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Facing the Future: Encouraging Critical Cartographic Literacies In Indigenous Communities

Jay T. Johnson[1]

Department of Anthropology and Geography
University of Nebraska at Lincoln, 934 Oldfathre Hall
Lincoln, NB USA 68588-0368, email: jaytruman@earthlink.net

Renee Pualani Louis

Department of Geography, Univeristy of Hawai'I at Mānoa,
2424 Maile Way Honolulu, HI USA 96822, email: reneel@hawaii.edu

Albertus Hadi Pramono

Department of Geography, University of Hawai'i at Mānoa,
2424 Maile Way Honolulu, HI USA 96822 Fax 808.956.3512 monti@cbn.net.id

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"There is an Indigenous Geography in the making – a new approach to land consciousness involving map reading and map-making that is leading to the establishment of an encompassing, innovative and pragmatic new discipline." José Barreiro (2004)

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Abstract

As Indigenous academics researching and participating with various mapping initiatives, we have began to perceive that while many Indigenous communities have a long history of using Western cartographic techniques, including GIS, in their efforts to establish land claims, map culturally important sites and protect community resources, they were not critically aware of the science with which they are engaged. We have established our goal to assist and encourage the development of a critical literacy in cartography within Indigenous communities. We use the term literacy not to imply an ability to read and write, rather we are engaging the part of the word's etymology which recognizes having competence in a system of knowledge. Western cartography is a complex knowledge system with a long history, much of its last 500 years being involved in furthering the colonial exploits of European crowns. Using the work of Paulo Freire (2000) on critical consciousness as a foundation, we have taken this concept a step further to describe a critical cartographic literacy which recognizes that as J. B. Harley states, "[m]aps are never value-free images… [c]artography can be 'a form of knowledge and a form of power' (1988)." Our article explores our development of a critical cartographic consciousness in order to aid Indigenous communities in how they engage with one of the most prevalent informational technologies currently in use in many of these communities' modern cartography/GIS.

Introduction

As Indigenous[2] academics engaged with mapping initiatives and working as cartographers within various Indigenous identified communities across North America, Indonesia and the Pacific[3], we have become concerned about the ways in which these communities, and other Indigenous communities around the world, are engaging with Western cartographic technologies. The mapping techniques and GIS software being used by Indigenous communities around the world to establish land claims, map culturally important sites and protect community resources, has a

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[2] Following the editorial precedent set by John Hylton in *Aboriginal Self-Government in Canada*, words such as "Aboriginal", "Native" and "Indigenous" have been capitalized in the same manner that words such as "European" and "American" are capitalized when referring to specific peoples. (Hylton, 1999).

[3] Recognizing that there are substantial differences between and within the communities we discuss in this paper, we believe that a rigorous definition of Indigenous would serve only to create fixed boundaries where they do not exist so we choose to leave these intellectual boundaries porous, but also recognize that the communities we work with do themselves identify as Indigenous (Niezen, 2003; Dean and Levi, 2003).

long and distinct history; a genealogy intrinsically intertwined within Western knowledge systems (see Harley and Woodward, 1987; Harley, 1988; Peluso, 1995). What we are labeling here as 'Western cartography' is not only founded within a Cartesian-Newtonian epistemology but is also connected with and has been informed/transformed within both historical and current 'contact zones'(Pratt, 1992) of the colonial projects of the West. To engage the technologies of Western cartography is to involve our communities and their knowledge systems with a science implicated in the European colonial endeavor (Harley, 1992b) and is a decision which should be made only after examining not only our past experiences of colonial mapping/surveying but also the long history of Western cartographic traditions.

While we caution Indigenous communities about how they engage with Western cartography, we also recognize the value these technologies have brought to the struggles of our communities. One cannot deny the value of works such as the Nunavut Atlas (1992) or the mapping efforts of the Wet'suwet'sen and Gitxsan (Sparke, 1998) in establishing Indigenous connections to lands, resources and cultural sites. Our aim in this paper is to encourage the development of a critical literacy, concerning how Indigenous peoples engage with and employ modern cartography and GIS, and how in this process we safeguard and encourage a literate continuation of our own Indigenous cartographic traditions.

Our paper is inspired by the Hawaiian concept of 'facing future', a concept based within an epistemology born in the navigational exploits of the colonizers of the Pacific. The concepts of 'past' and 'future' are explained by Hawaiians using bodily directions, the front of the body faces the 'past' while the back faces 'future'. Hawaiians 'face' their 'future' with their backs because the future is an unknown. On the other hand, 'past' is knowable; it can be 'seen' in front of each of us, shaping our character and consciousness. Hawaiians believe that knowing who they are, genealogically, and where they came from, geographically and metaphysically, makes them capable of making more informed decisions about the direction to move in the future. By allowing this concept to guide our work we are focusing our attention first on Western cartography's history, including its role in creating and perpetuating European colonialism (Harley, 1992b: 532) and second on the history of Indigenous cartographies.

We are also encouraging a reflexive approach toward our current engagements with these technologies. While many define GIS/computer cartography as 'tools', we recognize that 'tools' implies something which can be put away and no longer have consequence in ones life until they are needed again. These mapping systems are technologies, something that we may choose to engage with but even if we decided to turn them off and go about our daily routine they will continue to have influence over our lives (Fox et al., 2005b). Specifically, we define these technologies as a 'techno-science', a discipline where technology has become the embodiment of science (see Turnbull, 2000). These technologies

modify and transform the worlds that are revealed through them, delivering apparent 'realities'.

Critical assessments of the adoption of mapping technologies by local communities have flourished under the rubric of Public Participation GIS (PPGIS), particularly for those in North America. However, it heavily focuses on neighborhood planning by urban communities which are largely literate in modern cartography and have more access to the technology. As concerns over ethical issues of GIS, particularly participation (Schlossberg and Shuford, 2005) and privacy (Crampton, 1995) have grown, there has been an evolution in PPGIS leading to the development of a GIS-2 that is more receptive to community needs and interests (Obermeyer, 1998). Nonetheless, due to its urban-oriented nature PPGIS has not put much attention on "cartographic encounters" (Lewis, 1998) that occur in rural and indigenous communities. This paper, and the work of authors such as Fox, Suryanata and Hershock and attempting to address this deficiency (Fox et al., 2005a).

In an effort to reflect on the problematic nature of Indigenous counter-mapping projects, this paper examines the advantages and risks that accompany the use of modern cartographic technologies by Indigenous communities (Turnbull, 1998: 38). The authors conclude that Indigenous communities must take a two-pronged approach toward implementing mapping projects: on the one hand becoming literate in these cartographic methods, while on the other hand developing a critical consciousness that attends to the dangers that accompany the use of modern cartographic technologies. In addition to encouraging critical literacy toward Western cartography, we end this work by advocating that Indigenous communities support their own cartographic traditions.

Multiple literacies, multiple cartographies

In order to develop critical thinking in our endeavor to reveal how Western cartography transforms and modifies our lived places, we are looking back to the work of Paulo Freire (1985; 1987; 2000). One of the most important philosophers and educators of the twentieth century, Freire's work has been particularly influential for grassroots movements and community development not only in the South but also on the academic tradition of the North[4]. The theoretical core of Freire's argument is his conceptualization of critical consciousness or *conscientização.* Finger and Asún describe the term as "the process by which a

[4] We have chosen to use the binary North/South in this paper, but acknowledge that it is not unproblematic in itself.

group (class) become aware of their cultural oppression, of their 'colonised mentality', and by doing so discover that they have a popular culture, a popular identity and a societal role" (2001: 84). The practical realization of critical consciousness is achieved through problem-posing education; through dialogue between educators and learners. This method treats learners from marginalized groups not as mere objects to be filled with information, but instead they are encouraged to break from what Freire calls their 'culture of silence' and become knowing subjects (2000).

For Freire, critical consciousness is best perpetuated by encouraging a critical literacy through his particular style of educational praxis. Freire believed that through reading and writing, in the 'language of the people', human emancipation and social transformation could be achieved (Freire and Macedo, 1987: 159). Our work is looking at literacy in a somewhat broader context then merely reading and writing. We are defining a literacy that refers loosely to any body of systematic useful knowledge (Collins and Blot, 2003: 3). While Freire, like others of his period, identify a single thing called literacy, something seen as a set of 'autonomous' skills with far-reaching almost determinist consequences (Street, 2003: xi), we are referring, as does the work of Collins and Blot, in seeing "relativist, sociocultural or situated models of *literacies* – which conceive literacies relationally, that is as intrinsically diverse, historically and culturally variable, practices with texts" (2003: 4). We are particularly intent on this recognition of multiple literacies. Multiple critical literacies operate against a neutral conception of literacy which would perpetuate the specific cultural values which underpin a surface neutrality (Street, 2003: xiii). Just as maps are not value free in their representations (Harley, 1988: 278), so particular models of literacy replicate specific cultural values and patterns. Our model of critical literacies strives to encourage an anti-colonial, anti-universalist approach, promoting the acknowledgement of the unique epistemologies of Indigenous communities.

This discussion of literacy, no matter how broadly defined, begs the question of how we intend to define a text. Brian Street has observed that, "[t]his question is particularly relevant at the current time as new modes of computerized and digital representation become widespread" (2003: xiii). Since cartographic production is increasingly based in computerized and digital representation, can maps, no matter how they are produced, be considered texts? Along with Barnes and Duncan, we are using an expanded concept of the text, one which includes other cultural productions such as paintings, maps and landscapes, as well as social, economic and political institutions (1992: 5). Acknowledging that while it "is true that literally [maps] have no grammar and lack the temporal sequence of a syntax, 'what constitutes a text is not the presence of linguistic elements but the act of construction' so that maps, as 'constructions employing a conventional sign system', become texts" (Harley, 1992a: 238; McKenzie, 1986: 35). These texts we call maps are ineluctably a cultural system. "Cartography has never been an

autonomous and hermetic mode of knowledge, nor is it ever above the politics of knowledge (Harley, 1992a: 232). As such, maps are open to the deconstructive efforts of the critical consciousness we are encouraging.

Returning to the heading of this section, having described 'multiple literacies' now let us turn our attention to describing what we mean by 'multiple cartographies'. Just as the recognition of multiple literacies allows for intrinsic diversity, historic and cultural variability, so the recognition of multiple cartographies allows for the recognition of diverse forms of spatial representation among various cultural groups. Harley observes that "recent studies in anthropology, art history, and ethnohistory identify a corpus of indigenous maps that represent valid 'alternative' cartographies, different from European maps, yet important in the history of spatial representation" (1992b: 522). This conceptualization of multiple or alternative cartographic traditions has been supported in varying degrees by the works of other geographers as well (Chapin et al., 2001; Harley and Woodward, 1987; Lewis, 1998; Louis, 2004; Pearce, 1998; Rundstrom, 1987; Sparke, 1998; Woodward and Lewis, 1998). As a part of multi-volume History of Cartography project, Woodward and Lewis (1998) even provide a classification of Indigenous spatial representation. While recognizing Indigenous cartographic traditions, Turnbull (1998) warns that the use of terms such as ethnocartography and Indigenous mapping runs the risk of "subsuming all other traditions under Western notions of maps and cartography (p. 17)." We agree that there is a certain risk involved in using this terminology but emphasize that using the term 'cartography' to describe Indigenous spatiotemporal representations and performances is fundamental in creating a 'shared space' through which different cartographic traditions can be compared and translated. The creation of a 'shared space' through which Indigenous and Western cartographic traditions can be performed and compared requires as Turnbull has asserted, the recognition that distinct knowledge systems are locally produced and not 'universal', as Western science has claimed (1997).

We do not intend, however, to leave our discussion of multiple cartographies at the level of comparison and translation, important as this step may be. The next step, from our perspective, is to recognize that 'critical consciousness' requires a vigilance to the inherently political nature of the mapping process, no matter who is involved or how the mapping will be 'performed' (see Louis, 2004). While some academic cartographers have embraced the concept of multiple cartographies and are even employing critical theory to the discourse of cartography we recognize that for most cartographers these concepts will be alien and bizarre. As human geographers and cartographers working in Indigenous communities, we have a strong desire to see the "conceptual vacuum" between cartography and human geography healed (Harley, 1992a: 232). One aspect of healing this "conceptual vacuum" will entail recognizing the power relations

involved in employing Western cartographic techniques while also accepting, embracing and welcoming non-Western cartographies.

Critical literacies, Western Cartography and Indigenous agency

> "More indigenous territory has been claimed by maps than by guns. This assertion has its corollary: more indigenous territory can be reclaimed and defended by maps than by guns. Whereas maps like guns must be accurate, they have the additional advantages that they are inexpensive, don't require a permit, can be openly carried and used, internationally neutralize the invader's one-sided legalistic claims, and can be duplicated and transmitted electronically which defies all borders, all pretexts, and all occupations." Bernard Nietschmann (1995: 5)

Participatory mapping, using any number of different techniques from simple hand-drawn maps, three dimensional modeling through to complicated geographic information systems have been employed in an effort to empower various types of local communities around the globe (Brody, 1982; Chapin, 1998; Corner, 1999; Craig and Elwood, 1998; Elwood and Leitner, 1998; Flavelle, 1995; Fox, 1998; Harris et al., 1995; Harris and Weiner, 1998; Kosek, 1998; Nietschmann, 1995; Obermeyer, 1998; Peluso, 1995; Pickles, 1995; Poole, 1995; Rundstrom, 1998; Sparke, 1998; Stone, 1998; Tobias, 2000). These projects have encouraged various types of communities from First world neighborhoods to Third world rural villages in re/representing their communities within the visual constructs of Western cartography, reinscribing the maps of their place with their own conceptualizations. Indigenous communities have used participatory mapping projects to represent various use and occupancy patterns, traditional ecological knowledge, sacred sites, legends and Indigenous place names (Tobias, 2000). While there is a great deal of information concerning the empowerment of local communities through community engagement with mapping technologies, our goal is to discuss the specific impacts for Indigenous communities and to explore how our vision of critical cartographic literacy may empower these communities in their engagement with Western cartography. The goal to encourage Indigenous communities to actively, if not always critically, engage Western cartographic techniques to aid in various land claims has been the goal of numerous academics and non-governmental organizations (Aberley, 1993; Chapin, 1998; Chapin et al., 2001; Fox, 1998; Fox et al., 2005a; Kosek, 1998; Lewis, 1998; Peluso, 1995; Rundstrom, 1998). Many, like Fox and Peluso, demonstrate the common belief that Indigenous communities must engage in Western cartographic endeavors or face the "the alternative futures, of not being on the map, as it were, being obscured from view and having local claims obscured" (1995: 403).

Many, if not most "counter-mapping" projects, are projects designed to dramatically increase the power of people living in a mapped area to control the representations of themselves and to increase their control of resources (Peluso, 1995: 387), and in addition assume that a *basic* level of Western cartographic knowledge is sufficient for Indigenous communities to engage with this techno-science. Many, if not most "counter-mapping" projects leave cartographic literacy to the imported 'expert' who attempts to translate Indigenous place biographies onto the Western map that underlies their project. Unfortunately, as Rundstrom observes, "[the] prevailing Cartesian-Newtonian… epistemology does not prize key characteristics of indigenous thinking, including; the principle of the ubiquity of relatedness; non-anthropocentricity; a cyclical concept of time; a more synthetic than analytic view of the construction of geographical knowledge; non-binary thinking; the idea that facts cannot be dissociated from values; that precise ambiguity exists and can be advantageous; an emphasis on oral performance and other non-inscriptive means of representation; and the presence of morality in all actions" (1998: 7-8). Counter-mapping projects face the task of translating community information based within these key characteristics of Indigenous thinking and when this task is left to the uninitiated outside expert, much is lost in that translation.

One issue in Indigenous mapping projects which effectively demonstrates this loss of information in translation is the pervasive difficulty with fixed boundaries (Brody, 1982; Chapin, 1998; Chapin et al., 2001; Fox, 1998; Kosek, 1998; Peluso, 1995; Rundstrom, 1998). While Indigenous communities generally recognize fluid and flexible boundaries over land and resource use, once these boundaries become fixed within a Western cartographic representation, the fluid and flexible nature of Indigenous thinking is lost (Fox, 1998: 3). Based on several case studies from Southeast Asia, Fox et al. (2005) have noted that within Indigenous counter-mapping projects these newly fixed boundaries serve to shift the social relations both within and between communities, unfortunately encouraging the development of a notion of private property where one did not previously exist. One attempt to translate Indigenous understandings of boundaries onto Western maps is in drawing a distinction between use and occupancy observing that use maps generate artificial overlap (Tobias, 2000). This is one technique which can force Indigenous knowledge to fit within the fixed boundaries of the Western map and can provide valuable representations in legal proceedings but in the end, it is a technique which further perpetuates the loss of Indigenous geographic knowledge. Another failure of translation can be seen in the loss of place names and their associated role in creating and re/creating local knowledge. As Louis has observed, "[i]n Hawaiian cartography place names are mnemonic symbols [which when] performed in daily rituals are a conscious act of re-implacing genealogical connections, re-creating cultural landscapes, and re-generating cultural mores" (2004: 4). With the introduction of Western cartography, Hawaiian place names, and the essential role they have played in 're-

creating cultural landscapes' become the (un)intentional victims of cartographic translation. In both examples the underlying problem is the difference of worldviews and practices in which Western and Indigenous cartographies evolve.

Encouraging the development of critical cartographic literacy within Indigenous communities requires more than the *basic* level of cartographic education developed in many, if not most 'counter-mapping' projects. When these projects maintain the cartographic expertise with the outside expert and do not encourage the development of Western cartographic literacy within Indigenous communities they are denying these communities the ability to become agents in their own mapping projects. The political and epistemological effects of involving outside experts in the form of researchers, NGOs and cartographers is too often overlooked (Kosek, 1998: 4). Unfortunately, as Rundstrom observes, "most still imagine that the production of a "one-world" view through pursuit of counter-mapping projects worldwide is benign and helpful in protecting the status of others. I have come around to thinking though, that our little habit may be just another manifestation of the White Man's Burden" (1998: 8).

The development of critical cartographic literacy within Indigenous communities has been the work of a handful of cartographers, academics and organizations engaged in 'counter-mapping' projects, such as the Indigenous Communities Mapping Initiative and the Aboriginal Mapping Network. Well trained Indigenous cartographers, like Moka Apiti in Aotearoa/New Zealand and Renee Pualani Louis in Hawai'i, have been using their education within the Cartesian/Newtonian cartographic epistemology to translate Indigenous geographic knowledge for Western audiences, producing autoethnographic[5] cartographies (see Louis, 2004; Pratt, 1992). Both the work of these organizations and Indigenous cartographers trained in Western techniques assists in bringing a greater degree of cartographic literacy to Indigenous communities. In the end though, we must admit as Rundstrom has, that "counter-mapping and GIS can provide at best no more than a simulacrum of indigenous or non-Western geographies" (1998: 9). And, the initiatives encouraging critical cartographic literacy within Indigenous communities are far from the norm among 'counter-mapping' projects.

Encouraging critical cartographic literacy will entail, as Freire's critical consciousness work has demonstrated, the development of an awareness of cartography's role in dispossessing Indigenous communities of land and resources. Harley observes that "maps were the first step in the appropriation of territory. Such visualizations from a distance became critical in choreographing the Colonial

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[5] Pratt defines autoethnograpy as "instances in which colonized subjects undertake to represent themselves in ways that *engage with* the colonizer's own terms" (1992: 7 italics in original). We are employing this term to describe certain cartographic representations that attempt to represent Indigenous tempro-spatial conceptualizations through Western cartographic means.

expansion of early modern Europe" (1992b: 532). Western cartography served European imperialism through acts of "geographic violence," by renaming, reframing and controlling the space of the colony (Turnbull, 1998: 17; Mitchell, 1988). The maps produced in the colonial expansion of North America described a bounded land, controlled by coordinates of latitude and longitude, whose 'silences' described "a land without the encumbrance of the Indians" (Harley and Laxton, 2001: 187). The colonial map asserted the external centralized power of the state to dominate 'its' territory and expanded the judicial control out toward the 'blank spaces' of the Indigenous nations (Harley and Laxton, 2001).

The power that Western cartography asserts is not only though the power of the external judicial control of the metropole over the colony, it is also the internal power asserted by the cartographer "over the knowledge of the world made available to people in general" (Harley and Laxton, 2001: 112). The conventional signs, rules and specifications of Western cartography serve not only to dominate the landscape, they also serve to control the way in which we envision and represent the landscape. As surely as the lands of Indigenous communities have been appropriated through the labor of the surveyor and cartographer, so the way in which Indigenous peoples view the world has been influenced by the standardization and universalizing nature of Western cartographic knowledge. It is this colonization of the processes of making the world known through the standardized knowledge system of Western cartography which has colonized the cartographic traditions of non-Western peoples (see Turnbull, 1998).

In order to re-educate the 'colonized mind' in relation to cartography's role in colonial dispossession a pedagogic focus is called for within 'counter-mapping' projects. Indigenous communities need to become aware not only of the historical role of cartography in their dispossession but also in the ways in which cartography continues to betray these same communities today, even when the maps/GIS being produced are objectively intended to benefit their interests. Of course we agree with Sparke when he says that "[s]howing how cartography can operate both for and against colonialism not only deepens the scholarly work of critical cartography, it also counters the too-speedy denunciation of maps and mapping as metaphors of domination" (1998: 466). Let us paint a worst case scenario though for how the uncritical adoption of Western cartographic techniques can serve to perpetuate colonial dispossessions. First, putting indigenous knowledge into a GIS makes it tangible and accessible. It may even diminish it, as Rundstrom has observed, because it is no longer contextually defined (1998). Secondly, storing information within a GIS makes it easier for that information to be used beyond its original intent and context. Lastly, because the source and recipient of the information is separated in space and time it becomes more difficult to impose moral restraint on its use. Indigenous communities need to understand the full implications of their engagement with Western cartographic techniques and we

believe that can be achieved through education that encourages a critical cartographic literacy.

We envision two different but not mutually exclusive paths toward creating critical cartographic literacy within Indigenous communities. First, as has been alluded to, 'counter-mapping' projects need to make critical education, preferably through a Freirean 'problem posing' technique, an integral part of their program. Here the outsiders and Indigenous community members, as knowing Subjects, learn together to problematize the spatial realities represented within the mapping process and investigate the impacts of this process on Indigenous mapping. In this process both groups gain and give new meanings to the world which feeds into their map production. To date, dialogue in counter-mapping has been problematic because many researchers/map makers envision Western cartographic techniques as the perfect/sole solution to the land and resource dispossessions of the communities in which they are working. To truly engage in a dialogic counter-mapping process, it would be beneficial if outside experts engage in identifying their own 'colonized mentality' before attempting to create critical consciousness among the community. They should embrace a 'border crossing' in order to move beyond their own cultural roots allowing them to feel comfortable within various zones of cultural diversity (Giroux, 1995). This means that outside cartographers/mapmakers must understand Indigenous cartographies and make every effort to incorporate these diverse knowledge systems into a 'new' mapping endeavor which will strive toward a post-colonial, post-modern cartography (Turnbull, 1998). This understanding though may require an extensive apprenticeship within which outsiders learn the language, cultural values and knowledge systems that underlie Indigenous cartographies.

The second path we envision for bringing critical cartographic literacy into Indigenous communities entails community members becoming adept in the Cartesian/Newtonian cartographic epistemology. Skilled Indigenous cartographers can act as advocates as well as technicians for their own and other Indigenous communities. They can also become key agents and educators within Indigenous communities, building critical cartographic literacy through their understanding of the epistemological divide between Western and Indigenous cartographic systems.

These steps toward critical cartographic literacy are only the beginning of what will be required for Indigenous communities in their response to and engagement with Western cartographic technologies. We envision that the development of a critical consciousness in relation to cartographic representation will lay the foundation to addressing more concrete issues related to this engagement such as reflexivity concerning the use of these technologies and the internal community critique of the maps produced.

Recognizing, encouraging and embracing Indigenous cartographies

> "These [modern Native American] maps…are a glimpse of uncharted territory; they portray the edges and faint outlines of a new way of seeing the world and one's place within it" Mark Warhus (1997: 3)

While the context of this paper to this point has been the development of critical cartographic literacy surrounding the use of Western cartographic techniques within Indigenous communities, we do not want to ignore an equally significant issue underlying much of our discussion to this point; Indigenous communities have their own cartographic traditions. Mark Warhus states that the Indigenous knowledge contained within these cartographies "was passed down in songs, stories, and rituals, and the understanding of the landscape it imparted was as sophisticated as that of any western map" (1997: 3). Since these cartographies are frequently stored within songs, stories and rituals they are generally performative and process in nature and frequently fail to be recognized as cartographic representations (see Woodward and Lewis, 1998). When we state that they fail to be recognized as cartographic representations we do not only mean by academic cartographers but also, unfortunately, by Indigenous peoples as well.

Two significant aspects of colonial education projects have aided this dismissal of Indigenous cartographic knowledge both within the academy as well as Indigenous communities. First, as Western scientific knowledge has become a nearly universal science for all, so too has Western cartography become a near-universal science for representing all landscapes. Harley observes that "the belief in linear progress: that, by the application of science, ever more precise representations of reality can be produced… has led to a tendency not only to look down on the maps of the past (with a dismissive scientific chauvinism) but also to regard the maps of other, non-Western or early cultures (where the rules of map making were different) as inferior to European maps" (1992a: 235). Second, since colonial education programs were developed with the express purpose of assimilating Indigenous populations, Western epistemological hegemony was assumed as one key component.

One important aspect of Freirean pedagogical praxis is aimed at assisting colonized groups to uncover their popular language and culture. For Indigenous communities, rediscovery of their language and culture is intrinsically connected to uncovering connections to their lands which may be on the verge of disappearing through dispossession or educational assimilation. As people who have stored significant historical, cultural and scientific knowledge within place names, the landscape is an invaluable knowledge repository; to quote Keith Basso, "wisdom sits in places" (1996). Recovering these connections through Indigenous cartographies then becomes as important a task for Indigenous communities as saving tenure to the lands upon which this knowledge is written. The lessons

learned in creating a critical cartographic literacy with reference to community involvement with Western cartographic techniques may assist with the process of uncovering Indigenous cartographies.

Warhus' work documents "three different approaches to making the contemporary Native American presence known. [The] re-creation of the nineteenth century Native American landscape upon a western cartographic base, [the] adaptation of western technology and legal structures to Native American ends, [and]…the merging of the Native American and western landscapes" (1997: 211). The three examples cited by Warhus demonstrate the on-going nature of Indigenous cartographic knowledge. They also demonstrate the growing competence of Indigenous peoples in Western cartographic techniques as the three maps cited convey their representation within a Western cartographic style and thus can be considered autoethnographic in nature (see Pratt, 1992). Like the map entitled *Wallum Olum* below (Johnson, 2003), they convey Indigenous concepts employing Western cartographic principles in order to portray Indigenous geographic information to a predominately Western audience. This map portrays the historical account of the Lenni Lenape migration across North America by using both the pictograms associated with the history as well as Native American images such as the continent resting on the back of the Turtle alongside Western cartographic conventions. As important as this style of map is in preserving a certain level of Indigenous cartographic knowledge they can play only one part in the preservation of Indigenous cartographic traditions.

One recent event, the International Forum on Indigenous Mapping held in Vancouver, British Columbia, Canada in March 2004, has been successful in both encouraging critical literacy and Indigenous cartographic traditions. Hosted by the Indigenous Communities Mapping Initiative along with several funders, including the Ford and Tides foundations, the stated purpose of the conference was "to bring together indigenous peoples and their partners engaged in mapping for the purpose of establishing connections and exchanging knowledge across these divides and reminding us all that we are not alone in these important endeavors." As the primary objective of the conference was geared toward assisting Indigenous communities with Western cartographic projects, there was no intentional focus on Indigenous cartographies. An interesting thing occurred though as participants from around the world stepped forward to make presentation concerning their mapping projects; their Indigenous cartographies were frequently an unacknowledged part of their presentations. Seri Indians from Mexico sang songs describing the same landscapes their visual representations portrayed. Various Native Hawaiian groups chanted and performed hula significant to the mapping projects from their territories. These performative cartographies were natural outgrowths for these groups but remained unacknowledged as cartographies until the closing plenary of the conference. For Indigenous communities to succeed in developing critical cartographic literacy with regard to the effects of Western

cartography in their communities they must also become aware of their traditional forms of cartography, and encourage their continued practice.

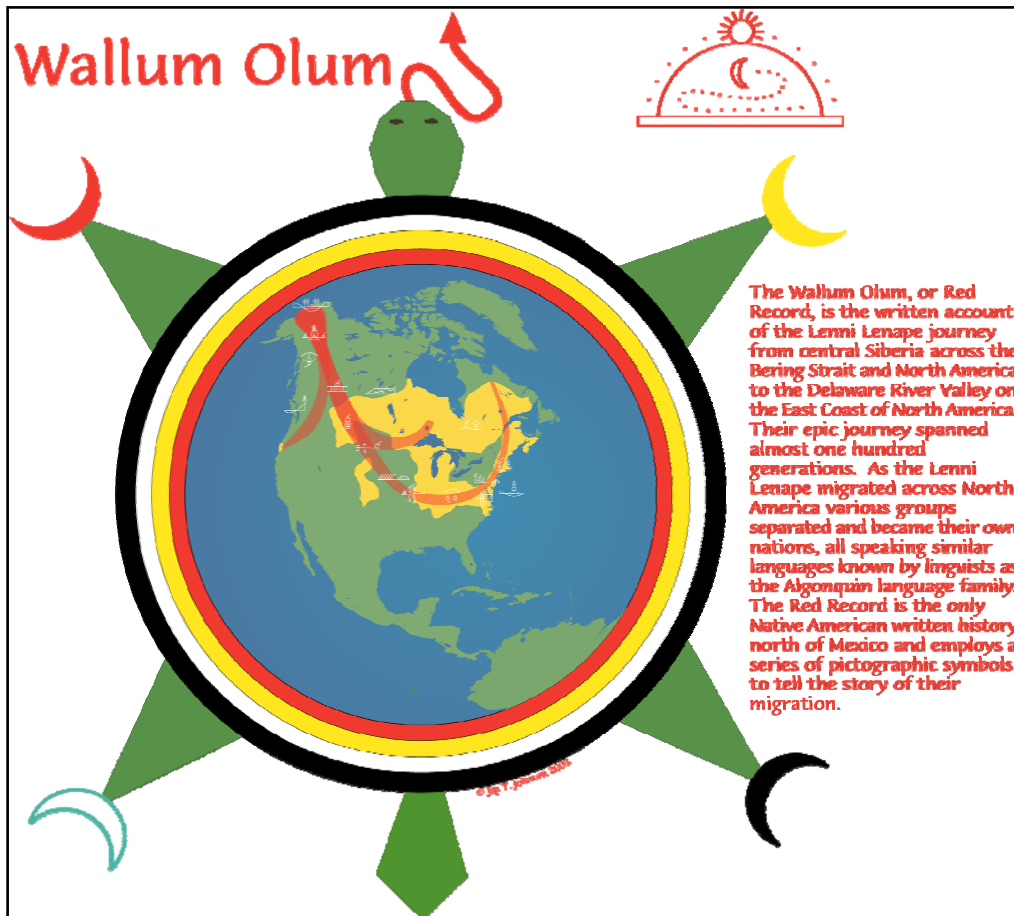

Figure 1 "Wallum Olum" by Jay T. Johnson

Conclusion

Our goal of encouraging cartographic literacies within Indigenous communities is one that will require a clear and unequivocal dedication to developing critical consciousness by both community members and researchers within mapping projects in these communities. This will require a commitment by Indigenous communities who choose to engage Western cartographic technologies in their land and resource claims work. It will also require the dedication of researchers and cartographers working with Indigenous communities to take on a pedagogic style similar to Freire's in their research work, committing themselves to a task more difficult than the mere production of a map. A 'counter-mapping' project which is committed to creating critical consciousness within the community

will need to engage in problem posing education before any map making efforts can begin. Communities need to understand the ramifications of such mapping efforts before decisions concerning whether or not to digitize, record or symbolically represent sensitive community information. For some researchers this may mean the development of entirely different research methodologies, focused more on the needs of the community than on the needs of the researchers. Linda Tuhiwai-Smith has described this decolonization of research methodologies we propose as 'partnership research' or a research agenda that is driven by the desires of and seeks to empower Indigenous communities (1999: 178). 'Partnership research' would also encourage researchers to mentor community members so that necessary cartographic skills were developed within communities and not held solely by the skilled researcher.

Indigenous communities will need to make a commitment to the development of cartographic literacy, through encouraging the education of interested community members and/or through educational programs with outside experts. Having a successful mapping program requires more than the purchase of the appropriate technology; it also requires an investment in education. Our communities also need to encourage youth to learn from elders the traditional geographies and cartographies. Much of this knowledge is under threat of permanent loss. The preservation of this knowledge may come through saving the stories and songs in GIS databases, but hopefully they can also be preserved through their continued performance.

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