffman as a counterintuitive phenomenon where "some very disordered systems spontaneously 'crystallize' into a high degree of order" (Kauffman 1991a: 78). Alternatively, Cohen and Stewart (1994: 411) refer to it as 'simplexity,' "the emergence of large-scale simplicities as a direct consequence of rules," or laws of nature. Predictable laws interact with unpredictable contingencies to trigger the collapse of chaos. Then simple rules emerge from the underlying disorder and complexity.

2. For an overview of the concept of stitches in the sewing together of a narrative, see Marcus Doel's innovative paper on the work of Jacques Deleuze and Felix Guattari (Doel 1993).

3. It was noted by Resnick (1994) that the children who participated on his research programme tended to confuse levels of reality during cell-space explorations; for instance, the turtles and their respective actions were humanized.

4. The theory of island biogeography has been inverted, for in Kauffman's formulation, a "frozen component" acts as a barier to the spread of information, whereas the extension of sea ice in glacial periods is thought to have acted as a bridge for cultural and biotic diffusion.

5. An alternative name for this co-evolution of systems is provided by Cohen and Stewart's term 'complicity,' which occurs when "the tendency of interacting systems to coevolve in a manner that changes both, [leads] to a growth of complexity from simple beginnings – which is unpredictable in detail, but whose general course is comprehensible and forseeable" (1994: 3).

6. Bhaba (1990) provides an explanation of these hybrid, interstitial spaces associated with postcolonial identities.

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the thorn

it seems like sacrilege
for a man
with hands gnarled like a jack pine,
cracked and knotty,
to be holding the garden sylphs.

but he is just a pious man
with bulbous knees
paying homage
to his companions:
plucking out marauders
with suspicious tendrils,
murmuring to nascent buds,
singing to the blooms,
explaining a move
to an interloping slug,

a man nursing
his gardens
by moods and myths.

(once I even saw him
tape a wisp of bark
to the bald spot
on a birch tree).

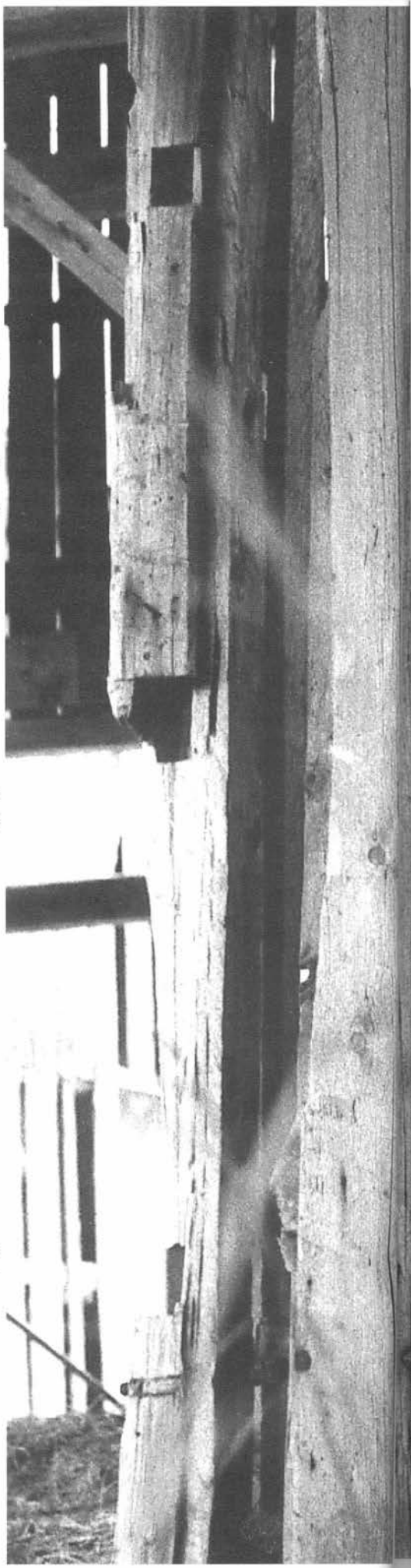
Lisa Richardson

Lisa Richardson is a Graduate student at the Faculty of Environmental Studies at York University.

Photos by Yolanda Wiersma

doors

by Steven Slavik



Walking down the middle of the street at midnight, I can smell distinctly the mustiness where the air from the river has risen. I can feel it too, distinctly cooler and damper than the air left on the street from the hot, dusty day. I walk along to the river's edge where I hear its hiss on the rocks, and I can easily imagine what I see daily, the swift rope of the river's water twining and turning, swallows pirouetting across its surface, the currents pouring against boulders hidden deeply on its bottom, upturned into folds, bulges and billows, and I imagine its separate streams sliding against one another – as I walk I can see the two well-lit bridges cross the river, one lit in pink, one in a hard blue-white; beyond the bridges I can see the lights of the smelter which creates a constant roar never easing out of consciousness, punctuated by metallic clanks and the regular whistle, the occasional siren signifying who knows what: I can see the pink lights on the board-walks rising up the hill between the rows of houses. As I cross the nearest bridge I look down into the black water roiling below and I wonder how deep it might be here, the black surface reveals nothing except the idea that the river is composed of separate, swift currents which twine themselves together down into a rope pulling itself to the Pacific Ocean. I have dropped bottles into the river with messages. They too disappeared into the black surface. As I continue across the bridge on the walkway, the spider webs stand out, spread across the girders. The thick webs proliferate in the spaces between the girders, silhouetted against the lights on the bridge which attract myriads of bugs. Although I enjoy walking here in the afternoon too, tonight it is cool and relatively quiet.

In the afternoons I can also sit in my office and look across the river to the west and into town. When I tire of watching customers in the new Subway I can watch the clouds come over the mountain which the river runs under, which the town sits under. A single cloud sometimes peeks over the top, with the sun just behind it, and creeps slowly over the river and the town. Then again, layers of clouds may pour over the top, racing to be further east and away. A single cloud may come over, pitch black and opaque, and begin to rain. Rain may or may not reach the ground. It may thunder. The wind may whip up the dust. It smells of rain and dust simultaneously and if I am outside, it's Paradise. Other days a dull layer will cover the whole valley and rain thunderously. Sometimes I am lucky enough to be outdoors smelling and hearing the storm, feeling it on my face, but my office, with western facing and polarizing windows, helps me see it more clearly.

texture

All these textures, all these details! From any perspective at all, the world is full of texture, large texture like the flow of clouds across the sky or thunderheads undercut by a stream of wind; small textures like the movement of grains of sand as an ant lion snuggles himself into the bottom of his pit. The world is more than full of texture, I would say. The world is texture. It's not as if I can look about and find a structure that the world is painted onto or which the world fills. Texture isn't painted onto the walls and it doesn't fill the world like my cup is full of coffee. Qualities can't be scraped off to reveal bare "matter," pure mass, or the x-y-z of space. The world is texture.

And with little reflection, it seems obvious, I can see I'm another texture. I don't mean just that no matter how closely I look at myself, I see detail. I mean that, yes, in those terms I'm part of the world, a moving part. I mean that if you or I look right, I dissolve into all the textures of the world, become a part of the whole thing, something that, when seen from across the river, becomes part of the landscape. I also mean something like, me, as a person, I'm a texture. I'm like a spot on the wall, only with something added.

You could examine me in detail. You'd find fingerprints (still on my fingers), the level of uric acid in my blood (probably high), my inevitable bit of irritation at something or other, how I am in other ways. Yes, I'm embedded in all these textures, I'm continuous with all the textures of the world. I'm not inside or outside of the world, I'm just part. If you cut it with your knife, you cut me too, like a half-kilo of butter.

But I'm not writing here of my interests or beliefs, attractions or avoidances. These, of course, all happen in the world, are all part of the world and are all part of me. They seem to me to be textures which are more obvious to others as they look at me. I'm embedded in another way, of more interest to me right now. I'm just like the world, granulated, like the waves on the river or the ripple in the clouds. The "me" is a grain of sand, a gust of the air, a leaf falling. I've read it this way: "To be secure and intimate with reality means to be in contact with the inside of which there is no outside. (There is nothing but entrance)."

Everything is an entrance. No matter how I look, how I explore, I am led to more texture. Each cat on the street is an entrance, it crosses ahead of me, my eyes and mind follow it, a new door into cat life, and into my life. It's like grazing. I graze here until the grass is too short for me, then move aside a little and graze. Not to do this, I'd have to hold myself back. And that's another door. I cannot not go through a door.

And that's exactly how I'm another texture. Important: emphasize the "I" here, the unique me. I am a door. For myself and for others. Everything I do opens doors, in just the same way that the river opens doors for me. I follow myself as I go. I notice. As I go, others notice. But it's not a question of who is important enough to be noticed. We are neither more or less important to one another, we simply notice where we are and where we might be. We turn around one another like river currents.

horizon

So the world is texture, and I'm a texture. Another thing: As I'm led or as I lead myself through the world, something always looms and lingers up ahead, just within sight. Other textures, of course. But where they appear – that's the horizon. Walking through an oak forest, the horizon may be close. In a space suit, tethered to a shuttle orbiting Earth, I might feel the horizon a bit further off. But horizon isn't distance. The horizon is where I think the next entrance may be. ("Think" is too strong a word here, "feel" equally artificial. Those are made-up ideas anyway, just standardizations of what we are supposed to be like.)

To have a horizon, I must have imagination and curiosity. I have to be able to foresee. Not necessarily understand, think, or even feel, but foresee. Definitely not "understand," which means to restrict oneself to "standing under." Understanding comes later, if I want to. In foreseeing, I have to be able to consider what it might be like "over there." What would it be like up there with the cirrus clouds? What's over the hill? Who is that guy, really? What would it be like to be in his shoes? What would it be like if we made decisions based on the flights of birds? That's what's unique about being human. Our particular granulation is to foresee, to become involved in texture with foresight, to create horizon. People are constantly creating horizon in the world.

What does that mean? The world is full of doors – in fact is nothing but a door, if not in the sense of a single door. Every detail is an entrance to another; I've never found the edge beyond which is nothing. No detail is "the last one." We and everything are embedded in the world; the horizon is part of the world too, and embedded with us. The horizon is as close as the texture, but it's not a texture.

I've walked along this river under this mountain before. Today it's misty; the top of the mountain is concealed. I've done this walk many times before. I love the boardwalk which crosses the ravine, its flexibility and creakiness, I love the sound my boots make on it, the thumps and the creaks. I see flowering roses. At a certain point the walk branches and I recall an affair I had once, we went up that path, I still have reason to recall it. I go further and see the apartment where at another time a friend lived. From here, the river is opaque, full of eddies, offering only a surface. I hear car and truck noises. Here is the river, a texture, I am inside, it is inside. We are both doors waiting to be opened by myself and others.

Yet it's not so simple.

The texture does not ride alone on the surface of things, like a goose bobs on the river. The opaque water has a depth, the black roiling river follows a way to the Pacific Ocean. The texture itself owes something to the horizon. The river owes itself to my walk, to the bottles I've thrown in, to the Pacific Ocean. The river is found in this essay. The world is not simply. It is layered. What it will be sits on what it is – I'd rather say, what it is sits on what it is. They sit together seamlessly. Can we speak of this?

Where I am depends on my foresight. I foresee, and open doors where they find them. But doors aren't broad and general, they're specific. Like those eyes of needles, they open only to the path I want to travel. The door I see opens only to my touch and only I carry the key. I don't know how to say more now. This is the extent of my horizon.

location

If we want to know who or where we are, we tell ourselves a story. "I'm the one who – was treated so evilly as a child," or "I'm the one who 'recovered.'" We locate ourselves. The story can be one of heroic effort and victory or one of continued victimization. It doesn't have to center on efforts. It can be a travelogue: "Here I am, in the middle of the Sahara Desert, lost in time." It doesn't matter. The function is what's important. The story serves to locate, to place one in relationship.

We all have our stories, and thus location; we have location and thus stories. As we locate ourselves, it's always through the stories we use to explain where we are. I don't mean stories spun out for entertainment. I mean the ways by which we orient ourselves, understand our vigils, paths, and flights in life: "Through the woods to grandmother's house...," and "Through the woods to the witch's den..." put us in different locations.

I'm not talking about fairy tales. I'm not even talking about stories with words. I mean the intertwined currents of feelings, precognitions, expectations, determinations, ideas, visions, hopes, disappointments, or glooms that we spin out and which we seldom can even describe, those ways in which we point, goad, and pull ourselves along our straight and narrow, crooked and wide, torturous or facile ways. I mean those ways in which we foresee, which involve us in texture and horizon. I mean those ways in which we participate in being and becoming simultaneously. I mean *all we are is story.* A desert of prickly story, an ocean of comforting story. All we are is a proliferation of forward-looking movement in texture, like a continuous kicking up of dried oak leaves as we walk through the forest.

By the way, that's another story, that one that says we move *forward.* Inside and outside has no direction. Doors just pass one through to the "other" side; one side is "the other," but *not forward.* Perhaps it's a story that we *move;* at least we *participate.* We are the stories. We say we move and we become. I can't see a more fundamental story than participation itself.

Crossing the green, flat surface of Arrow Lake, perhaps a mile wide, in broad, warm sunlight, the water seems transparent for about an inch and then turns into an opaque, jade-like substance, glowing internally. Branches fade away about a foot below the surface. Or so it seems. Perfectly flat and still and almost rising a little with my breath. Little circles on the water surface radiate from it as the slight wind rocks a floating branch. It invites walking on, I know my feet would sink about an inch and find a smooth purchase, and I could walk, kicking up the inch of water before me.

But this idea of story – of pushing a future out ahead of one, one's own horizon – each story has texture and horizon, each story is about texture and horizon, each story uses texture and horizon, each story provides texture and horizon, each story shows texture and horizon. Each story is a texture for me, a spot on the wall inviting cleaning, a fly walking across the ceiling inviting a swat, a green lake inviting water walking. This idea does all of these. Each story, each idea, offers me its horizon, and I take it. Imagine the proliferation of the forest before we arrived.

god

Where is the best place to go to imagine God? *Here,* I am overwhelmed by the thicket of books, of opinions, of stories – by the thorns of the children bouncing on their bed, the dog squeaking next door, the cat slinking along the edge of the room, the diary on the desk. For me, right now, – *come along with me!* – for me – *come!* – a desert simplifies, where I can become simply hot, dry in the wind, and long-legged. We can spend the night. I've brought enough water and food. We won't need a tent.

We lie on our blankets in the dark, under a bowl of souls. The fire is out and we've done with talking for now. We can still hear the embers snapping and the wind blows the smoke over us. A few noises come from the darkness. But I am not ready to sleep. A plane's red lights blink. A satellite moves there, steadily across the sky. Above everything is the churning backdrop of the sky. The green streak of a meteor catches the edge of my sight, but I'm too slow. Above, everything is the churning backdrop of the sky. I ride the earth through the sky with every soul who has come this way.

Having simplified, I might ask "When is God?" That question fits better for me than "Who?" "Where?" or "What?" When is God? Always. Just as I am. As always as the sky is broad from where we lie. Quick! Catch it! Another meteor streak.

As I'm led or as I lead myself through the world, something always looms and lingers up ahead, just within sight. Other textures, of course. But where they appear – that's the horizon.

Steve Slavik has completed an M.A. in Counselling Psychology. He lives in a small community on Vancouver Island, where he works as a marriage counsellor with violent men. When he isn't working, he loves to write.

Coyote Catches the Light

Coyote came down from the mountains
walked over the hills
came to the edge of the mesa

snorted
farted

and looked out over the desert
following the lines of darkness down
toward a pool of light
filled with shiny boxes
red/white ribbons
and *them*

Coyote snuck in to the light
Remembered sneaking into it one night and
—BOOM—
Almost got turned inside out
Almost got stuck in the fence
Almost got a hole in his hide

So coyote started to chew the cobwebs in the sky
Chewed them for a long time
Grabbing them with both hands
stuffing them in his mouth
until his mouth got sore
his hair stood up on its end
and he was tired

"ugh," coyote said

But the light was gone

and so were *they*

So coyote stepped out
into the cold, dark
silence of the desert night

and howled

John Sandlos

Photo by David Pauls

CULTURE, CASH, CONGRESSIONAL CLASH: the debate over development in the ARCTIC national wildlife refuge

by Derek Teevan

> "We must protect the earth that God gave us and guarantee our children safe food and clean water."
>
> (President Clinton, Budget veto message, December 6, 1995.)

In the fall of 1995 there was a proposal before the American congress to open the Arctic National Wildlife Refuge to development.[1] The Republican dominated Congress saw the potential to generate revenue from the oil under Alaska's wilderness. Opponents of development argue that any oil drilling in the Refuge will upset the balance of the fragile ecosystem. The Refuge is home to the Porcupine Caribou herd, and the proposed area for development – the 1002 Lands – is their primary breeding ground. Any small reduction in the Caribou herd could have grave impacts on the Gwich'in peoples who live on the Alaska-Yukon border. The Gwich'in rely on the Caribou as a food source and as a cultural icon. This paper examines, within the context of this dispute, the competing conceptions held by people with regard to the utility of the natural world and the physical, cultural and political boundaries these arguments negotiate.

According to John Strohmeyer[2] the first wildcatters – individual oil prospectors – started drilling for oil in Alaska in 1901. By the 1940's, the U.S. military was scouring the Alaskan landscape for potential oil deposits, claiming national oil security as the motivating force. If the military found oil, however, they kept their discoveries confidential. It was Dwight Eisenhower's Republican administration in 1953 which began leasing federal land en masse for oil exploration. The leasing process created a miniature economic boom in Anchorage, Alaska; with oil leases being offered at just twenty-five cents an acre, speculators were drawn from all over the United States.[3]

The United States recognized Alaska as a state in 1959 with the passing of the Alaskan Statehood Act. The Act outlined the governmental structure and the relationship of Alaska to the lower forty-eight states. The Act summarily forced the First Nations people into the republican structure of the United States government. A key item in the Act was the division of government funds generated by developing Alaskan lands. Any funds accruing from the lease of federal lands in Alaska is to be divided by the State and Federal government at a ratio of 90/10 per cent respectively. No funding formula was devised, however, to compensate the indigenous population for the settlers' encroachment on their land.

The Arctic National Wildlife Range was created in 1960 following the efforts of Olaus and Margaret Murie who, foreseeing the possible effects of development decisions made by distant politicians and bureaucrats, had lobbied congress since the mid 1950's to recognize the area as a national wildlife site. With the creation of the Range came protection of the calving grounds of the roaming Porcupine Caribou Herd (PCH). Further support for conservation in the Range came in 1964 when Congress passed the Wilderness Act. The Act sought to "secure for the American people of present and future generations the benefits of an enduring resource of wilderness."[4] In 1980, President Jimmy Carter passed the Alaska National Interest Land Claims Settlement Act (ANILCA) which doubled the size of the Range and renamed it the Arctic National Wildlife Refuge. The change in title recognized that the lands had been set aside for the interest of the whole United States.[5] The ANILCA did not, however, include the section of land referred to as the 1002 Study lands as part of the wilderness designation.[6] This was a significant exclusion, as this breeding ground of the Porcupine Caribou was to be studied for potential petroleum deposits. Early on, the government's dichotomous philosophy for the Refuge was established: the area, however protected as a spiritual and physical "natural endowment" for the nation, was to be simultaneously considered for exploitation as a "financial endowment."

By 1987, Canada and the U.S. had signed the Porcupine Caribou Conservation Agreement in which both countries agreed to protect the migrating Caribou and its habitat (the Refuge and territory in Canada) which together "comprise a unique and irreplaceable natural resource of great value which each generation should maintain and make use of so as to conserve them for future generations."[7] Private groups concur with the sentiments expressed in the Agreement: "The Refuge, including the Coastal Plain, is a world class natural area with incomparable and irre-

placeable ecological, scientific, historic, and educational values for the American people. It is the outstanding example of remaining American wilderness.[8] Developers, bureaucrats and conservationists all recognized the uniqueness of the Refuge to the United States and the world, although from very different perspectives; developers, because of the possible stores of petroleum beneath the tundra; bureaucrats, both for its economic potential and majestic wilderness; conservationists, because they have labelled it "the American Serengetti."[9]

the development argument

Proponents of development in the Refuge have several reasons to be optimistic. The first is that the Alaskan political delegation in Washington has never been stronger; Republican Senator Frank Murkowski and Congressman Don Young, both from Alaska, occupy the positions of Chairman of the Senate Energy and Natural Resources Committee and Chairman of the Committee on Resources respectively. Further, the ranking Democrat in the state, Governor Tony Knowles, is also in favour of development. Their main concern is the level of state debt and the potential loss of jobs which would accompany the imminent shut down of the existing oil fields at Purdhoe Bay. Secondly, the Republican dominated Congress has been seeking an array of legislative changes to federal environmental regulation, the effect of which would increase the likelihood of development in the Refuge.

Alaska is the only state without a state tax, relying instead on the land lease revenues and oil taxes to support state activities. The most lucrative revenues come from the tax on corporate profits, which have been declining in recent years due to increased costs associated with the decrease in the quality and quantity of oil. The ability of corporation accounting mechanisms to amortize depletion losses over time further reduce these profits. As corporate profitability decreases, so do the number of available jobs. To ensure continual income, the state must deregulate protected lands and lessen "costly" environmental policy which would permit otherwise non-profitable resource extraction. Actions like these help to maintain jobs, and keep the Alaskan public happy, while continuing to fill the state's coffers.[10]

The oil find at Prudhoe Bay generated substantial sums of money for the State of Alaska and for many companies in the lower 48 states. From the oil money Alaska established the *Permanent Fund,*[11] which pays all residents of Alaska a yearly dividend. The dividend was worth almost one thousand dollars to each citizen in 1994. Oil revenues have built schools and shopping malls, and been used to establish a "domestic" dairy products industry (which failed), hospitals and other social amenities including streetlights that don't work in the cold. During its construction, the pipeline created hundreds of jobs for southern workers and inflated the local cost of living. Arguments against development are seen by proponents to be arguments against the obvious prosperity oil has brought to Alaska.

Opponents to development in the Refuge argue that the current push to open the area has been fuelled by the burgeoning state and federal debt, as the previously developed oil fields are progressively becoming less profitable. The state deficit is running at $513 million a year, but a state financial planning commission noted that Alaskans would balk at giving up their entitlement from the Permanent Fund. Commission Chairman Brian Rogers commented that, "the universal entitlement [of the Permanent Fund] is as sacred a cow as you're going to get."[12] Murkowski and Young believe they need to recreate the period of growth that allowed the government largesse to avoid imposing a state income tax. Stevens, Murkowski, and Young wrote an open letter to their constituents arguing to open the Refuge, stating: "Oil revenue funds about 85 per cent of the state's budget, but Prudhoe Bay is in decline."[13] They recognize that the pipe line that crosses the tundra needs to be fed in order to continue to be profitable. In an interview, Young was quoted as saying "the State's $1.3 billion share of the lease pot would help it recover from declining revenues for Prudhoe Bay development."[14] Further exploration and development are clearly necessary to feed the expansive pipeline network and the artificially sustained Alaskan economy.

The original estimate of revenue generation from leasing was $2.6 billion.[15] The $1.3 billion referred to by Young in his letter is based on the concession they have made in Washington; a fifty-fifty split in the potential revenues, shared between the national and state government. However, the $2.6 billion assumed in Republican documents has been

challenged by a U.S. Geological Survey estimate which evaluated the revenue potential from the Refuge at only $850 million.[16] Young was reported to have said that the state would accept the split to open the Refuge and then sue for the 90-10 divide later.[17] Although the fifty-fifty sharing of any revenue runs contrary to the Alaska Statehood Act of 1959, Newt Gingrich (R), the House Speaker, stated that if there is not a fifty-fifty split then there will be no development.[18] Murkowski guaranteed Gingrich that the fifty-fifty split is assured. While Murkowski may be comfortable saying this, it is not a claim he can lawfully make, for it would require a legislative change in Alaska and Washington to amend the Stateship Act. An unattributed development slogan, however, suggests that "50 per cent of something is better than 100 per cent of nothing."[19]

Murkowski and Young continue to lobby top Republicans to support development, yet nowhere have they outlined their plan to ensure the successful passage of the required legislation for the fifty-fifty split. They have tried, however, to include authorization to develop the Refuge in the federal budget reconciliation bill, a piece of legislation that funds everything the U.S. government is planning to undertake for the upcoming fiscal year. Their attempt followed a two-tiered strategy. First, the inclusion of a proposal in the reconciliation bill meant that any Congressmen who opposed it had to find another revenue generating item to offset the loss of budget revenue. The second aim of this strategy was to "ham-string" President Clinton.[20] The belief was that Clinton would not risk the political fallout he would surely suffer if he used the presidential veto on the entire federal budget bill; as President Clinton does not have line-item veto power he could not strike out the drilling authorization while leaving the rest of the budget intact.[21]

In getting the Refuge development issue in the budget reconciliation bill, Murkowski and Young introduced development as an issue of national oil security. Oil security first became an issue during the oil crisis of the 1970's when the OPEC nations flexed their oil production muscles and forced NATO allied countries to compete for oil on OPEC's terms. Fearing another oil crisis during the Gulf War, President George Bush renewed efforts to open the Refuge by adding an amendment to the National Energy Security Act that favoured development. The logic of domestic oil development was to reduce dependence on foreign oil, thereby achieving "oil security."

In response to Bush's development efforts, the push to minimize consumption through conservation efforts was reintroduced. Legislators argued that it would be more effective to *reduce* the use of oil than to increase domestic reserves as a response to the oil security issue. The Sierra Club, the Wilderness Society and other environmental conservation groups led this campaign, arguing that increasing the automobile consumption standards would have a dramatic effect on oil consumption.[22] They predicted that with automobile standards increased to thirty miles per gallon the U.S. would save twice as much oil through efficiency by 2020 as U.S. geologists predicted was in the Refuge.[23] Therefore the existing supply would be enough. This simple logic won during Bush's tenure because conservation legislation could more readily impact change, while legislation to open the Refuge would not produce results for years. Five years later, neither convinced nor defeated in his efforts, George Bush pledged his support for Alaskan Senator Frank Murkowski. In a letter to Murkowski, Bush wrote, "[A] major lesson from Saddam Hussein's brutal invasion of Kuwait is that we must not become totally dependent on foreign oil."[24] The oil industry analysts believed that a national security issue would win public favour. They claimed that, "ANWR has a broader appeal since it can be couched as a national security issue, rather than just an oil industry issue..."[25]

For some oil proponents the Refuge is a debate about the policy of access. An editorial in the *Oil and Gas Journal* argued that oil and gas companies should support those who are fighting to open the Refuge, claiming that: "They should do so even if they lack interest in leases in the area. They should do so even if they think that ANWR leasing is a hopeless cause. They should do so because important principles of public policy are at stake."[26] The editorial goes on to say that although everyone knows that the area "is the most prospective frontier...many companies have little enthusiasm for it,"[27] largely because the environmental legislation inevitably involved in opening the Refuge would make it too costly to develop. The editorial clearly outlines the philosophy of development:

> The petroleum resource at ANWR, like all natural resources, represents potential wealth. Left unexplored and undeveloped, it has no value. Unleased, unexplored, and undeveloped, the ANWR petroleum resource creates no jobs, generates no profits, and provides the government no revenues from lease bonuses, royalties, or taxes. In its present state, the ANWR petroleum resource is taxable economic activity explicitly prohibited by Congress.[28]

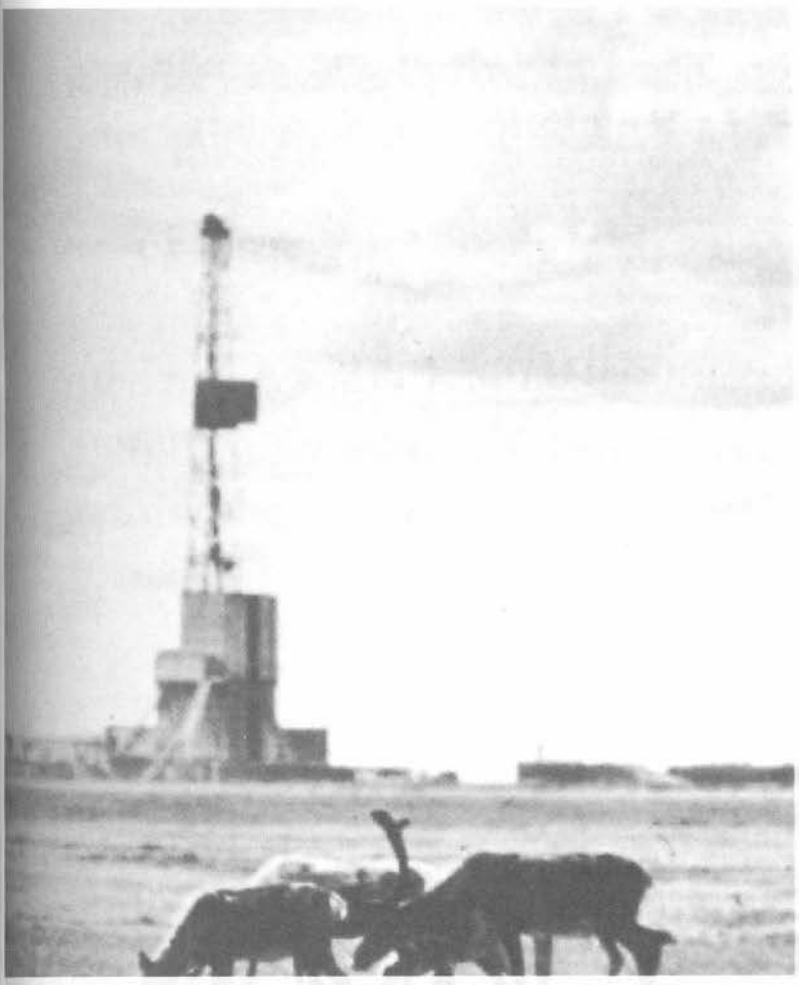
The pro-development view of resource "value" only concerns that which can be leased, explored and developed.[29] In contrast to the Gwich'in perspective on development, which we will explore shortly, the natural landscape holds no intrinsic or cultural value to prospective developers. When compared to the long-term cultural perspective of the Gwich'in, the plans for development in the Refuge are clearly premised on short-term economic considerations.

An important paradox highlighted in political critiques of development concerns the issue of debt reduction; though employed by Republicans as political leverage to open the Refuge, they are not eliminating tax breaks to oil and gas industries as a necessary means to reduce the debt. This is hardly surprising, given substantial investment from the American government helped build the required infrastructure necessary to transport oil across the tundra.[30] Aliza Fan notes that the Republicans have failed to withdraw $200 billion in tax breaks to corporations (largely energy companies). These tax breaks have become commonly known as "corporate welfare."[31] In a similarly contradictory move, the oil proponents who make note of national oil security are lobbying Congress to allow the exportation of oil currently being drilled on the Alaska North Slope (ANS). Undermining their oil security defence, the Republican proponents of Refuge development have sought to sell oil from the Strategic Petroleum Reserve (SPR) and sell off the Elk Hill Naval Petroleum Reserve in California. The oil from these two sites would be sold for export. Clearly, while an effective political tool, oil security is not the central motivating force in opening the Refuge.[32] Rather, the Refuge is just one item in the Republican mission to loosen environmental regulation and get government out of the business of resource management.[33]

If policies were made consistently there would be no need to develop the 1002 lands. Regardless of a pro-development decision, industry insiders note that it will take years to develop the fields and further years to receive the benefits of oil. All of these policy changes regarding the Refuge are components of the Republican's broader commitment to eliminate environmental legislation.

In many ways, the policies pursued by Senator Murkowski and Congressman Young, backed by the Republican agenda, are analogous to the settlement of the American West, through which settlers expropriated the land from the aboriginal population for economic benefit. The massacre of the buffalo and the subsequent demise of aboriginal cultures can be witnessed today in the demise of the caribou and the cultural extinction contemplated by the Gwich'in peoples. In point of difference, however, this latter historical development takes place within a broader political and cultural context which challenges the boundaries under consideration. In the following section, the strictly political and economic justifications for opening the Refuge to development will be contrasted to the cultural and transnational dimensions of the development debate. While politicians consider the state deficit and perpetuate the erroneous myth of domestic oil security, opponents to development consider the cultural survival of the Gwich'in peoples and the international conservation agreements that have been signed to protect the migratory patterns of the Porcupine Caribou.

in direct conflict with the goals of international



porcupine caribou – international agreements and the gwich'in position on development

The central argument in opposition to development of the Refuge comes from those who desire to protect the Porcupine Caribou Herd (PCH). The PCH have roamed the land now divided into the Yukon, Northwest Territories and Alaska for more than 25,000 years. Northern Aboriginal people have been living subsistently with the caribou from time immemorial. After the political division of the region through Canadian Federation and American Union, the caribou and the Aboriginal people came under the jurisdiction of differing governments, and were governed independently for more than 100 years.

Plans to develop the 1002 lands represent the worst threat ever to the Caribou. According to the Department of the Interior and the Refuge's game wardens, "a reduction in calf survival of less than 5%/year would be enough to change an increase in the population to a decline."[34] In 1986 the U.S. Department of the Interior released a draft resource assessment which predicted a forty per cent decline in the Porcupine Caribou Herd should oil development in the 1002 lands occur.[35] In direct conflict with the goals of international agreements, the attrition of Porcupine Caribou caused by authorized U.S. policy would be a disaster of international proportions.

Much can be said about the emphasis placed on international conservation agreements. Such agreements are an easy method of documenting the "friendliness" of two nations and can be used to placate environmentalists, naturalists and indeed aboriginal people who rely on the agreements to protect a cultural livelihood. Like the unconfined natural habitat of the caribou, conservation agreements do not recognize permanent political or social boundaries. Nor do the agreements take "domestic" priority in a way that a deficit or federal election would. In this case the offender may consider silence by the other signatory as acquiescence of the infringement.

agreements, the attrition of porcupine caribou caused by authorized u.s. policy would be a disaster of international proportions.

In 1987 Canada and the United States signed the Porcupine Caribou Conservation Agreement. The Agreement sought to protect the Caribou which migrate across the Refuge and into Canada's Yukon territory. Ann Garneu, counsel at the Canadian Consulate in New York, states that "[t]he original Agreement was to maintain this as a wildlife refuge, and it's our government's policy to maintain that and prevent any further development."[36] Development in the Refuge would contravene the Agreement on a number of grounds, two of them are paraphrased and then examined here. The objectives of the Agreement are as follows:

(a) To conserve the Caribou and its habitat through international co-operation and co-ordination so that the risk of irreversible damage or long-term adverse effects resulting from the use of Caribou or their habitat is minimized.

(b) To ensure opportunities for customary and traditional uses of the Porcupine Caribou Herd by those covered in the ANCILA and in Canada by Native users as defined by the Porcupine Caribou Management Agreement.

With regard to objective (a), Canada was not consulted about possible development in any part of the Refuge, including the 1002 lands, which are specifically protected by the definition and use of the term "habitat" in the international agreement. "Habitat means the whole or any part of the ecosystem, including summer, winter and migration range, used by the Porcupine Caribou Herd during the course of its long term movement patterns."[37] As ordained by objective (a), Canada has the right to be involved in all studies or development proposals which would impact the Porcupine Caribou Herd. Canada has fulfilled objective (b) through the establishment of the Porcupine Caribou Management Agreement (1985) and the institution of the Canadian Porcupine Management Board.[38] Action to protect and conserve the region began after the Mackenzie Valley Pipeline Inquiry (1977), which recommended that the northern Yukon be designated a national wilderness park. That same year the Canadian government issued a Withdrawal Order, prohibiting development in the northern Yukon until a management plan was approved. Subsequently, Ivvavik (1984) and Vuntut (1993) National Parks have been established in the area, which protect the Caribou and support the Aboriginal right to hunt. Through these measures, Canada has clearly lived up to its end of the Agreement.

Canada has gone well beyond the original Agreement made with the US to ensure conservation of the Porcupine Caribou Herd. By contract, the Canadian Government must be able to expect at least recognition of the accepted terms in the Conservation Agreement. By international law, development in the Refuge would violate the following Canada-U.S. conservation accords:Migratory Birds Convention, 1916; Conservation of Polar Bears, 1976; and the North American Waterfowl Management Plan, 1986. As Interior Secretary Cecil Andrus said about the Refuge in 1978,

> In some places, such as the Arctic Refuge, the wildlife and natural values are so magnificent and so enduring that they transcend the value of any mineral that my lie beneath the surface. Such minerals are finite. Production inevitably means change, the impacts of which will be measured in geologic time in order to gain marginal benefits that may last a few years.[39]

While the Secretary of the Interior Bruce Babbitt poetically quotes one of his predecessors on the value of the Refuge, there are nevertheless those who depend on the Refuge as a primary food source. Aboriginal people have subsisted in the Refuge on the Porcupine Caribou for time immemorial. The Aboriginal people of the region are divided, however, on the issue of development. The rift is based on the continued ability of the people to sustain themselves: for the Inupiat, in the modern world of money and corporations; for the Gwich'in in a subsistent manner not far removed from their ancestors.

The Inupiat Eskimo of the far north (Beaufort Sea region) have reaped huge economic benefits from oil development. Like the state, they now need the 1002 lands opened to ensure a consistent flow of oil and therefore revenue. As holders of the subsurface rights in the 1002 lands, the Inupiat certainly have a keen interest in possible benefits from development. There is only one permanent Inupiat village in the Refuge, Kaktovik, home to 220 people. Oil development in the 1970's created great wealth for this community. Money that accrued from the Purdhoe oil development enabled Kaktovik's villagers to build modern homes and schools, put in streetlights, and build a medical clinic. The Inupiat are part of the Kaktovik Inupiat Corp. and the Arctic Slope Regional Corp., both established by the 1971 Alaska Native Claims Settlement Act. The two corporations rely solely on oil revenues for their continued existence.

There is another side to the development story for Aboriginal people – the historical relationship of the Gwich'in with the Porcupine Caribou. The Gwich'in represent all that the pro-development people have argued against; they are undeveloped, unexploited, and unyielding in their desire to continue in their traditional ways. Arctic Village, a community of about 125 Gwich'in Athabaskan Indians, sits just outside the Refuge on the south slope of the Brooks Range. The Gwich' in number about seven thousand and live in more than fifteen tiny communities south of the Refuge and in the Canadian Yukon. The people hunt and fish within the Refuge, just as they have for centuries. As their relationship to the Porcupine Caribou challenges conventional political and geographic boundaries in the arctic, the Gwich'in find themselves at the centre of the Refuge development controversy, defending the non-economic value of the Refuge against the interests of the Alaskan government and Republican politics.

In an article submitted to *The Washington Post,* Sarah James and Floyd Peterson argue that the Republican pro-development team of Young and Murkowski, "have turned a deaf ear to our traditional native needs and to the will of all Americans who value their Alaskan natural heritage."[40] James, a Gwich'in from the community of Arctic Village, tells all who will listen that any effect on the Caribou will have a negative impact on her peoples' traditional way of life. "Development of the Refuge" she argues, "would be a form of genocide against the Gwich'in."[41] The Gwich'in cultural subsistance on the caribou, having developed over the millennia, represents the harmony in which they exist with the migratory animals. The Gwich'in are members of the Canadian Porcupine Caribou Management Board, which was created to monitor and manage the caribou so as to conserve it for future generations.

The Canadian Porcupine Caribou Management Board views development as a "no-win" situation for anyone; firstly, because there is only a twenty per cent chance that there is oil; secondly, because the estimates would only supply enough oil to fulfill the U.S. need for approximately two hundred days; thirdly, because of the inherent threat to the caribou.[42] With the backing of the Board, Gwich'in from Old Crow, Yukon Territory, took lobbying measures into their own hands. They launched a ten-city U.S. tour, lobbying against development for the protection of both the Caribou and their culture. Norma Kassi was one of those to travel through the U.S., lobbying on behalf of future generations of Gwich'in. A former Old Crow MLA, Kassi was interviewed prior to the U.S. lobbying tour by Janet Patterson on CBC Radio in Whitehorse, with whom she discussed the importance of the Caribou to the Gwich'in:

> basically [the Caribou is] all our culture, our songs, our traditional activities. When the initiation of young men as hunters within the nation are initiated, that's because of the caribou. Our dances are caribou dances. Our songs are caribou songs. The caribou is everything to us. It's our whole way of life, our social, our economics, our cultural dependence are all on the caribou.[43]

J. Bennet Johnston (D-Louisiana), a key Democratic proponent of development, showed his ignorance about the Refuge with the following comment: "[It's} frozen, and nobody is up there, and the caribou is really a bogus issue."[44] The Gwich'in, with help from supporters around the world, set out to combat the kind of ignorance represented in comments from those like Johnston.

Letters of support for the Gwich'in arrived from all over the world. Bernard A. Gagosz, Consul General of Canada in Seattle, wrote about his impressions of the effects of development on the Gwich'in:

> they are truly the People of the Caribou...there is real anxiety among the Gwich'in about possible development in the 1002 lands which would disrupt the natural cycle that has existed between the caribou and the Gwich'in for many hundreds, perhaps thousands of years. It is they who will assume the greatest risks...[45]

This letter was written to U.S. Senator Mark O. Hatfield (Oregon) after a trip to Old Crow with His Excellency Raymond Chretien, Canada's Ambassador to the United States. The trip was clearly unique: Canadian Aboriginals lobbying the American people, to influence the United States Congress on an issue that Canadian Foreign Affairs deemed an American domestic issue. Foreign Affairs took this stance as part of the Canadian Liberal government's strategy on Canada-U.S. relations. According to Peter Adams MP (Liberal, Peterborough), this was because the Liberal government did not want to challenge the Clinton administration outright and risk the Democrats losing the next election.[46] The Canadian government did write to the President, having their consulates write to Congressmen in their area regarding the impacts of development, reminding them of the Porcupine Caribou Conservation Agreement. It is unfortunate that Canada did not take a more aggressive stand on the issue considering the validity of their claim based on the Agreement, for it is only with Canada's vigilance in this regard that the future of the 1002 lands issue can be resolved.

the future of the refuge

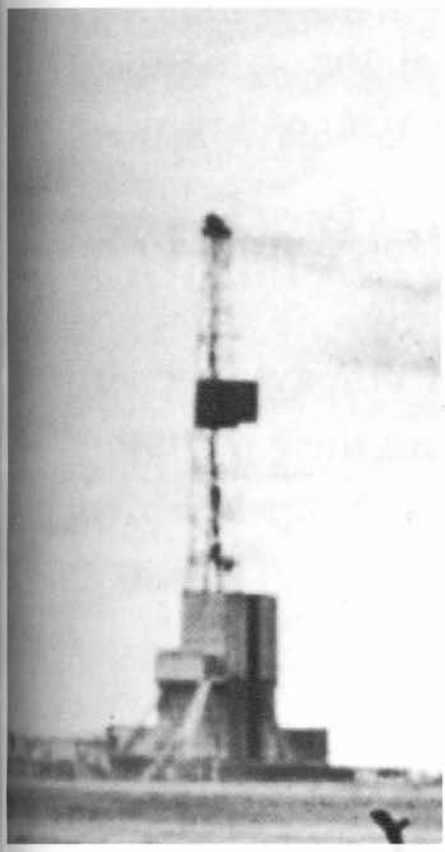
While the latest battle against opening the Refuge was won with the vetoing of the budget bill, the war goes on. The President's veto message read as follows:

> this bill would open the Arctic National Wildlife Refuge to oil and gas drilling, threatening a unique, pristine ecosystem, in hopes of generating $1.3 billion in Federal revenues – a revenue estimate based on wishful thinking and outdated analysis. I want to protect this biologically rich wilderness permanently.[47]

Even though President Clinton has vetoed the budget reconciliation bill, it is still possible that a new government would vote to open the 1002 lands for development. The President has not yet made any moves to "permanently" protect the 1002 lands through either granting Wilderness status to the area, or granting the whole Refuge National Monument status. After such a designation was achieved for the lands, it would take another act of legislation to amend the Wilderness Act before any activity could proceed.

Canadians concur with President Clinton's intention to permanently protect the area. Creation of Ivvavik and Vuntut National Parks represents Canada's commitment to the conservation of the caribou and the area of their habitat. The Canadian Arctic Resources Committee's (CARC) Nigel Bankes writes that the time has come for an Alaska-Yukon international wilderness park. The park would enrich the already established bi-lateral agreements such as the management of the Porcupine Caribou Herd.[48] In a letter to Prime Minster Chretien, Banks, on behalf of CARC, recommends that the Canadian government seek wilderness designation for the 1002 lands. Such a plan would twin the northern Yukon and adjacent Alaska wilderness areas, and nominate the twinned area as a World Heritage Site (WHS) under the UNESCO World Heritage Convention.[49]

Designating the 1002 lands as "wilderness" would bring the area under the ANCILA which created the Refuge in 1980. This protection would ensure that the area was not developed without a Congressional amendment to the Wilderness Act. The wilderness designation, twinned with an international agreement to recognize the adjoining Canada-U.S. national parks, would



better serve the aboriginal people and provide a greater protection against the possibility of changes to the American Wilderness Act. The best interests for the Refuge would be recognized in its recognition as a World Heritage Site.

Canada must continue to support President Clinton's anti-development stance while working towards the goal of permanent recognition of the Refuge as a WHS. International cooperation of this magnitude finds precedent in the 1979 negotiations between Canada and the U.S., after which Kluane National Park Reserve in the Yukon and Wrangell-St. Elias National Park in Alaska were declared the first international WHS. Both countries should take pride in their seminal work in the WHS movement and continue their leadership by acknowledging the importance of the Arctic National Wildlife Refuge, the Porcupine Caribou and the Aboriginal people along their borders to the world.

conclusion

The debate over development in Arctic National Wildlife Refuge is multi-faceted, spanning the political and social spheres of the U.S. and Canada. In the "melting pot" of the U.S. the Republicans have tried to boil down the issue of development to one of bloodless economics, ignoring the wilderness character of the Refuge, the international agreements for conservation of the Porcupine Caribou, and the cultural heritage of the Gwich'in. This paper has sought to articulate the fluid nature of political and cultural boundaries concerning the development dispute in the Arctic National Wildlife Refuge, and how the Gwich'in have challenged political conventions by taking their grievances to the U.S. government. To consolidate these victories in the future, Canada must not only continue to lobby the U.S. government to respect the Conservation Agreement, but encourage the creation of a World Heritage Site spanning the borders of the two nations.

research for this paper was gathered through traditional library sources; primary research was conducted using electronic mediums such as the World Wide Web and radio transcripts along with personal interviews. Initial research findings as they related to Canada-U.S. relations were presented at the Northern and Polar Studies Colloquium, Trent University in a presentation titled: *Can a Republican be a Conservationist or a Democrat a Preservationist? The debate over development in the Arctic National Wildlife Refuge.*

notes

1. The Arctic National Wildlife Refuge is referred to as ANWR, pronounced ANWAR in most of the American literature. This paper uses the notation "the Refuge" because this author feels the acronym "ANWR" depersonalizes the issue of development in the area. When quoting directly, ANWR is used.
2. See John Strohmeyer, *Extreme Conditions: Big Oil and the Transformation of Alaska* (New York: Simon & Schuster, 1993) for a critical examination of the effects of oil development in Alaska.
3. *Ibid.*
4. Dan Smuts, "A Wilderness Revival" (1995) *Sierra Club Bulletin* (July/August).
5. Doug Urquart, "The Politics of Migration" (1994) 22 *Northern Perspectives* (No.2-3).
6. The "1002 Study lands" are referred to in the Act as the area to be studied for petroleum potential.
7. *Agreement between the Government of Canada and The United States of America on the Conservation of the Porcupine Caribou Herd* (Ottawa, 17 July 1987).
8. "Latest Study Warns of ANWR Environmental Harm" *The Oil and Gas Journal Online* (25 Septmber 1995).
9. "Oil, Wood, Angst: Alaska" *The Economist Online* (30 September 1995).
10. The Tongass National Forest is another hot seat of debate in Alaska; the primary mill is threatening to shut down, putting one thousand jobs at stake. Ted Stevens has tried to introduce federal legislation to increase cutting by up to 75 percent so as to maintain employment regardless of the market need for lumber (*The Economist:* 30 September 1995). This is another prime example of Republican economics trumping environmental issues.
11. Timothy Egan, "Alaska Legislators' Oil Vow Gets Different Play at Home" *The New York Times Online* (11 November 1995). The Permanent Fund is estimated to be worth $18 billion.
12. *Ibid.*
13. See *The Oil and Gas Journal* 93 (28) (10 July 1995) for information on the Komi (Russian) oil spills in the Arctic not covered by mainstream media. The article discusses the problems with pipelines that could happen in Alaska.
14. David Whitney, "Gingrich Backs Range Drilling" *Anchorage, Alaska* (18 October 1995).
15. This is anticipated revenue from leasing revenue alone, paid over the total number of years before a find is developed.
16. "Showdown Near for ANWR Leasing Issue" *The Oil and Gas Journal Online* (6 November 1995).
17. Patrick Crow, "Aiming for the Foot" *The Oil and Gas Journal* (13 November 1995) 40.
18. Egan, *supra* note 11.
19. Crow, *supra* note 17.
20. Cited on the World Wide Web Site, http://alaska.alaskan.com/anwr/
21. Opposition governments have always argued that there can not be a line item veto in omnibus budget legislation. Senate and Congress have just recently approved a change in budget legislation which will eliminate omnibus budgets and allow line item vetoes.
22. The "automobile consumption standards" refers to the efficiency of automobiles to travel farther on the same or less fuel.
23. Will Nixon, "Northern Exposure" *The Utne Reader Online* (November/December 1995).
24. Kimberley Music, "Battle Continues Over ANWR Provision as ex-President Bush Breaks Silence" *The Oil Daily* (19 October 1995) 3.
25. Aliza Fan, "Wall Street Analysts Place Their Bets on Congress Lifting ANWR, ANS Bans" *The Oil Daily Online* (3 January 1995). Fan is quoting Bud Tower, an oil industry analyst at Howard, Weil, Labouisse, Friedrichs Inc.
26. "ANWR Leasing Issue Revives" *The Oil and Gas Journal* (31 July 1995).
27. *Ibid.*
28. *Ibid.*
29. For more information on the political values of the Republicans, see Carl Pope, "Congress, Red in Tooth and Claw" *Sierra* (July/August 1995). Pope compares their contemporary policies to the philosophy of Social Darwinists.
30. See Joseph J. Romm and Charles B. Curtis, "Mideast Oil Forever?" *The Atlantic Monthly* (April 1995), for a discussion on domestic oil production, oil security, and the need for continued government support of alternative energy sources.
31. Aliza Fan, "Senate, House Budget Committees OK Slashing DOE Funds, Opening ANWR" *The Oil Daily* (15 May 1995) 1.
32. *Ibid.*
33. Changes or amendments to lower acceptable standards are being proposed for the following Acts: Clean Water Act, Endangered Species Act, Environmental Protection Agency, Safe Drinking Water Act, and Toxic Waste.
34. See *supra* note 11.
35. Urquart, *supra* note 5.
36. Arthur Gottschalk, "Who is Breaking the Pact?" *The Journal of Commerce Online* (17 October 1995).
37. *Agreement between the Government of Canada and The United States of America on the Conservation of the Porcupine Caribou Herd* (Ottawa, 17 July 1987). Section 1, Definitions Part C.
38. The Canadian Porcupine Management Board is funded by the Canadian federal government, Yukon Territorial government and the Gwich'in from land claim funds. All of the parties above have equal power on the Board.
39. Cited in Bruce Babbitt, *Testimony of the Secretary of the Interior Before the Committee on Resources, United States House of Representatives, on the Arctic National Wildlife Refuge.* (Washington, 3 August 1995).
40. Sarah James and Floyd Peterson, "At Risk in Alaska: Our Salmon, Our Eagles" *The Washington Post Online* (21 July 1995).
41. Allanna Sullivan, "Polar Opposites: Fates of Alaska Tribes May Ride on Impact of Drilling in Refuge: Inupiat Need Oil's Income; Gwich'in Fear Extinction in Caribou Are Driven Off; 'I Cry for My Children'" *The Wall Street Journal* (2 November 1995) A4.
42. Information distributed in the U.S. by the Canadian Porcupine Caribou Management Board urges the American people to lobby their Congressmen not to vote in favour of development.
43. Interview with Janet Patterson on CBC Whitehorse (3 October 1995).
44. Kimberley Music, "ANWR Issue Becomes Political Football" *The Oil Daily* (4 December 1995) 1.
45. Letter of Canadian Consul General (Seattle) B.A. Gagosz to U.S. Senator (Oregon) M.O. Hatfield (12 September 1995).
46. Personal interview with Peter Adams (8 March 1996).
47. Reported in the *U.S. Department of the Interior News Summary* (6 December 1995).
48. Nigel Bankes, "The Alaska-Yukon International Wilderness Park: An Idea Whose Time has Come" (Faculty of Law, University of Calgary, 1994) [unpublished].
49. Letter to Rt. Honourable Jean Chretien, Prime Minister of Canada (10 May 1994).

derek Teevan is currently operating his Community Development & Planning consulting company, and looks forward to exploring the legal bounds of environmentalism at law school in the near future.

purple loosestrife
and the "bounding" of nature in north american wetlands

by John Sandlos

One of the more well known themes among the Christian parables is the separation of the righteous and pure from the impure and the unholy. In one notable example, Christ recounts the experience of a farmer whose enemies have come in the night to plant weeds in his wheat field. When one of the servants asks whether he should pull the weeds, the farmer responds: "No... because while you are pulling the weeds, you may root up the wheat with them. Let both grow together until the harvest. At that time I will tell the harvesters: first collect the weeds and tie them in bundles to be burned, then gather the wheat and bring it into my barn" (Matthew 13:29-30). While this parable may appear to the modern rational mind as nothing more than a quaint expression of Judeo-Christian ethno/agro-science, the persistent reader is rewarded with a deeper understanding of the importance of weed control further down the page. At the request of His disciples Christ explains the parable in terms of a larger cosmological purpose: "the weeds are the sons of the evil one, and the enemy who sows them is the devil.... As the weeds are pulled up and burned in the fire, so it will be at the end of the age. The Son of Man will send out his angels, and they will weed out of his kingdom everything that causes sin and all who do evil.... Then the righteous will shine like the sun in the kingdom of their Father" (Matthew 13:39-43).

Clearly, to the early Christian, the act of weeding carries a greater symbolic weight than is implied by the basic physical and ecological need to produce an adequate food supply. The obvious lesson of the parable – how and when to remove weeds – invites the reader to participate in the larger cosmic struggle of establishing God's kingdom on earth. The physical source of the symbol and the symbolic action are not separate, thus allowing the "true believer" to participate fully in the established natural and moral order of the universe. Physical "facts" and valuative ethical principles are not separate in this world view, and the status of nature (i.e. the farmers field) as a social and cultural space (i.e. the "emerging" kingdom of God) is implied throughout the parable.

It is quite likely that the denizens of contemporary agricultural and botanical institutions devoted to the loosely defined practice of "weed science" no longer see themselves as participating in a cosmic struggle to establish God's kingdom on earth. Indeed, what constitutes the traditional scientific world view is a life world that is devoid of purpose, mystery, and moral significance. The Cartesian universe only allows for a single actor – the knower – to approach a natural world that waits passively to be "known," and thus can no longer be a repository for the socio-cultural residues of myth-making humanity. Indeed, the "natural" knowledge derived from the scientific practice of weed control exists only for a single purpose: to control and eradicate the plants that humans designate as weeds.

However, science can never be divorced from its complex socio-cultural and political origins. Even the most seemingly innocuous and innocent disciplines within the scientific enterprise (including weed science) produce and reflect a social world view as much as they merely record the objective facts of nature. What follows is a discussion of the scientific work surrounding the invasive (to North America) European plant Purple Loosestrife *(Lythrum salicaria)*. The intention is not to prove or disprove the scientific orthodoxy concerning the ecological "effects" of this aquatic perennial. Rather, my goal is to illustrate that the science surrounding purple loosestrife has neither divorced itself from social influence, nor ceased to act as an arbiter in social and political affairs. Given this expanded context, the scientific war against purple loosestrife becomes not merely an effort to liberate nature from the depredations of a noxious weed, but remains part of the larger mythic battle for control over the universe.

the purple loosestrife "problem"

An information pamphlet released a few years ago by Ducks Unlimited describes the threat posed to North Americans by expanding populations of purple loosestrife. Under an ominous heading simply titled "The Invader," there is an account of the spreading scourge:

> Purple Loosestrife invades wetlands and gradually takes them over. The weed ultimately chokes out all native vegetation, creating a dense purple landscape almost totally devoid of wildlife. Purple loosestrife came from Europe over a century ago. Its unrelenting spread across North America was aided by the absence of natural predators.

While the quoted material obviously employs the language and tone of a popular information leaflet, it does effectively summarize the main arguments put forward in support of controlling purple loosestrife by the scientific community: native wildlife doesn't use it as habitat or food, native wetland plants are displaced by the invader, and the spread of the plant is facilitated by a lack of natural predators in North America.

Much of the evidence for these assertions comes from a 1987 paper authored by Daniel Q. Thompson, Ronald L. Stuckey and Edith B. Thompson. A remarkable document in many ways, the paper recounts history of purple loosestrife colonization in North America, its apparent impacts, and discusses several possible control methods. It includes a synthesis of a vast body of purple loosestrife research, as well as the field observations of the authors. It has become, in many ways, the Bible of purple loosestrife management and control.[1]

A recent paper by Mark Anderson (1995) has suggested that the largely visual nature[2] of Thompson's evidence constitutes a subjective interpretation of qualitative changes in the wetland biotic community.[3] While the anecdotal nature of Anderson's evidence proves nothing regarding the interaction of purple loosestrife with native flora and fauna, it does call into question Thompson's claim to have derived the absolute truth concerning native wildlife interactions with purple loosestrife from objective scientific facts. Indeed, the use of subjective judgments in Thompson's

the scientific manager's role in this "world assault" on "earth" is that

work is most readily confirmed by his remarkable statement that "although we need quantitative measurements of the effects of various stages of *L. salicaria* invasion on the structure, function, and productivity of North American wetland habitats, the replacement of a native wetland plant community by a monospecific stand of an exotic weed *does not require a refined assessment* to demonstrate that a local ecological disaster has occurred" (my emphasis; 1987: 25).

Thompson's statement is not so much a reflection of "bad" science, but illustrates a deeper problem with the scientific claim of objectivity. Despite the best attempts of the "objective" scientist to divorce fact from value, he/she must construct disembodied facts into a core of meaning that forms a conclusive narrative structure for the scientific text. Like a historian, the scientist never simply records objective facts, but instead arranges a body of evidence into a structured account that attempts to produce a definitive meaning. The process of meaning production places the scientist and his/her readers in a discursive community that is intimately related to the larger process of cultural reproduction. In other words, the creation of meaning can never be divorced from the social context in which it is embedded. As Haraway puts it, "what determines a 'good' story in the natural and social sciences is partly decided by available social visions of these possible worlds. Descriptions are determined by vision; facts and vision are perceived through stories; the worlds for which human beings contest are made of meanings" (1988: 80). The argument here is that science is *necessarily* subjective because it is partly a product of and partly produces the cultural context in which it is immersed. The problem with the science of purple loosestrife can therefore be located not in "mistakes" made in the field, but instead in the refusal of the scientist to recognize and make explicit the social and cultural boundaries and categories that encapsulate the story of purple loosestrife in North America.

the problem with exclusion: nature as commodity; nature as dirt

> Man is in the habit of valuing things according to how well they serve his purposes.... Given his need for objects and his use for them, he draws the conclusion they have been created to serve him.... Why should he not ignore a plant that is useless to him and dismiss it as a weed, since it really does not exist for him? *–Goethe*

Human society, both contemporary and ancient, is rife with conceptual boundaries and divisions. In the classic Cartesian mode, our brain is separate from the body, our body is bounded by skin, which is enclosed within a culture, which in turn constructs borderlines between civilization and the surrounding world of nature. Of course, the boundaries are more permeable than we like to admit; disease enters through the skin and wild animals dance in and out of the forest at the edge of the domesticated farm. Nonetheless, the conceptual boundaries remain fixed, at least in the human mind, and transgressions are not permitted to alter the sanctified categories of being.

Of course, the creation of the boundaries and the placing of natural entities within these conceptual categories is entirely a human construct; it would not exist if we did not exist.[4] As the anthropological work of Mary Douglas has shown us, the notion of boundary transgression, or pollution, has its origin in the social construction of reality. If culture "provides in advance some basic categories, a positive pattern in which ideas and values are tidily ordered" and "above all... has authority" (1966: 38-39), then uncleanliness, or pollution, "is matter out of place," and "we must approach it through order. Uncleanliness or dirt is that which must not be included if a pattern is to be maintained" (1966: 40).

While Douglas' earlier work does concentrate on purity rituals and taboo in so-called primitive societies, she has applied her cultural theory of pollution to the secular and supposedly rational tenets of contemporary western society. Pollution ideas are, according to Douglas and her colleague Aaron Wildavsky, "an instrument of control" that gives "the central establishment... the monopoly of explaining the natural order"[5] (1982: 47). Thus, "from the point of view of the central political establishment, the socially inferior are morally and physically contaminating, to be segregated and forcibly confined, punished if they try to break out" (47).

While the relevance of pollution categories to the governance of human relations is obvious to any student of history, there remains the question of how this social action relates to the concept of natural pollution (i.e. an invasive exotic such as purple loosestrife). One may fairly argue that the toxicity of DDT was not socially constructed, and that its subsequent ban in North American was of immeasurable benefit to wildlife in general and raptors in particular. While I would not argue with this point directly, I do suggest that the *presence* of DDT in "our" natural environment was/is a social construction; it belonged because the "pollution" of crop eating insects did not. When a nature without birds and, more importantly, a civilization without humans was contemplated by Rachel Carson, only then was DDT removed and "safer" alternatives found to control insects. The categories that make up what is natural and what is pollution are whatever humans want them to be and, more importantly, whatever the central power structures of the society assume they must be. As Douglas and Wildavsky remind us, "nature is what the center establishment sees as natural" (1982: 47).

With the latter point in mind, we must remember that the mere mention of the word "weeds" in the human context has evoked a whole range of metaphorical association with the "battle" to control nature.[6] From the farmer's field to the suburban garden, no expense has been spared by the chemical industry and its patrons to rid nature of the first stages of plant colonization and succession. Of course, the war on weeds has extended beyond the realm of necessity and, as Evernden reminds us, they "have become noxious not because of their effect on cattle, but because of their conceptual effect on suburbanites; they are a *pollutant*. They are intrusions into the order of the lawn, and into the domain of human willing. Clearly then, as "natural" (i.e. wild) entities which must be excluded, "weeds are dirt, as is the rest of nature" (Evernden 1992: 119).

Nonetheless, the war on purple loosestrife is apparently conducted on behalf of nature, an attempt to liberate the biotic community from the tyrannical influence of a life destroying invasive weed. Indeed, purple loosestrife control is portrayed by its practitioners as an environmental initiative intended to save nature rather than control it. Accordingly, the purple loosestrife literature, scientific and otherwise, dutifully discusses the impacts of the weed on endangered *species* and threatened biodiversity more generally. Purple loosestrife is a pollution according to the scientific community, and all of nature suffers under its pervasive influence.

Regardless of the both perceived and actual ecological effects of the purple invader, it is apparent the "pollution" ideologies of the sociological center have been extended in to the wetlands of North America and, consequently the scientific effort to "liberate" nature from purple loosestrife has failed to de-couple itself from its philosophical origin as an instrument to dominate and control nature to the satisfaction of human desires.

of the "sane assassin," an emotionless defender of center values against the depredations

The ecologist Mark Anderson has pointed out from his literature survey of purple loosestrife work that "birds, particularly game birds and waterfowl, provide the bulk of the justification for loosestrife management" (1995: 227). However, no species other than the canvasback was identified in the Thompson paper as endangered in any way by purple loosestrife. Similarly, the impact of purple loosestrife on fur bearing mammals was also discussed at great length by Thompson, though none of the species (muskrat, mink) highlighted in the Thompson paper can be considered threatened in North America. What is threatened by purple loosestrife is the economics of exploiting such species, and Thompson (1987: 43) carefully outlines the millions of dollars that will be lost to the economy of the Midwestern United States due to any loss of hunting, trapping, and recreation revenues due to a decline in the production of the wetland "resource."

The crux of the matter, it seems, is not the preservation of a wetland community, but the maintenance of a social pattern that demands the dominance of human interests and influence in the natural landscape. Reptiles and amphibians, arguably the life forms that have suffered the most dramatic decline due to the commercial destruction of wetlands, have hardly been discussed in the purple loosestrife literature. Even the rhetoric of preserving the native plant community against an exotic invader rings hollow when one considers the "fifty year struggle" of wetland managers to remove native stands of cattails to encourage "wildlife diversity and abundance" (Thompson 1987: 2), a process that is remarkably similar in concept and content to the "duck producing" purple loosestrife campaign.[8] For the hunting groups that have been supporting purple loosestrife control, and for their scientific allies in the universities and government agencies devoted to wildlife management, the wetland exists merely as a waterfowl producing factory, and anything, be it purple loosestrife or cattails, that threatens this assigned sociological role must be exterminated as a form of pollution regardless of the effect on the wider wetland community.[9] This obsession with managing wetlands "pollutants" to produce a "maximum sustainable yield" of a desired species/commodity reinforces the basic tenets and conceptual categories of the capitalist industrial society as "the preoccupation with productionism that has characterized so much parochial Western discourse and practice" becomes "hypertrophied into something quite marvelous: the whole world is remade into the image of commodity production" (Haraway 1992: 297).[10]

Moreover, the transgressive ontological boundaries erected by the extreme anthropocentric categories of the commodity culture prevent a more complete analysis of its relationship to the purple loosestrife "problem." Alfred Crosby has illustrated that exotic species have not historically been invaders in their own right, but were instead followers in the wake of European expansion. According to Crosby, "the success of the portmanteau biota and of its dominant member, the European human, was a team effort by organisms that had evolved in conflict and cooperation for a long time" (1986: 293). In other words, invasive organisms entered North America as a result of the expanding social, economic and biological influence of European humans on the "new" continent. They are the byproduct of our own vicious colonial invasion begun over five centuries ago.

Within such a context, the more recent spread of purple loosestrife (along the disturbed soil regimes of canals and superhighways in North America) can be understood as stemming from an expanding industrial economy rather than as the result of a "viscious invader" posing a threat to wetland plant communities. Furthermore, the extraordinary historical loss of wetlands throughout North America must also be attributed to the expanding engine of human enterprise rather than the introduction of purple loosestrife, though I have not seen any papers authored by weed scientists that discuss the spread of invasive commercial developments throughout the remaining wetlands of North America.

Given this new perspective, the purple loosestrife control effort must be seen in a new light: it acts not to save nature but to legitimize the commodity interests of the dominant culture by simultaneously mitigating its worst effects and by ensuring a continued "bountiful harvest." The scientific manager's role in this "world assault" on "earth" is that of the "sane assassin," an emotionless defender of center values against the depredations of the uncontrollable wildness of nature. The scientific manager is the emissary of "center world" who operates at the margin between nature and society, methodically providing the "cleanest" methods to kill insects, coyotes, wolves, weeds and other varmints that pollute the social order of the productive farm, hunting area, town or city. Purple loosestrife control is therefore not an act of preserving wetlands in the face of an alien invader. It is, rather, an assertion of power by human civilization over nature and, as such, it reinforces the images of perfection that form the collective human construction of a socialized and, sadly, a sanitized natural world.

of the uncontrollable wildness of nature.

notes

1. Indeed, the literature published on purple loosestrife since 1987 has largely dealt with the control of the plant rather than ecological interactions with native flora and fauna. Of the literature surveyed, a total of 15 papers used the Thompson et al. paper as a proof, or a partial proof that purple loosestrife degrades wetland areas as wildlife habitat (see: Keddy 1988, Hight and Drea 1991, Thompson 1991, DeClercke-Floate 1992, Blossey 1993, Benckhuysen and Simser 1993, Haber, Keddy, White 1993, Malecki et al. 1993, Manguin et al. 1993, Becker and Welling 1993, Keddy 1994, Skinner at al. 1994, Blossey and Schroeder 1995, Hight et al. 1995). It should be noted that several other papers listed in the bibliography did not make reference to the ecological impacts of purple loosestrife. The urgency these papers outline for various types of control programs suggests the authors accept the apparent negative ecological impact of purple loosestrife as a given fact.

2. In fact, there are two photographs on the cover, one showing a green "pristine" wetland, and the second showing the same wetland several years later as a purple infested "wasteland." However, the first photograph of the supposedly "healthy" wetland was taken in June, well before the flowering season, while the second photograph was taken in August, during the height of the loosestrife flowering season, thus making the two photographs extremely difficult to compare (see Anderson 1995).

3. For example, Thompson provides little conclusive evidence supporting a decrease in the biomass of other plant species as a response to purple loosestrife invasions, and Anderson's own research found no definitive correlation between the density or percent cover of loosestrife and the floral species richness of the given area. Furthermore, the assertion that loosestrife is not utilized by North American fauna also deserves some consideration. Batra (et al. 1986) has recorded the use of purple loosestrife as a source of nectar and pollen by 14 separate species of insects. White-tailed deer (Rawinski 1982 cited in Anderson 1995), muskrat (actually cited in Thompson et al. 1987), rabbits (Anderson 1995) and meadow voles (Kiviat 1989 cited in Anderson 1995) have shown evidence of grazing on the shoots of the plant. Anderson (1995) has observed American coots, pied-billed grebes, black-crowned night-herons, American goldfinches and gray catbirds nesting in stands of loosestrife. Red-winged blackbirds are known to nest preferentially in stands of loosestrife (Keddy 1992).

4. I do not mean to imply here that the perceptual world view of nonhuman life is irrelevant. It is often forgotten that humans do not have a monopoly on the social existence over forms of life.

5. I am conscious of the fact that Douglas and Wildavsky use their analysis of pollution to question the environmental movement's construction of ecological collapse models. By using this material to support my arguments concerning purple loosestrife, I am not "turning coat" on the movement, but am suggesting the need to develop more compelling arguments than those that are purely technical in their orientation.

6. As we have seen from the earlier Biblical example, both the deep antipathies and metaphorical associations run to the roots of our origins as agriculturalists.

7. Thompson discusses the bog turtle and the canvasback.

8. Indeed, without the invasive species rallying cry, the cattail mangers are somewhat more forthright in their motives, one scientist declaring that "chemically created openings... are an acceptable management tool to create wetland openings that enhance waterfowl *use* and *production*" (Solberg and Higgins 1993 *Abstract*).

9. A similar example came to the fore during the winter of 1995/96, as the Ontario Federation of Anglers and Hunters ran a campaign to "save Ontario's deer" from the particularly harsh seasonal weather conditions. Donations were solicited so that feed could be distributed throughout the forests of the province, presumably so that enough deer would be available to be shot for recreation the following autumn. Again, it seems that "saving" the deer is not the issue so much as maintaining the productive supply. Paradoxically, in a fax adressed to a recent forum I attended on the ethics of deer culls to protect vegetation in provincial parks, OFAH suggested that southern Ontario was overpopulated with deer, and hunters should be allowed access to protected areas to rectify this pressing problem. Furthermore, it seems that the ducks that need to be saved from purple loosestrife are also threatened by the hunters whose representative organizations are supporting eradication campaigns. Hunters unable to identify waterfowl in the firld may be shooting rare species, and have even been known to shoot hawks, herons, grebes and shorebirds. See Barry Trent McKay, "Bag Limits a Joke in Hunters Can't Identify Waterfowl," in *The Toronto Star* Oct. 20, E4.

10. Andrew Light and Eric S. Higgs have written a fascinating paper on the relationship between restoration projects and capitalist commodification. Their particular focus is the corporatization of restored images of nature to act as an apology for continued exploitation of nature and as a pristine image to sell products. See "The Politics of Ecological Restoration," *Environmental Ethics* 18, 227-247.

11. See Thompson (1987) for an early expansion history along canals, and Wilcox (1994) for an account of superhighways as a major agent of spread into the western United States.

12. I am borrowing here from Dennis Lee (1977) the concept of a continual struggle between world (civilization) and earth (nature). Lee discusses Michael Ondaatje's poetic representation of this battle in the person of the law enforcement officer Pat Garrett, a "sane assassin" who controls the wild unpredictability of the outlaw Billy the Kid. I am suggesting that the scientist is modern society's ontological law enforcement agent.

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Outward Bound

I could choose to rest, to glory in
the smooth glacial slopes of isolation
my form reflected on the arctic's deep
I could abide on ice floes glowing
generous white as my skin, and
buried in Aurora's blue-snow-sleep
dream the echo of my native speech
crystal banks refracting voice and light
spilling the tundra flush with tones of me
white on white, a swelling insulation

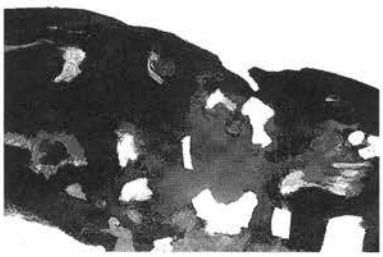
but, selling my mother's diamonds for the fare
and knowing the place will scorch my skin
beyond all repair, I still choose
the high noon of your so southern love
walking the line where north meets south
feet bare, sun-blistered for the tight-rope stunt
bedsores from the lumpy seam where sex is stitched
two poles, worlds, flags, lives, bodies stewed
the equatorial mists rise sizzling from the mix
salt for the earth and meet for each other
flesh/bone baked and broiled as one
we'll make our love on the burning meridian

Sheila Hassell Hughes
1991-97

Barbara Noske

BEYOND BOUNDARIES

Humans and Animals



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Reviewed by John Sandlos

There are certain ideas that have become so pervasive in recent times, that any mainstream discussion of their relative merits (or lack thereof) is deemed faintly ridiculous by the adherents of the newest of the new world orders. The sanctity of free markets, the benefits of global trade, and the absolute importance of generating absolute amounts of wealth on a nation by nation basis remain the largely unquestioned gospels of our time. Still, one does find a healthy dose of dissent in the alternative press, among left-wing academics, and among the few remaining social democratic voices in our political parties and public policy making regime. Indeed, one can, if one wishes, still participate in counter-hegemonic discourse without having to tear down too many conceptual barriers, and without having to upset too many of the institutions – universities primarily – that will still tolerate such deliberations.

However, it is still possible to cross certain iconoclastic borders within the confines of radical discourse and, in the book *Beyond Boundaries: Humans and Animals,* Barbara Noske probably does go "too far" for even the so-called radical left. Her most fundamental "mistake" is, I suppose, to focus on something so firmly entrenched and so much a part of our being as the species boundary and all of its inherent conceptual baggage, particularly the assumed uniqueness and superiority of human beings in relation to all other living things. Indeed, Noske's mission is not simply to critique humanistic ideologies and practices in relation to animals, but to radically re-think the most fundamental aspects of our entrenched human-centred cosmology. Her relatively brief volume is not only a sweeping examination of the historical human-animal interface, but also a more ambitious effort to "get our conceptual house in order" (as present fiscal policy makers might put it) within the context of the broader relationship between humans and other animals. Noske therefore challenges everything from the anthropocentric assumptions of the social sciences, feminism, biology, and mainstream environmentalism to the destructive practices of capitalist agriculture and the animal research establishment. The more fundamental question concerning the place of humans in the "great chain of being" remains paramount throughout such diverse criticisms, and Noske continually asks her readers to consider a universe where humans no longer rest at the apex of Creation: "even if there is such a thing as a species boundary between ourselves and all animals, might this discontinuity exist on a horizontal level rather than on a vertical and hierarchical level."

The book begins with an analysis of domestication – defined here as a process that removes a particular species from its natural subsistence cycle – that moves from the early neolithic to the rigid hierarchies of what Noske terms the "animal-industrial complex." The latter discussion is a litany of sufficiently gritty details describing the institutions of factory farming and "scientific" animal research to justify the author's claim that something has gone terribly awry in the human relationship to other species. Noske analyses the intensification of these "broken" relationships under modern industrial agriculture and, in one particularly brilliant section, uses a Marxist framework to suggest continuities (though perhaps not a direct equation) between the condition of human and animal labourers in the productive process of the capitalist farm. Like workers under a capitalist regime, animals in the modern farm and laboratory are alienated from the products of their own bodies, from productive activity (i.e. deskilled like the assembly line worker, animals are bred to be milk producers, meat producers, or tissue producers rather than autonomous beings with a free will). They are also alienated from fellow animals, from surrounding nature, and from their own species life. Thus, the historic mission of positivist science to devalue nature is largely complete with respect to animal life, and the author's fervent desire for humans to regard animal presences as "other worlds, whose otherworldliness must not be disenchanted or cut to our size but... respected for what it is" lies dead on the killing floor of our so-called enlightened age.

However, Noske remains undeterred, and much of the remainder of her book is devoted to the establishment of a theoretical basis for human-animal continuities. She begins by dismissing scientists who reduce animal life to mere object status ("how can those who are content to study animals totally from without whilst showing no interest whatsoever in their minds, possibly know anything about what animals feel, think or want"), but also dismisses social scientific critics who, out of fearfulness toward socio-biological thought, assert the superiority and uniqueness of humanity solely because of the ability to create language, culture, and technology. Both the social and the biological sciences are, according to Noske, allied in their shared belief in animal "objecthood", and differ only in their willingness to apply this object status as an explication for human behaviour.

Noske takes a third and largely untrodden path in this debate by first pointing out the absurdity of lumping all other species into a single category that is separate from the one truly unique species of Homo sapiens sapiens, and by secondly asserting that animal cultures, languages, and technologies do exist; they are only different in kind from the human variations. Thus, the deterministic "trap" of the sociobiologists that terrifies so many social scientists can be rejected based on its absence anywhere in not only the "social" world of humans, but also in the so-called natural world of animals. Noske elaborates on this point in a beautifully written section that synthesizes a great deal of covert scientific and non-scientific writings that describe social relationships amongst animals and between animals of different species (there are many examples involving humans). This, for me, was the most interesting and provocative section of the book, one that created almost an aura of suspense as firmly entrenched conceptions about the human relationship to the cosmos come crumbling down around the reader.

More importantly, Noske's examination of such phenomena as the "radical" science of Goodall-Fossey-Galdikas, the wildlife narratives of writers such as Farley Mowat, the primate sign language experiments of the Gardners, and the documented existence of "wolf" and "gazelle" children (i.e. children raised by other species), places them within a comprehensible social and intellectual framework. What emerges is this author's ground breaking call for an "anthropology of animals", a proto-discipline through which humans can remind themselves that "other meanings exist, even if we may be severely limited in our understanding of them."

If there is some fault with *Beyond Boundaries,* it lies in a tendency to move too quickly from one set of ideas to the next. The reader is often catapulted from Marxist theory to more anecdotal information in one fell swoop. The discussion of human primate ancestry is somewhat lengthy, while the postscript on androcentrism and anthropocentrism is badly out of place following the discussion of human-animal continuities. Conversely, some issues are glossed over too readily by the author, particularly the discussion of relationships between humans and animals in non-agricultural (i.e. gathering and hunting) societies.

Nonetheless, if the book includes some of the hesitancy endemic to breaking new ground, it also contains the ecstatic energy of something very fresh and new. There is a consummate passion to Noske's writing that is often lacking in the sterile and institutionalized world of academic publishing. Such passion manifests itself in an absolute intellectual and, appropriately enough, emotional commitment to her subject matter. *Beyond Boundaries* is therefore a must read for anyone who is, well, human. It may help you to become more so, and less so, all at the same time.

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