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Abstract
This article presents and discusses the cultural and technological contexts of the development of the Cybercartographic Atlas of Indigenous Perspectives and Knowledge of the Great Lakes Region in Ontario. The atlas was developed to enhance the capability to recover the systemic nature of traditional Indigenous knowledge by electronically interrelating different forms of expressive culture (language, oral traditions, items of material and visual culture, historical documentation). To reach this goal, this atlas includes a “living” geospatial database that serves as an artefact repository and enables communities to contribute geographically relevant knowledge and to develop their own interactive, multimedia online geospatial stories through modules or sections. Two of these modules are discussed here: a treaties module focusing on the survey phase of the Lake Huron treaty process, and a culture module geared toward engaging Aboriginal artists, community members, and high school students in contributing to the development of this community-based atlas. The discussion concludes with a critical look at the potential of cybercartography and the challenges that remain, especially when it comes to further developing the “living” and the collaborative dimensions of cybercartographic atlases.

Keywords: Indigenous mapping, geospatial storytelling, cybercartographic atlas, Web mapping, Great Lakes region

Résumé
The relationship between Indigenous communities and maps is often ambivalent. Historically, scientific maps have been used by nation-states primarily to assert their territorial rights and reinforce their power over Indigenous and other communities. In contrast, various alternative maps have more recently become “a vehicle of resistance, a language whereby rights to place may be asserted or through which non-dominatory representations might be cultivated” (Pickles 2004, 113). In an effort to further explore the potential for non-dominatory representation, this article discusses several alternative ways of mapping Indigenous knowledge, culture, history, and worldviews that are made possible by recent technological developments in cartography.

The importance of Indigenous communities’ mapping and representing their own territories and environment has been widely acknowledged. Domains such as counter-mapping (Peluso 1995), contrapuntal cartography (Sparke 1998), community mapping, and participatory GIS (Sieber 2004) have helped communities to reclaim their sovereignty over lands (Herlihy and Knapp 2003), with more or less success (Tobias 2000). The appropriation of cartographic techniques and technologies such as GPS and GIS has proved very efficient and useful for this purpose. Although the technological complexity of these techniques presents challenges to the non-dominatory representation of unique understandings of space, environment, and culture, these challenges can be met by adopting a performative approach to mapping that acknowledges its processual aspects and that goes beyond a view of the map as simply a spatially referenced graphic image with information reflecting specific themes. This type of approach is consistent with the performance aspect inherent in acting out Indigenous understandings, which are often expressed through non-visual practices such as storytelling, art, and dance. As highlighted by David Woodward and Malcolm Lewis,

an indigenous culture’s maps offer evidence of its ways of cultural worldmaking. The map is found at the interface of the secular and spiritual, it deals with the spatial-world views of societies (in the sense of both landscape and world order), and it often reflects a society’s view of its history and origins. The map is at the juncture of performance and artifact, of the visual and the aural, of the static and the dynamic. It sheds light on such deeply ingrained and universal human needs as wayfaring and feeling “in place.” (1998, 10)

Concerns have been raised within the literature on critical GIS and cartography about the need to address the tensions that exist between geospatial technologies, on the one hand, and Indigenous worldviews and approaches to mapping, on the other. Specifically, the positivist assumptions that are considered to undergird GPS and GIS are seen to be incommensurable with Indigenous and post-foundationalist approaches to knowledge, and, because of this incommensurability, it is felt that geospatial technologies are incapable of reflecting multiple ontologies of space (Turnbull 2007). This epistemological stand-off has led to two basic positions in critical GIS. The rejectionist camp includes what Margaret Wickens Pearce describes as those who reject the use of geospatial technologies in favour of mapping practices, such as sketch mapping, that are “personal and centred on the exploration of emotional meanings in the landscape” (2008, 1). In contrast, the revisionist camp acknowledges the benefits of geospatial technologies but believes that it is necessary to change the way we think about cartography (Pickles 2004). Revisionists engage in alternative mapping practices that assume a critical stance toward geospatial technologies and the cartographic traditions from which they are derived (Johnson, Louis, and Pramono 2005; Pearce 2008; Pickles 2004; Turnbull 2007).

The Cybercartographic Atlas of Indigenous Perspectives and Knowledge of the Great Lakes Region presented in this article assumes a revisionist position. Moving beyond the concept of traditional representational cartography, the “living” cybercartographic atlas framework allows for the development of novel geospatial modes of expression that can be used to better reflect both traditional and contemporary Indigenous knowledge and understandings. It provides a means to present the histories of how individuals from the communities of this region have conceptualized and represented their identities in relation to space, time, land, and spiritual forces. This atlas has two major elements: (1) a “living” geospatial database, to which the communities may continue to contribute geographically relevant knowledge, and (2) some highly interactive, multimedia-rich online educational modules, which can be updated, commented on, and further developed. These elements are considered below, following a discussion of the relationship between cybercartography and Indigenous knowledge and a description of the atlas. The discussion concludes with a critical look at the potential for cybercartography to continue to support revisionist atlas projects and the challenges that remain,
especially with respect to further developing the “living” dimension of cybercartographic atlases.

2. Cybercartography and Indigenous Knowledge

Recently, the domain of Internet mapping has seen dynamic developments in terms of emerging tools, services, databases, and participants. New products developed by the private sector (e.g., Google Earth, Microsoft Virtual Earth) and open-source projects (e.g., NASA World Wind, Minnesota Mapserver) are providing new means of constructing and disseminating maps over the Internet. These new mapping applications allow for the integration of the user in the content-development phase through applications such as GIS/2 (Sieber 2004), open-source mapping applications, wiki atlases (e.g., Placeopedia, Openstreet, Geowiki), and virtual globes (Miller 2006). Citizens are contributing to the emergence of what Michael Goodchild (2007) calls “volunteer geographic information” through their increasingly wide involvement in a collective process of geospatial knowledge construction. Cybercartography is both a part of and a contributor to these dynamic developments. Cybercartographic atlases are very much products of the social computing Web 2.0 environment, in which community involvement is the driving force of the project.

Cybercartography was introduced in 1997 (Taylor 1997) and later formally defined as “the organization, presentation, analysis, and communication of spatially referenced information on a wide variety of topics of interest and use to society in an interactive, dynamic, multimedia, multi-sensory format with the use of multimedia and multimodal interfaces” (Taylor 2003, p.406). While the map is considered central to cybercartography, the notion of geographic narrative underpins the concept. Maps and associated media help in a unique way to tell stories about people, places, space, and society (see Taylor 2005; Taylor and Caquard 2006). To further illustrate and explore the potential of the cybercartographic paradigm, some innovative cybercartographic atlases have been developed.2

The production of this new generation of atlases has required the development of a framework-specific open-source software known as Nunaliit.3 The Nunaliit software is an effort to effectively synthesize newly available geographic information resources (e.g., spatial databases, sensor networks, map services) with other forms of information (e.g., multimedia, formal and informal narrative, haptics) in order to facilitate new knowledge-construction networks. One of the major strengths of Nunaliit is that it allows individuals to input information in different forms, including storytelling and other voice input, video, photographs, and text in any language. It enables community members to create their own atlas content and thus determine the way their relations to territory are portrayed. This open-source software was specifically developed in response to the theoretical shift in cartography from a supply-driven to a demand-driven approach, and it allows what were previously more passive map users to become active “map creators.” Cybercartographic atlases are designed to facilitate direct community contribution, as illustrated by the current development of three Indigenous community-based cybercartographic atlases: the Atlas of Arctic Bay, in collaboration with Nunavut Arctic College; the Kitikmeot Place Name Atlas, in collaboration with the Kitikmeot Heritage Society; and the Living Atlas of Indigenous Perspectives and Knowledge in the Great Lakes Region, presented in this article.4

The name of the software developed to create these atlases—Nunaliit—illustrates the community orientation of the project. The word nunaliit means “settlement,” “community,” or “habitat” in Inuktitut – the name given to the dialects of the Inuit language in Canada. This name was chosen for the cybercartographic framework to emphasize the community-based approach driving the development of the software in different domains: (1) open-specification approaches, (2) modularity, (3) “live” data, (4) geospatial storytelling, and (5) audio-visual mapping.

Indeed, the Nunaliit software is an effort to produce a cartographic development environment that supports integration of geographic information through open specifications. Open-specification approaches are required to ensure interoperability between remote data and information sources, a key element for sharing geospatial information among users and communities over the Internet (see Kresse and Fadaie 2004; Pulsifer and others 2008). The creation of the Open Source Geospatial Foundation (OSGEO) by community members from several open-source geospatial projects was intended to support the development of community-based projects such as cybercartographic atlases. The systematic use of open specifications in cybercartographic atlases will ensure the interoperability of these atlases and their potential interaction with other open-specifications data and applications – such as live remotely sensed data through GeoRSS feed – and facilitate their long-term sustainability.

The term “modularity” can have different meanings in cartography. In cybercartography, a content module is a component of the atlas containing cartographic, narrative, and multimedia elements for the purpose of examining a particular question, topic, area, or phenomenon related to a geographical area. Examples of content modules of the Indigenous Atlas of the Great Lakes Region are described in Part 3 below. Developing content in a modular way enables community members (individuals, groups, or organizations) to contribute to the process in the context of their individual discipline, technical capacity, or institutional framework. The concept of modularity is central to a community-based approach and to the
Cybercartographic Atlas Framework (Pulsifer, Caquard, and Taylor 2006). It is appropriate for small groups and communities because it allows them to develop their own specific content (Nyerges 2005). A cybercartographic atlas aggregates several interrelated and evolving modules. Community members can modify existing modules or create new ones. Furthermore, the modules can be fed with remotely sensed live data, such as ice thickness or current temperature, as illustrated in the introduction module of the Atlas of Antarctica. In this respect, the cybercartographic atlas can be considered a “living” atlas. Once an atlas has been launched, it is hoped that community members will continue to be involved and will further develop their atlas in a way that benefits them. Module development is facilitated by technology that allows people to integrate and render live geospatial data and to combine it with canned data, operations, and narrations. As Brian Greenspan and others argue, this “manner of integrating live information and non-trivial navigation within narrative structures points toward new ways of involving users in exploring digital environments, a key principle of cybercartography” (2006, 36).

Atlases are not only scientific representations of geographical elements; they can also be seen as narrative forms that tell stories and stimulate imagination (Wood 1987). Maps can generate and support narratives; they are tied to emotions, memories, and adventures in a variety of ways, as illustrated by the concept of “affective geovisualizations” (Aitken and Craine 2006). The importance of the narrative dimension of cybercartography has been emphasized by Greenspan and others (2006) in their research on live hypernarrative and cybercartography, following the work of Martin Dodge and Rob Kitchin (2000) on cyberfictions and future “spatialities” of cyberspace. The integration of geospatial storytelling tools and concepts in cybercartographic atlases is particularly relevant in the context of Indigenous knowledge, enabling local communities to tell their own stories, in their own languages, and narrations. As Brian Greenspan and others argue, this “manner of integrating live information and non-trivial navigation within narrative structures points toward new ways of involving users in exploring digital environments, a key principle of cybercartography” (2006, 36).

Verbal expressions, accent, pace, cadence, and emphasis are characteristics of spoken language that should be valued and are, in many instances, difficult to separate from the “content” of speech (or are at least difficult to translate into written form). Where it is deemed important for users to be able to access printed material related to recorded voices, short summaries or complementary texts that elaborate or amplify, in some way, the spoken segments might be an alternative to verbatim transcriptions that tend to diminish the unique characteristics of vocal performance. (2005, 397)

Nunaliit, then, can be defined as an open-source, open-specifications software developed for designing modules of multi-sensory cybercartographic atlases that are constantly evolving in order to enable compelling geospatial storytelling of the past, present, and future of communities. In other words, Nunaliit provides most of the functionalities required for Indigenous communities to develop and maintain their own cybercartographic atlases.

3. The Living Cybercartographic Atlas of the Indigenous Perspectives and Knowledge in the Great Lakes Region

3.1 Context

The territory covered by the Cybercartographic Atlas of Indigenous Perspectives and Knowledge of the Great Lakes Region is a potentially dynamic entity that can change as a function of the involvement of different communities on either side of the border between Canada and the United States. In the context of the pilot project presented in this paper, the preliminary focus of the atlas is on the central and northern parts of the province of Ontario.
The process of creating the pilot version of this atlas has involved the collaborative participation of a broad community, including academics (geographers, cartographers, historians, and anthropologists), subject specialists, Aboriginal community members (including artists, elders, political representatives, scholars, and educators), and software developers. Its first goal is to present previously excluded knowledge and to gather dispersed historical artefacts from many digital sources such as museums, archives, and private collections. These artefacts serve to contextualize the current social, geographical, and cultural situations of Indigenous communities; the atlas is as much about the past as it is about the present and the future of these communities. The Great Lakes Atlas serves as a gathering place for this material and enables community contribution of geographically relevant video/audio content in order to preserve this knowledge and heritage in a non-dominatory manner that is acceptable to the contributors. In all cases, community collaborators were consulted about the form their input would take in the atlas and, more generally, about the shape and direction of the atlas itself; content was added, in its various forms, only with the approval of the individuals concerned.

The second goal of this atlas is to translate this unique knowledge into highly interactive multimedia and multi-sensory narratives for broadly educational purposes. Transmitting this knowledge is often difficult within the communities involved, as young people do not always fully appreciate its value in their current environment. New technologies, including multi-sensory and multimedia techniques, are seen as a way of improving the transmission of knowledge across generations in Indigenous communities by engaging young people in new ways. In a wider context, these new narratives could inform high school students of the uniqueness and richness of Aboriginal knowledge and artefacts, as well as their relevance in understanding current social and environmental issues. That said, it is acknowledged that the knowledge, understanding, and stories encoded in the atlas have been re-contextualized into the modular spaces of the cybercartographic atlas. According to the revisionist perspective, such recontextualization can be a good thing, insofar as the atlas space has the potential to become a “third space” in which multiple ontologies can begin to be presented “based on a performative rethinking of knowing and mapping” (Turnbull 2007, 141).

In pursuit of these two goals, the atlas is structured around two major entities: a “living” geospatial database and a first set of learning modules that translate the data from that database into highly interactive multimedia and multi-sensory narratives for educational purposes. The cybercartographic infrastructure allows individuals and communities with an Internet connection to access the system, add information to it, or customize information for their own use. It allows community members to input information in their own language through voice input (including storytelling), video, photographs, documents, and other data formats. This “living” geospatial database is seen as a way of encouraging ownership of the atlas by community members and of ensuring continual updating and addition of new material.

To demonstrate the potential of the cybercartographic infrastructure, a first set of modules has been developed. The Treaties Module focuses on the historical and geographical dimensions of the Lake Huron Treaty of 1850, while the Culture Module deals with several culture-related sub-themes, described below. These modules illustrate both the potential of and the challenges for cybercartographic atlases in presenting complex Indigenous worldviews.

### 3.2 The Treaties Module

The Great Lakes Treaties Module is being developed to help understand evolving treaty relationships. As a cybercartographic space for collaborative knowledge making, this module takes a community-oriented approach to understanding evolving treaty-based relationships, including relationships between people, between people and institutions, and between people and “the land.”

The Treaties Module focuses on one specific treaty in order to provide the most comprehensive coverage possible, with the intention that this example will serve as a model for future modules to learn from and build on. It begins to tell the story of the Lake Huron Treaty negotiation, signing, and survey processes via the cybercartographic presentation of archival documents and artefacts, through the active involvement of an initial group of First Nations community members in the Lake Huron Treaty region and beyond and with contributions from other community members. Among the module’s aims are to achieve a context-sensitive understanding of the Lake Huron treaty-making process, to foster an awareness of the value of archival documents in understanding past events, and to present these documents in new and non-dominator ways.

With the development of the Treaties Module came the development of a module-specific pioneering knowledge-making community. Each member of this small but growing community contributed a unique perspective on Lake Huron Treaty historical geography, and all shared an interest in having their perspectives expressed in the atlas. The Treaties Module designer became positioned both as a mediator and as an equal participant in the process of creating a cybercartographic geo-narrative (or historical geographical story) of the Lake Huron Treaty negotiation, signing, and survey processes. Moreover, throughout the knowledge-making process, “community” was construed broadly to include all...
interested people who became involved in one way or another in the project and who were sympathetic to a non-dominatory approach to knowledge construction, including Lake Huron Anishinaabe, academics, technical specialists, and people at the grassroots level. These collaborative efforts were deeply relational, in that they involved the emergence of a new network of “investigative colleagues,” in contrast to the more traditional “researcher/researched” paradigm of investigation. Moreover, the investigations were relational in nature, in that they centred on the goal of coming to a better understanding of the evolving historical geography of Lake Huron Treaty–based relationships instead of “studying” one particular group of people or the other as research subjects.

The Treaties Module was not always focused on the Lake Huron Treaty region. At the beginning of the project, the module designer was working with a fairly loose geographical definition of the Great Lakes region and did not limit the study to the Canadian Great Lakes region or to any other jurisdictionally demarcated geopolitical entity. Because this was a project to develop sample content, however, it became apparent that after a certain period for preliminary background research, a decision would have to be made with respect to historical and geographical focus.

Several months into the research project, the module designer was referred to a paper by Michael Marlatt, “The Calamity of the Initial Reserve Surveys under the Robinson Treaty” (2004), that includes a relatively detailed description of the extended survey process for the Lake Huron and Lake Superior region treaties of 1850. An Anishinaabe Lake Huron Treaty region historical researcher had recommended the paper, and, after reading it, the designer was sure that the story of the Lake Huron Treaty signing and survey process would serve as ideal sample content for the Treaties Module: a perfect example for a cybercartographic geo-narrative designed to include previously excluded worldviews. Marlatt’s paper is particularly instructive for a number of reasons, including the fact that it is based on land-claims research conducted by the author on behalf of one of the signatory First Nations and the fact that it provides a critical examination of the survey process from a surveyor’s perspective. Marlatt describes the political and economic context of the treaty signing and survey processes and, drawing on the original surveyor’s reports, includes a nation-by-nation narrative tabulation of the various errors and omissions in the surveys themselves.

From this point, the module designer began to construct an interactive map based on Marlatt (2004). During this process, she initiated telephone contact with the chief representatives (the gimaahs) of the treaty’s signatory communities, in addition to contacting Marlatt himself and making connections with academics in the Ontario treaty research community and with archival specialists. In all cases, she described the cybercartographic atlas framework and the post-colonial approach of the Treaties Module and followed up by e-mailing a letter describing the project. It was quickly determined that it would be unreasonable to expect to develop collaborative investigative relationships with representatives from all 17 signatory communities in the space of several months, especially since doing so would involve community visits. Therefore, the developer decided to continue building the collaborative investigative relationships that had begun to develop with the gimaahs (and one band councillor) in four signatory communities spanning the range from east to west of the Lake Huron Treaty region. Throughout this process, collaborations involved the mutual sharing of a variety of knowledge in various forms, including historical texts, stories, and maps.

In February 2008, the Treaties Module designer made a trip to the Lake Huron Treaty region to visit with the community representatives who had begun to engage enthusiastically with her in the collaborative investigations. Although the designer had spent several months prior to her visit speaking by telephone with the people she would visit in February, this trip was the first face-to-face start toward relationship building between the designer and the various Lake Huron Treaty region community representatives. Much of the visit was devoted to discussing the vision and potential of the Treaties Module with the Anishinaabe community participants. During this process, the perspectives of the module designer and the participants often merged. That merging is reflected not only in the current messages and language used in the sample content of the module but also in the potential content that awaits entry into the atlas in further intended iterations of its development. Indeed, much of the historical, geographical, and cultural knowledge that emerged from these collaborative investigations remains “unmapped,” since it goes beyond the initial scope of the one-year atlas sample content project. However, the important points are (1) that recognition of a common vision allowed the module designer to tie together – in the form of a conceptual map – the variety of knowledge and understandings that had emerged from the collaborative investigations; and (2) that these collaborative investigations involved discussions of the forms this “map” would take in future developments of the Treaties Module of the Great Lakes Atlas.

Approaching this interactive mapping process from a combined deconstructive and collaborative mapping perspective, the designer had in mind the idea of looking at old maps in new ways by including previously excluded information – excluded not only from maps but from general knowledge of “the history” itself. The construction process for the pilot version of the Treaties Module
was exploratory and experimental. Similar to the decolonizing methodologies discussed by Linda Tuhiwai Smith (1999), this process was not “preordained” by any Western scientific method but remained open to the insights and directions of the Anishinaabe representatives from the treaty’s signatory communities and involved the rhizomatic development of relationships. 10

The collaborative community research approach adopted in the making of the Treaties Module is consistent with the aims of deliberative democracy11: to enhance mutual understanding in deliberative activities in a way that respects the identities and the preferred modes of expression of all participants. In this context, the Treaties Module can be viewed as a cybercartographic space for deliberative democratic interaction and education that acknowledges and incorporates a broad view of rationality similar to that of Iris Marion Young in Inclusion and Democracy (2000). Young challenges the narrow conception of rationality often employed in democratic deliberations, which she claims tends to exclude or diminish the significance of such forms of communication as greeting, rhetoric, and narrative.

This introductory sample of the Treaties Module has four “sub-modules” or parts: (1) Spirit; (2) Welcome; (3) Background; and (4) Survey Journeys, which includes three interactive maps titled (a) “1851 Enroute,” (b) “1851 In the Field,” and (c) “1851 Return.” The Spirit sub-module represents in a story form the spirit and intent of the Treaties Module: to put together the various parts of the Lake Huron Treaty process story in a way that enhances awareness of the ethical aspects of its many interrelated dimensions and can contribute to knowledge of how to engage in healthy and fair treaty relationships today. As a space for bringing together a range of perspectives on the historical geography of the Lake Huron Treaty, the Treaties Module attempts to enhance awareness by drawing attention to some important political, economic, and sociocultural sites of contestation that have both characterized and affected Lake Huron Treaty–based relationships over time. The Welcome sub-module reminds people that the incomplete survey process is just as important as the signed treaty document itself (see Figure 1). It draws attention to the existence of different perspectives and identifies at least four important aspects of “good” treaty relationships: fairness, balance, care, and mutual understanding.

Restoring the Balance is a frame in the Welcome sub-module that introduces two methodological concepts in a preliminary fashion, in anticipation of further work. First, it describes how the interactively mapped survey journey allows the map user to “track” the surveyor as the journey is recounted in his diary. This process is metaphorically linked to Aboriginal approaches to tracking and will be further developed as part of a related doctoral research project. The module designer was inspired to begin exploring the tracking concept after reading an account of tracking by a non-Indigenous person who tells the story of how he learned

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Figure 1. The introductory page for the survey section of the atlas’s Treaties Module

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the “science and art of tracking” from an Apache elder (see T. Brown 1999). This approach to tracking teaches one to perceive the thoughts, feelings, and intentions of “the tracked” as its trail is followed across the earth; in an important sense, it is a metaphor for interpretative narrative analysis. When the designer mentioned this concept to one of the community collaborators during a community visit, he provided her with his interpretation of provincial land surveyor J.S. Dennis’s thoughts, feelings, and intentions as the surveyor and his party drew the corners and marked the lines for that particular reserve. He did this both while driving along the original reserve perimeter and while examining the interactive map “1851 In the Field.” It is this type of interpretation that remains to be explored in further developments of the module.12

Second, the sub-module mentions how the process of putting the Treaties Module together involves a circular, holistic, or iterative method, which ties in with the holistic and iterative nature of cybercartography itself and with traditional Indigenous “circle society” approaches to knowledge (Sioui 1999). In addition, the Treaties Module could continue to reflect a circular or holistic design structure if it is further developed in the future, with the mapped survey journey as the core and a variety of interrelated dimensions circulating the periphery and interacting with the core (e.g., “side stories” that reflect social, economic, and political conditions). This dynamic methodology, which evolves as the story unfolds, is what enables this cybercartographic mode of presentation to provide a unique understanding of such complex social and economic processes as the Huron Treaty process, a process that continues to this day.

The Treaties Module involves a time-lined account of some relevant historical background to the Lake Huron Treaty survey journey process. Heidi Bohaker, a professor at the University of Toronto and author of a PhD dissertation titled “Nindoodemag: Anishinaabe Identities in the Eastern Great Lakes Region, 1600–1900” (2006), contributed the historical content up to and including the description of events in the 1830s. The history between the 1840s and 1851 is based on significant background events identified by Marlatt (2004). Featured in this section is a portion of video in which Gimaah Art Petahtegoose of Atikamekweng Anishnawbek provides a description of the Anishinaabe concept of *gimaah*, which is notably different from the English translation “chief.” This video illustrates the ability of the cybercartographic atlas to display contrasting perspectives with different media. It would be good to expand this background portion and other portions in order to contribute to a fuller understanding of the Lake Huron Treaty Process (e.g., biographies; “maps” of the institutional-regulatory structure and of interpersonal relationships; offices of the various government officials; and maps portraying such things as travel conditions, existing and emerging “development” activities, trade, and other relations).

Since the survey process and its registered results were just as integral to the treaty process as was the signed document itself, the core of the Treaties Module is the Survey Journey. This sub-module involves “bringing to life,” in a multimedia, interactive online format, the diary of J.S. Dennis, provincial land surveyor, for the surveys of the reserved lands described in the Lake Huron Treaty (Dennis 1851, 1853). This is done partly through three interactive maps highlighting the first year of a two-year survey process to formally define the boundaries of the reserved lands that were generally specified at the treaty signing.

The first map is a series of camp stops set against a standard settlement map, which tells a story in itself and illustrates the potential for maps in general as effective narrative vehicles. This standard government settlement map was chosen for a variety of reasons, including the fact that it shows Dennis and his party leaving the settled and “jurisdictionally demarcated” north shore of Lake Ontario and travelling through entrenched settler territory toward what is clearly marked as “Indian Territory” on the map. To further reinforce the “uncharted” nature of these lands, artistic images of “Indians” engaging in “Indian activities,” together with the “wild life” of the area – notice the wood buffalo – are included where there is a lack of survey information (see Figure 2). These maps engage in tracking in the most basic of ways in an effort to provide an initial basis for more detailed and interpretive tracking exercises in the future. They show the places identified by Dennis as places where he camped while on his journeys to “mark the corners” and “draw the lines” of the reserved lands indicated in a general way in the treaty. The diary entries associated with the stops are included to the right of the map, together with an audio clip of a voice representing Dennis. The diary entries are transcribed from Dennis’s original handwritten report.

Several educationally oriented extensions are possible for future developments of the Treaties Module. For example, a geo-narrative adaptation of Marlatt (2004) could be coordinated with Dennis’s map stops to illustrate one way of reading the archival survey documents critically from a surveyor’s perspective. This atlas module could also include a critical “mapped” presentation of the legislative and policy paper trail that attended the conception, crafting, and signing processes for the treaty in addition to the survey process itself. An appreciation of the historical and geographical context of the Survey Journeys could be presented by including biographies of individuals involved in the process, profiles of significant places and their histories, illustrations and descriptions of surveying techniques and instruments of the time,
and a treatment of modes of travel and travel conditions during the 1850s, when the survey process took place.

The process of preparing the initial sample content for the Treaties Module represents the first iteration of a revisionist approach to mapping that is at the same time performative (Del Casino and Hanna 2006). Further iterations will involve overlaying several critical components, including a range of stories, interpretations, and analyses from the broadly defined community, on the interactive Survey Journey maps.

3.3 THE CULTURE MODULE

The Culture Module currently has two main components, one focusing on contemporary Aboriginal arts of the Great Lakes region and the other taking a series of early-twentieth-century photographs as a point of departure to explore the cultural heritage of the Six Nations of the Grand River reserve. While the former draws primarily from the recent work of practising artists, the latter creates links between the past and present by connecting historical photographs to living traditions and communities today. This section is notable because, unlike many other parts of the atlas to date, it works primarily with members of the Haudenosaunee community who share a distinct set of core values, histories, and geographies that is different from that of their Great Lakes Anishinaabe counterparts. Both sections are geared toward engaging Aboriginal artists, community members, and high school students in developing and expanding on the existing module, and each provides a new perspective on how to incorporate diverse communities into the cybercartographic atlas, be they literal communities of Indigenous peoples or imagined communities of Indigenous artists. A third section telling the story of the origin of Mindemoya Island in Mindemoya Lake on Manitoulin Island has also been added to this module.

The component that centres on the Haudenosaunee (formerly known as Iroquoian) community of the Six Nations of the Grand River reserve builds on a series of “fieldwork portraits” taken between 1911 and 1918 by Geological Survey of Canada (GSC) ethnographer Frederick Wilkerson Waugh. Waugh’s journey from the Victoria Memorial Museum (now the Museum of Natural History) in Ottawa to the Grand River community is plotted on a contemporary map of the region (see Figure 3). Users are invited to enter the map through either location (as well as through other destinations, which have been georeferenced so that communities can later develop their own content on the same map). Contextualizing Waugh’s work according to the sites as well as the dates of his research invites students to consider the production of knowledge in both temporal and spatial terms.

Entering the map via the museum, atlas users can explore information on Waugh, the GSC, early anthropology, and the changing shape of museum research and ethnographic collecting practices. Users are also invited to learn how to “read” historical photographs in the present and are introduced to some of the issues to consider while

Figure 2. Interactive map for the “en route” portion of the survey journey set against 1846 settlement background map.
navigating the module. Entering the map at the Six Nations of the Grand River reserve, users are greeted by a series of interrelated “photo stories” interweaving Waugh’s portrait photography, journal entries, data collection, and sketches with images and information about the cultural artefacts the photographs contain, narratives of the people depicted, supplementary educational material, and links to additional sources. Waugh’s keen interest in Indigenous knowledge and specifically in Iroquoian technologies, such as the cultivation of crops and the tools used to harvest and prepare food, has greatly benefitted this aspect of the module. Included in his series of photo-based narratives are well-documented cultural practices from the early twentieth century, including the five stages of splint basket-making; a section on food preparation, from the field to the table; and a segment on sports and games, complete with detailed information on how the traditional equipment was made as well as the traditional rules of play. These “photo stories” not only provide a way in to understanding a synchronic moment in Haudenosaunee culture but also illuminate the various transformations the community has undergone over the last century, as well as highlighting many of the continuities the community maintains. For example, one part of the sports and games section focuses on the longstanding Snow Snake tournament, a Haudenosaunee winter sports event that was documented by Waugh and is still held each year in the community. By documenting both the traditional and the contemporary practice of the sport in terms of the rules of play, the equipment used, and even the geographical location of the event within the community, the module serves as an online multimedia and multi-sensory repository for the gathering, preservation, and transmission of this and other forms of Indigenous knowledge, in addition to the primary concern of recovering information about the social life of the community in the 1910s. This section of the Culture Module has been guided by world-renowned Iroquois/Onondaga photographer and curator Jeff Thomas, whose work has previously considered the anthropological photography of Waugh and other GSC ethnographers in two recent curatorial projects: Emergence from the Shadow: First Peoples’ Photographic Perspective, at the Canadian Museum of Civilization, and Aboriginal Portraits from the National Archives of Canada. In these exhibitions Thomas mined the archives of non-Native visual and written records to recover the Aboriginal histories and narratives obscured by the anthropological perspective. In the Culture Module, this section focuses specifically on the Haudenosaunee community, whose members will be able to interact directly with these photographs, making notes on the image contents, inserting genealogical and other connections, and uploading their own text, images, and audio/video clips pertaining to the

Figure 3. Frederick Wilkerson Waugh’s journey from Ottawa to the Six Nations of the Grand River community in the second decade of the twentieth century, plotted on a contemporary map of the region
historical works. This high degree of interactivity facilitates the reinterpretation of these historical photographs by community members who, like Thomas, are able to "mine" the images for personal and collective significance. Furthermore, it will facilitate understanding across Aboriginal and colonial cultures of the Great Lakes region, whose present-day composition includes a complex intermingling of First Nations, Métis, and Inuit peoples as well as the descendants of settlers, new immigrants, and other Canadians. These diverse peoples can use the atlas to learn how to "read" the anthropological photographs to develop a greater understanding of Haudenosaunee culture as well as of the practice and intent of anthropological photography.

This is important because, despite the problematic history of anthropological photography and Indigenous peoples (Edwards 1992), fieldwork portraits such as those taken by Waugh often contain information valuable to Aboriginal communities, and much productive work has been done by bringing these images back to the communities of their making (Brown and Peers with Kainai Nation 2006; see Figure 4). The photographs facilitate the shifting of focus from the original intent of the images (anthropological, colonial, empirical, etc.) to familial and collective connections, providing opportunities for contemplation and critique that, because of their democratic dissemination through the online, publicly accessible cybercartographic atlas, have the potential to lead to new understandings that can be separated out from past intentions:

Photographs, whether of people or of artifacts, have the same capacity as artifacts to evoke knowledge, spark lively debates on the identity and stories of the people or makers involved, and the cultural knowledge and intention encoded in them, and function as links between past and present. (Peers and Brown 2003, 6)

Museum and archival collections, in exchange, gain fresh meanings and acquire new interest for the community and the public alike when viewed through the eyes of members of the source community (Clifford 1997; Dunstan 1999).

The contemporary art of the Great Lakes is highlighted in a section of the Culture Module titled the "WikiArtists Map" – an interactive forum for contemporary Aboriginal artists to share their artwork with Aboriginal students and with the world. The WikiArtists Map invites First Nations, Métis, and Inuit artists who live in the Great Lakes Region, or who have created work in or about the region, to upload their biographies, artworks, and artists' statements to a map of Ontario. This section creates linkages between art and space by allowing artists to link specific works to any number of places on the map, including communities, landmarks, homes, sites of creation, or other sites of interest (see Figure 5). The multimedia and multi-sensory works in the sample map

Figure 4. Despite the problematic history of anthropological photography and Indigenous peoples, fieldwork portraits such as those taken by Waugh often contain valuable information to Aboriginal communities.
provided so far include paintings by Kim Hayden, the abstract canvases of Métis artist Jason Baerg, recent installation work by Frank Shebageget, digital manipulations by Métis new-media artist Rosalie Favell, photography by Onondaga/Iroquois artist Jeff Thomas, and sculpture and site-specific works by artist Maria Hupfield. Even if this section is currently less developed than originally expected (see Part 4 below), it enables other artists to upload their art and information on their own, filling in the map of Ontario with the multimedia works of contemporary artists from across Ontario and the country.

The Living Cybercartographic Atlas of Indigenous Perspectives and Knowledge provides an exciting forum for this complex and multivocal interaction between Aboriginal artists, scholars and educators, source communities, and the cultural institutions that hold these artefacts, art forms, images, and archives. However, the potential of this atlas to provide such a base will be realized only if community members are willing to contribute to its development and if they are given the appropriate support. It is here that a more critical reading of this pilot project must be provided.

The third section of the Culture Module features the Nenboozhoo Mindemooye Story. The atlas presentation of this story is based on two audio-taped interviews conducted in 1998 and 1999 between Alan Corbiere, director of the Ojibwe Cultural Foundation, and elder Johnny Debassige from M’Chigeeng. This story describes the origin of Mindemoya Island, located in Mindemoya Lake on Manitoulin Island. According to this story, Nenboozhoo was in the Lake Erie region playing all kinds of tricks on people in all sorts of ways. Eventually, the people chased him out and he ran away, heading for Manitoulin Island, carrying his grandmother on his back. After travelling across the water from the Bruce Peninsula to the southern shore of Manitoulin Island, Nenboozhoo began to run toward Mindemoya Lake. Finally, he could no longer carry his grandmother; when he reached the lake, he threw her into it. She became what is today called Mindemoya Island: “Enh, mii ‘mindemoya’ enji-zhinkaadeg. Mii dash [Yes, that is why it is called Mindemoya]” (Johnny Debassige speaking in Anishinaabemowin; English translation by Alan Corbiere).

In the atlas, this journey has been rendered through a multimedia map showing the different steps of Nenboozhoo and his grandmother (see Figure 6). Audio files of Johnny Debassige telling the story in Anishinaabemowin have been added, along with English translations by Alan Corbiere. The combined Anishinaabemowin/English translated text enables the story to remain in its original language while at the same time making it accessible to a wider audience.

4. Discussion and Critical Perspectives

This section offers a critical perspective on the achievements of the pilot project described above. While some of
the outcomes went beyond the original expectations, others fell short. Discussing the assets and limitations of the project is certainly part of the revisionist context of this research, as such a discussion could serve as a reference for future mapping projects as well as for the future development of this atlas.

As discussed previously, the “living” dimension of the Great Lakes Atlas is directly related to the interoperability achieved through the use of Nunaliit, in addition to the interpersonal interactions that go into content development. Indeed, the most important part of the “living” dimension of the atlas is to ensure that the content is continually updated, commented on, and generated by members of the communities involved. Theoretically, this can be done by developing new modules (or sub-modules) as well as by modifying existing modules. In practical terms, individuals interested in defining and developing the existing version of the atlas face several challenges, as illustrated by the Nenboozhoo Mindemooye sub-module.

The Nenboozhoo Mindemooye Story is a geo-narrative about place and memory (see Part 3 above). The rendering of this story recognizes and integrates the performative dimension of Indigenous cartography, in part through an interactively mapped presentation of a journey based on the telling of an oral story. In this story the protagonist, Nenboozhoo – the perennial spirit trickster – travels from his point of departure to his destination, leaving dramatic geo-morphological evidence of his journey along the way – Mindemoya Island being a prime (but not the only) example. Georeferencing of significant points on the map was based on approximate locations corresponding to places the Anishinaabe photographer remembered being when he took the photos and on the locations of the geographical features mentioned in the story. This geo-narrative combines two perspectives from within a local community: an elder’s knowledge of the traditional story and the Anishinaabe language is integrated with the photographic perspective of a younger Anishinaabe person from the same community and his translation of the story into English, as well as his editing decisions concerning the creation of audio clips from the story to match the written text, which was provided in both Anishinaabemowin (Ojibwe) and English. Production of the content for this module, then, can be considered a cross-generational effort.

In the context of the atlas, a second level of translation had to be implemented, from the original oral cartography into a visual map, using geospatial technologies. To some extent, the rendering of the Nenboozhoo Mindemooye Story bridges two generations within a community, as well as bridging this community with the Western world, by integrating different forms of cartographic expression: the oral/aural and the visual; the traditional and the technological; the non-Western and the Western.

Figure 6. The Nenboozhoo Mindemooye Story – available in the Ojibwe language and in English – tells the story of the origin of the Mindemoya Island in Mindemoya Lake on Manitoulin Island.
This Western materialization of oral cartography can also be considered a first step in the recognition of the cartographic dimension of this alternative form of Indigenous cartographic performance, which is often overlooked (see Sparke 1998). It can be seen as an opportunity to make this knowledge accessible to a broader audience by translating it into a more widely understood form of visual representation. As Mark Warhus points out, this kind of graphic document from aural culture can “open a window on the rich multidimensional landscape shaped by history, geography, human belief and experience, and an ever-present spiritual world” (1997, 3). Further, the aural and graphic forms of expression can support one another, insofar as acknowledgement of the Indigenous presence can be accomplished by merging the Native landscape and Western technologies and landscape (Warhus 1997). This merging allows Indigenous groups to uncover their own culture and language as well as to link it to the land through the map. Beyond the story of Nenboozhoo, it is the historical presence of Indigenous groups, cultures, and languages that is being materialized in this module. Reconnecting this presence with experiences and memory is “as important a task for Indigenous communities as saving tenure to the lands upon which this knowledge is written” (Johnson and others 2005, 90). In this context, the Culture Module contributes to making this presence visible by using the strengths of technological scientific cartography to welcome non-Western cartographies.

Despite the liberating potential of the module, however, it is possible that it could be viewed as yet another example of the use of Western cartographic technologies to colonize the cartographic traditions of non-Western people (see Turnbull 1998). Indeed, the visual result of this module as a “hi-tech” form of mapping “communicates a geography of modernity, universality, detachment, and placelessness” that Pearce considers “a visual language more commonly used not to portray place, but to erase it” (2008, 19). As a series of revisionist interactive mapping projects, the Great Lakes Atlas carries with it the acknowledgement of the potential for Western domination and the erasure of non-Western knowledge. At the same time, work on the atlas has involved attempts to mitigate this unwanted potential through the critical involvement of community members in the project.

Developing any form of community-based atlas requires engaging communities in developing a critical consciousness about cartography, which, in turn, requires “a commitment by Indigenous communities who choose to engage Western cartographic technologies” (Johnson and others 2005, 93). A major impediment in this pilot project was the partial nature of this commitment, which was due to several factors. First, the short-term, one-year duration of the project did not allow enough time to facilitate extensive involvement of community members.

Building relationships takes time, and such relationships are a prerequisite to any longer-term project. In essence, there was only enough time to make a start on building some of these relationships. Relatedly, the research funding structure allowed for only a few brief visits; there was no technological training component in this project, so that the focus really was on developing sample content that would demonstrate the potential of the atlas and of cybertcartography in general. Second, the project was driven by the research group and not by the various community members; this meant that although members of different communities were highly involved in the project and influenced its direction and outcome, the project did not generate the strong sense of commitment required to engage individuals in learning cartographic technologies.

Drawing on the work of Paulo Freire, Jay Johnson and others (2005) insist that the production of technological maps by community members requires significant dedication by cartographers and researchers to communicate relevant knowledge, including the knowledge necessary for community members to continue building the atlas on their own terms. This educative step was not integrated into the pilot project, mainly because of its short duration. Preliminary results were presented to community members in order to get further input and direction, as well as to ensure that everyone was aware of the direction of the project and of the way in which the content was rendered. Nevertheless, such presentations did not provide the basic training required to use the technology to make further community-based contributions after the launch of the pilot atlas. If the project had been of longer duration, this educational phase would have been incorporated more explicitly, in order to guarantee the appropriation and future development of the atlas from within the community.

Another major limitation on the overall involvement of community members in the expansion of the atlas lies in the complexity of developing new modules. Nunaliit, the software used to develop the atlas, is not yet at the point of enabling individuals without advanced computer skills to use it to create new modules. For instance, the design of the Nenboozhoo Mindemooye Story required the collaboration of both the community member who brought the story and members of the Geomatics and Cartographic Research Centre who had varying degrees of familiarity with Nunaliit. Indeed, Nunaliit still requires some coding in XML to develop content modules. Enhancing usability remains the major challenge for the future development of Nunaliit at this stage. While much effort has been put into successfully developing software that allows the stable rendering of geospatial stories in a multimedia format that is interactive and easily accessible from the user
side, significant work remains to be done toward the goal of enabling any user to become familiar with the technology and easily develop her or his own module. The appropriation of new media technologies requires commitment and time to mature, as illustrated in the K-Net project developed in northern Ontario (Beaton and others 2004). The appropriation of the technology by community members is critical in ensuring the “living” dimension of the atlas. This issue has been partially addressed through the development of a wikimap application.

The wikimap component was an attempt to allow users to add, comment on, and change existing content, including text, images, and audio and video files. This component was considered a way of engaging individuals from the community in active knowledge making and knowledge sharing. More specifically, the idea was to provide a simple user interface that would allow any artist located in the Great Lakes region to link him- or herself to pieces created anywhere else in the world, and vice versa (see Part 3 above). The idea of the wikimap generated a real interest among the Aboriginal artist community, but its use has not been as successful as originally anticipated. This lack of success can be explained by various factors such as the lack of direct involvement of individual artists in the project, as discussed above; the graphical limits of the application—just like any other wiki application—which may not fulfill the aesthetic requirements of some artists; and the limits of the interface, which is not fully user friendly. Nevertheless, the somewhat marginal use of this module should not undermine its power and its potential for Indigenous mapping projects. Indeed, the ability of the wikimap to enable community-based content creation, and its relevance to this goal, is illustrated by the ongoing development of the Kitikmeot Place Name Atlas. In this cybercartographic atlas, developed by the Kitikmeot Foundation, the wikimap is constantly being used to add new places and new stories related to these places. The success of this wikimap seems to be attributable to the dedication of members of the Kitikmeot Foundation to updating and developing the content. Indeed, this project emerged originally from the community, not from the researchers.

The long-term success of a project like the Cybercartographic Atlas of Indigenous Perspectives and Knowledge of the Great Lakes Region depends on the willingness of a community to develop and manage such a project, as well as on the capacity of teams of researchers and cartographers to provide the appropriate support and to ensure the transfer of relevant concepts and technologies. From a revisionist perspective, this transfer must enable Indigenous people to represent places and territories in their own ways, including dance, performance, songs, and stories (Warhus 1997; Woodward and Lewis 1998; Sparke 1998). Despite its limitations, we are deeply convinced that the pilot project presented here is an important step in this direction. We are also aware that many more steps will be required to develop atlases that truly follow community paths and perspectives and that convey appropriately the richness and the plurality of Indigenous perspectives.

5. Conclusion

Two major dimensions characterize the pilot phase of the Living Cybercartographic Atlas of Indigenous Perspectives and Knowledge of the Great Lakes Region presented in this article. First, its evolving dimension helps to mitigate the obsolescence that can be inherent in finished or “canned” atlases. This emphasis on evolving content helps to stimulate the continued contribution of Indigenous communities to future atlas development. The modules described above constitute only a sample of the atlas’s potential. Future developments will depend on the involvement of individuals and communities, as well as on the capacity of cartographers and researchers to simulate this involvement through an appropriate transfer of concepts and technologies. Although much has been done to enable the merging of Indigenous traditional knowledge with geospatial technologies and to render appropriately the unique Indigenous understanding of places, much also remains to be done to further develop this revisionist position.

The second important dimension is shared by all cybercartographic atlases: they are designed to render geospatial storytelling. They thus offer opportunities to Indigenous communities to tell their stories in a range of forms that better fit their unique ways of understanding and relating to the land, places, and spiritual forces. The cybercartographic atlas framework allows the linking of the latest online geographic technologies with traditional knowledge. Reflecting this dimension, the Living Cybercartographic Atlas of Indigenous Perspectives and Knowledge of the Great Lakes Region offers a unique opportunity to present multiple artefacts and stories and to allow their wide dissemination through multimedia and interactive forms of geospatial storytelling. These opportunities raise some concerns, such as the impact of the decontextualization of stories and their transformation from their original oral form to a more technological multimedia form. The Great Lakes Atlas attempts to mitigate this concern by focusing instead on the positive aspects of “recontextualizing” these stories in collaboration with community members. The atlas also raises hopes by providing the possibility of archiving ancestral stories that are at risk of disappearing, making these stories available to a wide audience and contributing to the broad dissemination of Indigenous perspectives and knowledge, which can help to connect elders with youth. As William Cartwright (2004) contends, the narrative mode is of great value in conveying geospatial
information. With this in mind, Indigenous geospatial storytelling might become highly inspirational to cartographers in developing new, immersive, and memorable forms of geographic expressions.

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Notes

1. Matthew Sparke’s (2005) concept of post-foundationalism is an umbrella concept that subsumes a variety of critical perspectives, including post-structuralism, post-colonialism, and post-rationalism.


4. For information on and links to these cybercartographic atlas projects see the GCRC’s Atlases page at http://gcrc.carleton.ca/confluence/display/GCRCWEB/Atlases.

5. This treaty is otherwise “officially” referred to as the Robinson Huron Treaty. However, our discussion reflects the preference of the newly formed Lake Huron Treaty Commission to refer to it instead as the Lake Huron Treaty.


7. For example, a grassroots Internet outreach was initiated during the prototype development phase of the project. The Treaties Module designer found images taken of places in the Great Lakes region posted by a variety of people from all walks of life. When she contacted them with requests for permission to use their photos in the interactive maps for the Treaties Module and told them about the module, the response was most often positive and encouraging.

8. Michael Marlatt is a professional surveyor with a degree in Native Studies from a university in the Lake Huron Treaty region.

9. In one case, a band councillor with years of treaty research experience was recommended by the band administration as the best person to discuss the Lake Huron Treaty.

10. An example of this openness is the chain of events that led the designer to revise her original idea of interactively mapping the Marlatt paper and instead to “geo-transcribe” the original survey diaries of provincial land surveyor J.S. Dennis. The inspiration for this change came after the designer participated in the mapping of the Nenboozhoo Mindemoya story (described later in this article), a traditional Anishinaabe story about the origins of Mindemoya Island told by a M’chigeeng elder. The experience of listening to the Nenboozhoo Mindemoya story while at the same time constructing a trail over land and water of Nenboozhoo’s travels led the Treaties Module designer to attempt the same sort of journey mapping with the survey diaries.

11. Deliberative democracy does not necessarily presuppose a capitalist model of economics, nor does it prioritize the notion of private property. Rather, it allows for the possibility that these are contested concepts subject to fair and inclusive “democratic” deliberations. For more complete accounts of deliberative democracy see Young (2000); Gutmann (1996, 2003); Gutmann and Thompson (2002, 2004); Crocker (2008); Fung and Wright (2003); and Richardson (2002).

12. See also David Turnbull’s (2007) discussion of a hodological approach to mapping that by definition includes an explicit focus on trails.


References


**Archival Sources**

Ministry of Natural Resources [MNR], Toronto, Ontario Crown Survey Records

Field Note Book (FNB) 832, Report, Diary and Field Notes, Survey of the Indian Reserves on Lake Huron, Vol. 1, J.S. Dennis, 1851

Field Note Book (FNB) 828, Report, Diary and Field Notes and Survey of the Indian Reserves on Lake Huron, Vol. 2, J.S. Dennis, 1853