

EPISTEMOLOGICAL INEQUALITY: ABORIGINAL LABOR AND KNOWLEDGE IN THE
GEOLOGICAL SURVEYS OF GEORGE MERCER DAWSON, 1874-1901.

by

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ABSTRACT

Historical studies of Canadian science often ignore the assistance that Aboriginal people provided to frontier scientists. Monographs and biographies detailing the extraordinary career of Canadian geological surveyor George Mercer Dawson in the late nineteenth-century subsume the role that Aboriginal people played in his explorations. Postcolonial scholarship dealing with science criticizes the low epistemological status that scientific explorers accorded to Aboriginal knowledge, but neglects how collaboration between Aboriginal people and scientists influenced the knowledge that they produced in the New World. Dawson's journals, technical notes, and scientific publications detail the numerous types of physical and intellectual labor that Aboriginal people contribute^{4d} to his surveying expeditions in western Canada, particularly British Columbia, Alberta, and the Yukon. Using Aboriginal guides, general laborers, and informants enabled Dawson to cover substantial amounts of terrain during short surveying seasons, avoid hazards and delays, make ethnological observations, and record information on regions that he did not personally visit. Despite borrowing substantial amounts of knowledge from his Aboriginal guides and informants, Dawson did not equate Indigenous knowledge with scientific epistemologies. Dawson extracted the knowledge that Aboriginal people supplied him with from its epistemological packaging, but frequently acknowledged the Indigenous origin of his information, even in highly specialized scientific publications. Dawson's work, then, serves as a powerful reminder of Aboriginal contributions to science produced during the exploration of North America.

TABLE OF CONTENTS

ABSTRACT.....	ii
TABLE OF CONTENTS.....	iii
LIST OF FIGURES.....	iv
ACKNOWLEDGMENTS.....	v
DEDICATION.....	vi
INTRODUCTION.....	1
LABOR.....	6
INDIGENOUS KNOWLEDGE.....	22
‘TIME IMMEMORIAL’: SCIENTIFIC EPISTEMOLOGIES AND THE ERASURE OF INDIGENOUS KNOWLEDGE.....	36
CONCLUSION.....	47
BIBLIOGRAPHY.....	48

LIST OF FIGURES

- Figure 1 Unknown, “Map by Indian ‘John’, a Takish, 18 Sep 87. At L. Lindeman.” Library and Archives Canada, Field Notebooks of G.M. Dawson, 1887, Notebook #2762, 8th inserted page.....24
- Figure 2 G.M. Dawson, “Haida Indians of Ya-Tza Village, Graham Island, Queen Charlotte Islands, B.C. Chief Edenshaw Standing Second from Left.” 23 August, 1878, Library and Archives Canada, a038154.....44

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DEDICATION

For my parents

INTRODUCTION

Aboriginal people have been alienated from the story of the development of science in Canada. Their absence is especially apparent in the polarized arguments that have been made about one of Canada's most famous scientists, 'rock star' George Mercer Dawson. Dawson was an extremely well-respected geologist who worked in and eventually directed the Geological Survey of Canada (GSC), the country's most prestigious scientific institution in the late 19th century. Between 1875 and 1901, Dawson mapped vast portions of western Canada, and collected extensive data on the resources, geological formations, species complements, and ethnologies of British Columbia, the Yukon, and Alberta. Some chroniclers have celebrated Dawson as a heroic pioneer – the 'little giant' who overcame physical disabilities (a hunched back and extremely short stature resulting from a childhood disease), braved harsh western landscapes, befriended the natives, and promoted Canadian science.¹ Alternately, Dawson has been rebuked as a racist agent of colonialism who ignored Indigenous epistemologies, belittled Native cultures, and justified the appropriation of Indian land.² Both arguments have some merit but are dangerously condescending to the Aboriginal people who assisted Dawson's scientific explorations in their territories. Historians have failed to take the contributions that Aboriginal people made to Dawson's surveys

¹ For works celebrating Dawson's legacy see L. Winslow-Spragge, *Life & Letters of George Mercer Dawson, 1849-1901*. (Montreal, 1962); L. Winslow-Spragge, *No Ordinary Man – George Mercer Dawson, 1849-1901*. (Toronto: Dundurn Press, 1993) J.C. Barkhouse, *George Dawson: The Little Giant*. (Vancouver: Clarke, Irwin & Company, 1974); P. Jenkins and G.M. Dawson (hereafter 'GMD') *Beneath My Feet: The Memoirs of George Mercer Dawson*. (Toronto: McClelland & Stewart, 2007); Library and Archives Canada, "The Life of a Rock Star – Hall of Fame, George Mercer Dawson." <http://www.collectionscanada.gc.ca/rock/021018-4300-e.html> (May 26, 2009); T. Rees, *Arc of the Medicine Line: Mapping the World's Longest Undefended Border Across the Western Plains*. (Lincoln: University of Nebraska Press, 2007), 137-140.

² For works discussing Dawson's role in Canadian colonialism see B. Braun, "'Buried Epistemologies': The Politics of Nature in (post)Colonial British Columbia." *Annals of the Association of American Geographers*. 87(1) (1997): 3-32; B. Braun, *The Intemperate Rainforest: Nature, Culture, and Power on Canada's West Coast*. (Minneapolis: University of Minnesota Press, 2002); D. Cole, "The Origins of Canadian Anthropology, 1850-1910." *Journal of Canadian Studies* 8(1) (1973): 33-45; J. Grek-Martin, "Vanishing the Haida: George Dawson's Ethnographic Vision and the Making of Settler Space on the Queen Charlotte Islands in the Late Nineteenth Century." *The Canadian Geographer* 51(3) (2007): 373-98.

seriously. In so doing, they imply that these contributions were not important and erase Aboriginal ownership of much of the knowledge that Dawson produced. Furthermore, they do little to advance our understanding of how European conquerors appropriated Indigenous knowledge to the detriment of Aboriginal claims to territory and dignity.³

Recent scholarship exposes the role that science played in the dark history of the European repression of Indigenous peoples. Cartographers and naturalists have drawn particularly harsh criticism, because the knowledge that they produced in colonial landscapes helped to cement empire materially and ideologically. By drawing attention to previously unexplored territories and the natural resources that they contained, scientific explorers promoted expansion and facilitated conquest along viable routes of travel. The maps and inventories of biota and geology that came out of exploration overwrote Indigenous territories with European models of empiricism, abstracted nature from culture, and transformed landscapes into the *terra nullius* that excused and encouraged appropriation. The rapid expansion of scientific knowledge that coincided with the first centuries of empire also supported Europeans' belief in their cultural (and sometimes biological) superiority. Insisting on their own cultural supremacy allowed Europeans to suggest that they deserved ownership of new territories since their advanced intellect enabled them to transform these landscapes productively. Most disturbingly, the seemingly benign impulse of scientific investigation shrouded the imperial context in which explorers operated, obscuring the damage that frontier naturalists caused to Aboriginal societies. Although the literature on the connections between science and empire does not leave Aboriginal people entirely out of the picture, it usually incorporates them in restricted and ultimately unsatisfactory ways.⁴

³ See also S. Zeller, *Inventing Canada: Early Victorian Science and the Idea of a Transcontinental Nation*. (Toronto: University of Toronto Press, 1987).

⁴ N. Blackhawk, *Violence Over the Land: Indians and Empires in the Early American West*. (Cambridge: Harvard UP, 2006), 148-58; M.L. Pratt, *Imperial Eyes: Travel Writing and Transculturation*. (London: Routledge, 1992); J.B. Harley, *The New Nature of Maps: Essays in the History of Cartography*. (Baltimore: Johns Hopkins UP, 2001); D. Clayton, *Islands of Truth: The Imperial Fashioning of British Columbia*. (Vancouver: UBC Press, 1999); D. Clayton,

While many scholars have acknowledged that Indigenous people supplied labor and local knowledge to Europeans conducting science in the periphery, Aboriginal people usually appear in the literature as hapless victims. Rather than scrutinizing the interactions between Natives and newcomers that produced scientific knowledge, historians have focused almost exclusively on the ways that Europeans ignored or pilfered Indigenous information. These narratives put Aboriginal people in a position of epistemological inferiority and make their subjugation seem inevitable, both trends that have disempowered First Nations throughout Canada's unique legacy of colonialism. Worse, they imply that we can ignore Aboriginal forms of knowledge – their unique epistemologies and understandings of the natural world – because science surpassed and erased them. We cannot disregard the role that cartographers, geologists, and other scientists played in generating colonialism, but we must also cautiously avoid assigning too much transformative power to European discourses like science. To do so would affirm the passivity of Aboriginal people and reinforce the repression of their knowledge about the natural world. As Nicholas Thomas put it,

local relations and representations are never totally encompassed or determined by the violence of colonialism, and . . . the distinctive forms of indigenous sociality and politics contribute in a crucial way to the dynamics of accommodation and resistance constitutive of colonial history.⁵

Indigenous contributions to local relations can be challenging to retrieve, since Europeans composed most of the written documents that have survived from the nineteenth-century, and colored them with their own biases towards Aboriginal culture. Nevertheless, the often slippery

“Circumscribing Vancouver Island.” *BC Studies* 122 (1999): 7-22.; D. Clayton, “Captain Cook and the Spaces of Contact at Nootka Sound.” in *Reading Beyond Words: Contexts for Native History*. (Guelph: Broadview Press, 2003); C. Harris, *Making Native Space: Colonialism, Resistance, and Reserves in British Columbia*. (Vancouver: UBC Press, 2002).

⁵ N. Thomas, *Entangled Objects: Exchange, Material Culture, and Colonialism in the Pacific*. (Cambridge: Harvard UP, 1991), 35-6.

power dynamics that prevailed between Natives and newcomers can reveal themselves if we pay close attention to the control that Aboriginal people retained over the production of knowledge in their territories, even as their population and political agency declined. From an historiographical standpoint, models that include First Nations in the history of science only insofar as science victimized them erase Aboriginal people from the whole history of modernity – reinforcing their alienation from histories and epistemologies that they helped to create.⁶

Scientists like George Dawson reassembled the information that they took from Aboriginal people and exploited their labor, and they did so under circumstances of coercion and violence. In no part of this process, however, did the knowledge that they gathered cease to *be* Indigenous knowledge. Rather, the science that came out of this encounter was partly Indigenous in origin, the outcome of collaboration on unequal terms. Recent work on colonial hybridity can inform our reading of the documents that colonial scientists produced in a way that accounts for the violence of imperialism without subsuming the influence of Aboriginal people. As Susan Scott Parish and Julie Cruikshank argue, science was a hybridized form of knowledge that was produced throughout the history of encounter, rather than one that Europeans brought to the new world intact. This knowledge helped Europeans to conquer and became foundational to colonial identities. In Canada, it allowed Canadians to claim a rational, enlightened identity and deny the same to Indigenous people, further entrenching the justifications underlying Canadian expansion. In the construction of this colonial identity and in the ways that they represented their own production of

⁶ Braun, *Intemperate Rainforest*; S. Zeller, “The Colonial World as Geological Metaphor: Strata(gems) of Empire in Victorian Canada.” *Osiris* 15(2) (2000): 85-107; B. Latour, *Science in Action: How to Follow Scientists and Engineers through Society*. (Cambridge: Harvard UP, 1987), 215-57.; M.E. Kelm, *Colonizing Bodies: Aboriginal Health and Healing in British Columbia, 1900-50*. (Vancouver: UBC Press, 1998); R. White, *The Middle Ground: Indians, Empires and Republics in the Great Lakes Region, 1650-1815*. (Cambridge: Cambridge UP, 1991). See also B. Belyea, “Amerindian Maps: The Explorer as Translator.” *Journal of Historical Geography* 18(3) (1992): 267-77.

knowledge, scientists erased Aboriginal influences from the knowledge that they helped to produce.⁷

Aboriginal people fundamentally enabled Dawson to make his great scientific accomplishments in British Columbia, Alberta, and the Yukon. Dawson relied almost entirely on Aboriginal labor and geographical knowledge to survey vast stretches of territory over the many seasons he spent in western Canada. Dawson's journals, geological reports, and other publications showcase the many forms of Indigenous knowledge that helped him to survey and represent western landscapes. Despite incorporating Aboriginal knowledge throughout his career, Dawson did not equate the ways that Aboriginal people knew their natural surroundings with scientific epistemologies. He downplayed the agency that Aboriginal people had in generating the science that he produced, and dismissed their epistemological and ontological relationships with the natural world as superstitious or mythological forms of knowledge that modernity rendered obsolete. Nevertheless, Dawson consistently borrowed information from Aboriginal people, even as he denied their capacity for scientific thought and ridiculed their rich forms of knowledge about the natural world.

⁷ Pratt; J. Cruikshank, *Do Glaciers Listen? Local Knowledge, Colonial Encounters, & Social Imagination*. (Vancouver: UBC Press, 2005); S.S. Parrish, *American Curiosity: Cultures of Natural History in the Colonial British Atlantic World*. (Chapel Hill: University of North Carolina Press, 2006); C. Hall, *Civilising Subjects: Metropole and Colony in the English Imagination, 1830-1867*. (Chicago: University of Chicago Press, 2002); B. Lightman, "Introduction." in *Victorian Science in Context*. ed. B. Lightman (Chicago: University of Chicago Press, 1997); K. Philip, *Civilising Natures: Race, Resources, and Modernity in Colonial South India*. (New Jersey: Rutgers, 2004); L. Schumaker, "A Tent with a View: Colonial Officers, Anthropologists, and the Making of the Field in Northern Rhodesia, 1937-1960." *Osiris* 11(2) (1996): 237-258; H.K. Bhabha, *The Location of Culture*. (New York: Routledge, 1994); K. Raj, "Colonial Encounters and the Forging of New Knowledge and National Identities: Great Britain and India, 1760-1850." *Osiris* 15 (2000): 119-134.

LABOR

Dawson's biographers have placed too much emphasis on his self-discipline to account for the tremendous amounts of information he gathered in Western Canada. According to lore, Dawson was tireless in the field and behind the desk, spending upwards of eight hours a day in the saddle while surveying brutal terrain and composing dozens of reports and scientific publications. This work earned him the respect of some of the most important scientific figures of the era, not to mention membership in its most prestigious institutions. Historians that have been more critical about his legacy have largely followed suit. Bruce Braun, for example, describes Dawson as "one of the most intrepid European travelers" of his time, and ignores the ways that he used Aboriginal guides and laborers when conducting field work.⁸ Dawson may have possessed more than ordinary energy and fortitude, but his personality does not explain why he was able to learn about as much terrain as he did. Like other surveyors, Dawson relied on Aboriginal people to guide him through the unknown western provinces and to undertake the tremendous amounts of labor required to conduct surveys. While they performed diverse kinds of work, Dawson generally employed Aboriginal people as packers, camp attendants, general laborers, axe-men, messengers, and guides. The Aboriginal people who Dawson did not formally employ for wages also performed valuable work in preparing goods that he purchased from them along the way. Dawson sometimes bought food to fill out diminishing provisions or extra feed for his horses, and borrowed or rented canoes for river journeys or to cross lakes. Dawson also bartered for Indian artifacts whenever he had the chance, amassing a large personal collection that he donated to various museums and exhibitions.⁹

⁸ Braun, *Intemperate Rainforest*, 44.

⁹ See D. Cole, *Captured Heritage: The Scramble for Northwest Coast Artifacts*. (Vancouver: Douglas & McIntyre, 1985).

Aboriginal people also gave him directions or helped him to find trails, sometimes accompanying him for short periods or marking the route ahead of the survey party. The tenor of Dawson's interactions with Aboriginal people highlights how dependant he was on their work and suggests that Aboriginals retained control over the production of knowledge in these remote territories.

Dawson went to considerable lengths to ensure productive working relationships with Aboriginal people while in the field. To improve his communication with laborers and informants, Dawson learned to speak Chinook, the pidgin trading jargon that flourished between Alaska and Oregon in the nineteenth-century. Since finding a guide or gathering directions often depended on securing the goodwill of a village's political elite, Dawson would often engage in a small gift-exchange with chiefs, usually consisting of a plug of tobacco or some food. He also exchanged such pleasantries with people that he met along the way, which helped to ensure a friendly atmosphere in which he could seek information on local geography, record ethnological notes, or negotiate terms of formal employment. Gift-exchanges and other pleasantries were small but important ways that Dawson established good rapport with locals, and suggest that Aboriginal people influenced the terms under which the day-to-day working atmosphere of surveys operated. These exchanges represented more than just polite interactions between strangers – the gift-exchange was a heavily formalized part of Aboriginal social and political life on the west coast that, at the most basic level, established and maintained status and political bonds between individuals and groups. Participating in the exchange drew Dawson into Aboriginal political networks, and often obligated him to participate in further exchanges to not upset the established political balance.¹⁰ For example, Dawson travelled mostly by boat during his 1878 expedition to

¹⁰ Several disciplines contribute to the literature on Aboriginal systems of gift-exchange across various geographical locations. I have consulted the literature that examines the role of the gift exchange in colonial encounter, including White, *The Middle Ground*.; J. Masco, "'It is a Strict Law that Bids us Dance': Cosmologies, Colonialism, Death, and Ritual Authority in the Kwakwaka'wakw Potlatch, 1849-1942." *Comparative Studies in Society and History* 31(1) (1995): 41-75; See also H. Codere, *Fighting with Property: A Study of Kwakiutl Potlatching and Warfare, 1792-1939*. (New York: Monographs of the American Ethnological Society, 1950); R. Fisher, *Contact and Conflict*:

the Queen Charlotte Islands (Haida Gwaii), but made sure to dock at major villages and pay his respects to high-ranking political figures. While he was making his way up the coast, Chief Klue and some other men visited Dawson aboard his ship after they discovered that Dawson had recently traded for artifacts with the chief of nearby Skedans.¹¹ Dawson remarked that he felt “obliged to buy” several articles that they offered to sell him, and also “gave them permission to sleep on deck as they showed signs of staying in the cabin all night if not.”¹² Even though he would only let them sleep on the deck rather than in the cabin, Dawson’s effort to not offend Klue, who he identified as a more powerful chief than Skedan, was a gesture that demonstrates Dawson’s entanglement in the status politics of Haida Gwaii. Any samples that Dawson gathered in the field had to be boxed, carried until they could find a suitable post outlet, and shipped across the country on the Survey’s strained budget. Dawson clearly went well out of his way in this instance to maintain friendly working relationships with two powerful Haida figures, who could in turn help him to spend his time in the islands efficiently. Friendliness, however, only went so far in helping Dawson to gather the information and labor that he needed in order to survey. Dawson had to carefully negotiate Aboriginal economics and invest substantial sums of money on labor and items in order to ensure productive working seasons in the field.¹³

Indian-European Relations in British Columbia, 1774-1890. (Vancouver: UBC Press, 1977), 45-6.

¹¹ Most villages on Haida Gwaii took the name of their hereditary chief, i.e. Klue = Klue’s village; Skedans = Skedan’s village, etc. See GMD, “On the Haida Indians of the Queen Charlotte Islands.” Appendix A, *Report of Progress for 1878-79*. Geological Survey of Canada (Montreal: Dawson Brothers, 1880), 161-2.

¹² GMD, 18 July, 1878, in D. Cole and B. Lockner, *To the Charlottes: George Dawson’s 1878 Survey of the Queen Charlotte Islands*. (Vancouver: UBC Press, 1993), 39 (hereafter ‘Charlottes’), 41.

¹³ When quoting Dawson, I have retained his original spelling and grammar to avoid inserting cumbersome ‘sics.’ As a result, some of his spellings differ from each other in the text, particularly those he used for Aboriginal words or place names, as he modified these for pronunciation. Dawson’s journals and field notebooks do not always mark the date for all of his notes, particularly notes that Dawson wrote on the reverse sides of pages, next to the narrative of his journey. When citing these sources, I have provided the date whenever possible, the approximate date and the acronym ‘RPN’ for ‘Reverse Page Note,’ and the page number for citations that can be found in Cole and Lockner’s reproduction of Dawson’s journals and Spragge’s *Life and Letters*. For Chinook, see GMD to Anna Dawson (hereafter AD), 3 October 1875, in D. Cole and B. Lockner, *The Journals of George M. Dawson, British Columbia, 1875-1878 Volume I, 1875-1876*. (Vancouver: UBC Press, 1989), 94-5 (hereafter ‘Journals Vol. I’); Also reprinted in Winslow-Spragge, *Life and Letters*, 117; GMD to Margaret Dawson (hereafter MD), 5 September 1875, *Journals Vol. I*, 80; For gift exchanges see Aug 27, 1875, *Journals Vol. I*, 75; Sept 10, 1876, *Journals Vol. I*, 255; July 14th, 1878, *Charlottes*, 39.

We should not suppose that Dawson finessed labor or information out of Aboriginal people. That kind of interpretation would assign too much cultural mastery to Dawson at the expense of the power that Aboriginal people retained over their own knowledge and labor. Rather, Aboriginal people performed valuable work for Dawson and sought fitting monetary compensation for the important services that they rendered, especially when Dawson could find no one else who knew the terrain as well as they did. Dawson generally paid his guides and packers between \$1.50 and \$2.50 a day and sometimes a bonus of extra supplies or food upon completion of their employment. These wages were comparable to what Indian packers received from the Canadian Pacific Railway Survey (CPRS), some \$60 a month – a figure that Dawson called “absurd” compared to the lower wages that they typically received. Ironically, if we factor in bonuses and the cost of feeding these employees, he paid more than the CPRS, and considerably more than the \$40 monthly that private packers earned or the \$35-\$40 that Indian laborers received at Kamloops.¹⁴ Added expenses included the canoes and horses that surveyors sometimes rented or purchased, along with extra food and other incidentals. This amount is all the more remarkable given the GSC’s constant struggle to secure funding from the federal government, and suggests that Dawson valued Aboriginal labor and knowledge enough to pay wages that seemed remarkably high to him. Dawson complained throughout his journals about the exorbitant prices that Indians demanded for services and items, especially the artifacts that he purchased. In fact, Dawson was at his most racist after being imposed upon for money. On his 1876 expedition to Fort George, he

¹⁴ Dawson gives the figures for the C.P.R.S and for Kamloops, *RPN Journals Vol. I*, 272. The figures are broken down by race and occupation, white unionized employees receiving the highest pay, followed by non-unionized white packers, followed by Indian packers and assistant packers, followed by Indian axe men and non-packers. The wages that Dawson paid are averaged from various expense notes in his journals and notebooks. See *Journals Vol. I*, 228, 233, 234, 252, 265, 276, 277, 278, 282; GMD, “Dawson Diary, 18 Oct – N(?) 9 1878.” McGill University Archives, c. 81 f. 6.; See also GMD, “General Note on the Mines and Minerals of Economic Value of British Columbia with a List of Localities.” Appendix R. *Report on Surveys and Preliminary Operations on the Canadian Pacific Railway up to January, 1877*. (Ottawa: MacLean, Roger & Co., 1877), 11, 20; For extra supplies see 2 Oct, 1887, 19 Sept, 1887 “b) Private Diary 1887 Vol. II. [17 Sept 1887-1 November 1887].” McGill University Archives. MG 1022 c. 81 140/F 59.

remarked that it “seems pretty hard . . . that these lazy & dirty savages should stickle for Such high Pay, when so many white men, in other Parts of the world would be glad to do the work for so much less.”¹⁵ Despite his offensive comments, Dawson nearly always paid what was asked of him or bartered for a lower rate, and as such his frustration suggests that he recognized how much his work depended on Indian labor. During his treacherous 1887 Yukon survey, an episode that we will return to, Dawson offers a rare comment demonstrating his own awareness of the importance of Aboriginal employees. After haggling over the extra pay that his packers demanded for accompanying him all the way from the Alaskan coast to the headwaters of the Pelly River, Dawson noted that “with out the Indians brought all the way from Wrangell we never could have managed it.”¹⁶ While Dawson seldom articulated his reliance on Indian labor explicitly, the Aboriginal people that worked for him seem to have had a clearer idea of how much explorers like Dawson depended on them.

Like most explorers, Dawson’s journals offer few comments on how Aboriginal people felt about the labor that they performed for the survey. However, Dawson provides some evidence in that Aboriginal people knew how much he depended on their labor and knowledge, and that they negotiated the terms of their employment from a position of power. Aboriginal people demanded high wages for their services and would refuse to work or sell an item if they did not receive a fair price. Often, Dawson’s reaction to the prices that Indians demanded suggests that they perceived that Dawson needed an item or services enough to pay higher prices than they might otherwise seek. When Dawson needed to rent canoes to cross Babine Lake, deep in the northern interior of BC, he had no option but to pay the “fabulous figure” demanded for the chief’s canoe in order to

¹⁵ 30 Sept, 1876, *Journals Vol. I*, 277.

¹⁶ 29 July, 1887, G.M.D, “Private Diary 1887 [22 April 1887-16 September].” McGill University Archives, MG 1022 c. 81 140/F 59.

secure additional canoes for a more reasonable rate.¹⁷ In the Yukon, the packers that Dawson negotiated with to take him and his crew to Juneau played Dawson off against miners in the region that also sought packing help, probably in order to get the highest possible wages for the least amount of work.¹⁸ The Aboriginal people that Dawson bartered with were skilled negotiators, and would occasionally ask Dawson for a higher price than they expected to receive and negotiate down to the maximum amount that Dawson was willing to pay, often earning concessions such as extra food or equipment in the process. When Dawson's guides felt that they weren't being paid adequately they confronted him, such as when one guide, whose name Dawson translates as 'Presphere,' asked for extra pay for the additional packing duties he assumed after Dawson's original packer left to attend to his dying daughter.¹⁹ Finally, there are several instances in Dawson's journals where Aboriginal people impressed their services or knowledge on him without his actually soliciting their help or information, suggesting that they were well aware of how valuable their knowledge and labor was. Dawson hints throughout his journals and reports that he valued Aboriginal knowledge highly, but primarily acknowledged how the physical labor that they provided him helped him to overcome the more challenging terrain that he travelled through.

Dawson's official reports, publications, and the testimonies that he delivered to parliament illustrated the natural features of areas that he actually visited; he compiled data from other surveyors and solicited information from locals for regions that he did not personally see. Gaining access to unexplored regions, then, determined how much he could observe and report on in a season, not to mention having the luxury of not tending to animals, packing gear, or setting up camp. Packers performed a considerable amount of the important physical labor that enabled Dawson to visit remote areas, negotiate challenging terrain, and devote his attention to geological

¹⁷ GMD to AD, 6 July, 1879, *Life and Letters*, 132.

¹⁸ 28 Sept, 1887, "b) Private Diary 1887."

¹⁹ 30 Sept, 1888, GMD, "Personal Diary 1888."

explorations. After Dawson raised camp in the morning and all had breakfasted, a packer's first obligation was to prepare the horses or collect them if they had strayed. Packers would fit the horses with aparejos, leather saddle bags that had to be very carefully strapped on to the animal or they would cause friction sores, which could fester and render the animal useless. The party would then set out, or Dawson would send the packers ahead to find and clear the trail while he lingered to make observations or to go on side trips. Sometimes a packer or two would accompany him on these trips to help him box specimens or carry his camera if he intended to take photographs. All members of the party would hunt along the way and fished at night if they camped near a lake or river. This allowed them to cut down on the amount of provisions that they needed to carry along with them. Travelling light could be extremely important, as the party had to portage where they could not travel by horse or canoe, and packers would literally shoulder the burden of the equipment. One example particularly exposes how tough the physical labor of surveying could be. On route to Kamloops from Babine Lake in 1879, 22 Indian packers, two of whom were women, impressed Dawson as they carried around 100 lbs. each through "rough mountainous country" to elevations "between 4000 – 5000 feet." Dawson remarked that the weather was "rather warm, and climbing up and down the steep rocky hills and through the woods was fatiguing enough to those of us who walked light." Indeed, since the terrain through which surveyors journeyed in British Columbia was often unsuited to large pack animal trains, packers' ability to carry loads of equipment on their shoulders and reduce the weight of provisions through hunting and fishing enabled surveyors to spend more amounts of time in heavily wooded and mountainous regions.²⁰

²⁰ Unless Dawson had been given very specific directions, or already knew a stretch of country well enough to strike out on his own, a local guide and contingent of packers nearly always accompanied him. Photographic apparatus could weigh up to 500 lbs. at this time. For sending guides ahead, 15 July, 1877, *Journals Vol. II*; Letter, GMD to M.D. 7 July, 1877 *Journals Vol. II*, 345-6; Letter, GMD to MD, 22 July, 1877, *Journals Vol. II*, 355; 27 July, 1877, *Journals Vol. II*, 359; For quotations, GMD to AD, 6 July, 1879, *Life and Letters*, 131; for carrying specimens see 3 Sept, 1875, *Journals Vol. I*, 79.

The first GSC survey of British Columbia in 1871 demonstrates the difficulties that surveyors could encounter if they relied on horses alone to pack large amounts of equipment. Under the leadership of then director Alfred R.C. Selwyn, the survey party journeyed from Victoria through the interior to the Leather (Yellowhead) Pass and back. To transport the 3,600 lbs. of gear and provisions that the party brought with them, Selwyn purchased 15 pack animals at Kamloops and hired a couple of Indian packers to tend to them. Selwyn knew that they would travel through heavily-wooded terrain, but expected that the CPRS axe parties that they followed would be able to clear enough trail ahead of them to accommodate the pack train. However, the axe men made extremely slow progress through the dense cedar forests of the interior, and the horses could barely negotiate the sloping zigzag paths that they cut through the uneven terrain. The party progressed extremely slowly, averaging six and a half miles of trail a day or less, one day making only 9,400 yards of trail. When they did not tag along behind the CPRS, they had guides leading them along Indian trails, but the horses could not negotiate the dense undergrowth and windfall that encumbered these narrow trails. Feed was extremely hard to come by in the interior, and as the horses weakened from starvation strayed long distances over night and became mired more easily in swampy sections of trail. By November, the party was nowhere near reaching their final destination (Jasper), and had exhausted nearly all of their provisions. They chose to abandon the horses, all of which starved to death, and canoe downriver to Kamloops to avoid spending the winter in the interior.

Selwyn found the trip disappointing to say the least. He saw very little in the way of resources along the route except for timber and small patches of arable farm land, most of which were already occupied. Selwyn remarked that BC's "forests, her fisheries, and her mines . . . are capable of almost unlimited development," but the federal government often threatened to cut off

the GSC's funding when they did not find valuable mineral resources so Selwyn may have been embellishing here a little bit. Selwyn also made few geological or geographical observations of substantial scientific value during the journey. He often had to join the axe-parties himself rather than spend time 'geologizing,' and twice bad trails forced the party to turn back before reaching destinations that they had hoped to survey. Referring to the stretch past Kamloops, Selwyn lamented that "the opportunities for observations during this part of our journey were, I am sorry to say, very limited, and those which I made confined to such exposures as could be seen on the trail we were following." Although his official report contains 23 pages of geographical and geological descriptions, he reproduced large sections from existing reports and compiled observations that his assistant made in the same season of Vancouver Island coal localities. While geologically-speaking the 1871 survey failed to meet many of its objectives, the GSC did learn a few valuable lessons about surveying in BC.²¹

We can highlight two major mistakes in the way that Selwyn surveyed this portion of British Columbia. Because Selwyn brought so much equipment, he needed a large number of pack animals, which prevented the party from taking full advantage of the narrow and heavily encumbered Indian trails. This put him at the mercy of the axe parties and caused long delays on the portions in which they did follow Indian trails. Dawson must have carried significantly less equipment when surveying, as he usually hired between 2 and 4 horses to ride and pack and one or two Indians to tend to them and guide. He brought flour, bacon, tea, and other foods on his surveys but relied on hunting, fishing, and buying food to fill out provisions, and further reduced his stock

²¹ On the pressure that the federal government put on the GSC to find resources, see W.A. Waiser, "A Bear Garden: James Melville Macoun and the 1904 Peace River Controversy." *Canadian Historical Review* 67(1) (1986): 42-61. As Waiser put it, "optimism was an essential ingredient" in surveyors' reports. Factual information about the 1871 survey drawn from A.R.C. Selwyn, "Journal and Report of Preliminary Explorations in British Columbia." (Montreal: Geological and Natural History Survey of Canada, 1872); B. Baltzly, "The Journal of an Expedition through British Columbia: 1871." in *Benjamin Baltzly: Photographs & Journal of an Expedition through British Columbia: 1871*, ed. A. Birrell (Toronto: Coach House Press, 1978); Quotation from Selwyn, 63.

of equipment by giving away items when he no longer needed them. Lightening up the pack loads allowed Dawson to portage and canoe wherever possible and clear less trail to accommodate his party. Selwyn also did not use Indian guides and directions to the extent that Dawson did because he ran into only a few Indians in the interior. This was not necessarily Selwyn's error, but his reliance on paths cut by the CPRS axe parties could have put him out of the way of the trails that hunting parties would have been using at the time and which might have led him to Indian villages or campsites. Unlike Selwyn, Dawson's journals tend to describe visits to Indian villages every few days, where he hired new guides, refreshed his horses, and collected information. Likely, since Dawson almost always followed Indian trails, he wound up at these villages more frequently. Dawson paid close attention while in the field for any signs of old trails or recent evidence that there might be Indians in the area. His enthusiasm for Indian trails suggests how much they aided his surveying:

If one of these old Indian Trails can be found . . . it will repay him [the explorer] to spend time & all his acuteness in endeavouring to stick by it, for the Natives have invariably found in the course of ages, the 'lines of least resistance' through the country, & when the dim track takes a sudden turn to right or left, one may be sure it does so to avoid some obstacle which a more direct path would have carried one into. The pioneer must train his powers of observation to notice quickly the faintest trace of an old 'blaze' on the trees, or twigs which have been cut by the axe, or bent over by the hand of the passing Indian to serve as a sign post by the way.²²

Although Dawson chalks his use of Indian trails up to his powers of observation in the above passage, his guides and the information that he received from Aboriginal people along the way seemed to have had a lot more to do with finding these trails.²³

²² GMD, "MSS on British Columbia (history, geography, & ethnology)." McGill University Archives, G.M. Dawson Papers, file 9, c.81. n.d,

²³ Selwyn, 20, gives the average loads that horses, mules, and Indians could carry at 250 lbs., 250-400 lbs., and 100 lbs., respectively. Dawson, then, likely packed between 500 and 1200 lbs of equipment on most of his surveys, a third or less than Selwyn brought on his 1871 survey.

Selwyn demonstrated in his 1871 survey that a keen eye might not have been much help in the field when he remarked that

our Indian acquaintance accompanied us for about three miles down the valley to show us the trail, which, to us, was almost invisible, but which he seemed to follow through a maze of fallen logs, as easily as I could a cleared waggon-road.²⁴

Indian trails were often very faint and encumbered with windfall, burnt timber, or undergrowth – one usually needed to have very specific knowledge to find them and familiarity with the route to stick to them. Recent depopulation from disease epidemics in BC reduced the quality and quantity of trails, making them even harder to find. On inquiring about the route through the Eu-tsin-i-koh (Euchiniko) valley, a man out hunting with his son

told us that the Trails about which we were inquiring were now nearly all bad & filled with fallen timber. That before the small pox swept off most of the Indians, many & good trails in all directions, now few & faint, & in attempting to follow, sometimes see trail, Sometimes not.²⁵

Dawson depended on his guides to find the trails that enabled him to make substantial progress, and he seems to have been well aware of it. As we have seen, he paid his guides quite well comparatively, even though he was rarely happy about doing it. When he could not find a guide, he either delayed his journey or abandoned portions that he had intended to survey altogether. The health and temperament of his guides often set the pace at which the survey could progress. One of his guides injured his leg while journeying between Quesnel and the Blackwater River in 1875, causing a “very provoking” delay.²⁶ His guides’ occasional drinking binges held the party back on two occasions during the 1888 survey season, one of which required a two day recovery period

²⁴ Selwyn, 38.

²⁵ 5 June, 1876, *Journals Vol. I*, 204.

²⁶ 25 Sept, 1875, *Journals Vol. I*, 90.

before they could proceed. Dawson complained about the unreliability of these guides, but did not dismiss them – indeed, one would be hard-pressed to find a single example in which Dawson fired any of his guides or packers, no matter how much advantage they took of him. We cannot boil down his patience with Aboriginal employees to his legendary good-nature; Dawson simply could not find his way around in the *terra incognita* of the Western provinces, nor carry all of the material necessary to survey, without the help of Indigenous guides and packers. The value of local guides, frequent information gathering from Native people, and the goodwill of important Aboriginal figures, however, never seemed more apparent to Dawson than during his 1878 survey of the Yukon River.²⁷

Dawson’s Yukon survey was not a colossal failure from a geological standpoint, in fact the report that Dawson released following his trip spiked gold mining interest in the region, inspiring grateful miners to name Dawson city after him. The expedition assessed where the Pelly (Yukon) River crossed the 141st meridian, the boundary between the North-West Territory and Alaska – an important question given contemporary increases in placer gold-mining in the region. Delays, unrest, and potentially dangerous stretches in which he had no local guides, however, led Dawson to call it a “debauched expedition” that at times “felt like a pleasure excursion” because of the slow pace of work.²⁸ There were several reasons for the party’s slow progress. First, Dawson had a particularly hard time procuring supplies past Wrangell, Alaska, remarking that he had been “much deceived in leaving Victoria without *everything*.”²⁹ Second, the Yukon landscape proved especially challenging and caused several unavoidable delays. By June 5th the ice still had not come off of Dease Lake, delaying the party 3 days before they progressed to a point near Laketon, where they

²⁷ For encumbrances on trails see 6 June, 1876, *Journals Vol. I*, 205; Selwyn, 28; For delays caused by lack of guide see 1 Sept, 1875, *Journals Vol. I*, 78; 23 Sept, 1888, GMD, “Private Diary 1888 [14 June 1888 – 18 October 1888].” McGill University Archives, MC 1022 c. 82 1401+; for drinking binges see, 29 June, 1888 and 12 Sept. 1888, “Private Diary 1888.”

²⁸ GMD, 12 July, 1887, “Private Diary 1887.”

²⁹ GMD, 30 May, 1887, “Private Diary 1887.” Emphasis in original.

remained a week building canoes for the rest of the expedition. The extremely swift waters of the Liard and Frances Rivers made poling “unexpectedly difficult and tedious,”³⁰ and took them through three treacherous canyons. Aside from the inherent challenges that the landscape provided, difficulties finding and keeping Indian guides who knew the area well caused long delays and forced the party to strike out on potentially dangerous stretches of territory in which they had little or no sense of where they were or what they might find ahead of them.³¹

After leaving the confluence of the Dease and Liard Rivers, two Tsimshian and three Stikine (Tlingit) guides joined the party to act as boatmen and packers on the stretch to Frances Lake. On reaching Sylvester’s Lower Fort at the mouth of the Dease, Dawson hired two ‘Stick’ Indians to accompany them up the rivers ahead, help him to find and portage over the old Hudson’s Bay Company (HBC) trail to the headwaters of the Pelly, and hunt for food along the way. Dawson encountered several challenges in securing these guides, as he arrived during potlatch season and they spoke little Chinook. He had few options about whom to hire, however, since the only other Indians in the region spoke no Chinook at all, and were only passing through to trade at the fort before moving to their summer hunting grounds. The Stick Indians only agreed to accompany the party after Dawson bribed their chief \$5.00, agreed to pay them \$20 each plus \$5.00 a day, and advanced them part of their wages. Despite the high pay, Dawson noticed that these Stick guides still seemed reluctant to make the journey. After making his usual remarks about Indian laziness, Dawson mentioned that a reported skirmish between a white miner and some Indians near the mouth of the Stewart River might account for the Stick Indians’ hesitance.

According to rumor, two Indians of an unspecified tribe had been killed during a dispute over

³⁰ GMD, *Report on an Exploration in the Yukon District, N.W.T., and Adjacent Northern Portion of British Columbia. 1887*. Geological and Natural History Survey of Canada (Montreal: Dawson Brothers, 1888), 8 (hereafter ‘Yukon Report’).

³¹ Factual information on the Yukon Survey drawn from M. Zaslav, *Reading the Rocks: The Story of the Geological Survey of Canada, 1842-1972*. (Toronto: Macmillan, 1975), 157-60; GMD, “Private Diary 1887.”; GMD, “(b) Private Diary 1887.”; GMD, *Yukon Report*.

supplies, and the rest of the group had retreated up the Pelly River for reinforcements. Local customs of retaliation demanded that two white people be killed in return, and a general feeling of anxiety fell upon the region.³²

The Stick Indians accompanied the party for a few days and drew maps of the rivers ahead but backed out before the party reached Frances Lake. Dawson speculated that the rumors of violence had influenced these packers to quit, remarking that “they know more about reported trouble between whites & Indians on Yukon than they say.”³³ He started to worry about the provisions holding out since the Stick hunters had only managed to shoot a beaver and a goose for food, and speculated whether the party might have to return to the Lower Fort for resupply. After he caught a large sturgeon and the party came across a moose that one of the boatmen wounded the previous day, Dawson worried less about the provisions holding out, but found it

very unfortunate having with us no Stick Indians as quite at sea about any trail. Having so far seen none, & if none exists very doubtful with our small heavily loaded force whether we can ever reach the Pelly with the necessary outfit for trip down it. With local Indians might have saved several days preliminary explorations & been further ahead.³⁴

Dawson carried on surveying the East branch of the lake, and held out hope that he would come across some more Stick Indians to show him the portage trail or an alternate route to the Pelly. To improve the chances of this happening, Dawson sent the Coast boatmen off during the day to make smoke in the hopes of attracting local Indians, and once thought he heard the report of a rifle in the distance. Again, the rumors of violence seemed to have thwarted the survey’s progress, as Dawson felt certain that any Indians in the region were probably avoiding them.³⁵

³² 30 May – 28 June, 1887, *Private Diary 1887*. Dawson seemed confused over whether these ‘Stick’ Indians were Tahltan or Tagish, so I have retained his use of the term ‘Stick.’

³³ 3 July, 1887, “Private Diary 1887.”

³⁴ 18 July, 1887, “Private Diary 1887.”

³⁵ 28 June – 13 July, 1887, “Private Diary 1887.”

By this point, the coast boatmen were becoming very unhappy as they had only intended to accompany Dawson as far as Frances Lake, and it was becoming clear that they would have to help on the portage through the unfamiliar country ahead. Since Dawson absolutely needed the boatmen for the portage he offered them a \$10 bonus each on completion of the trip, plus some of the extra equipment they planned to discard, and used “all my power of conciliation & encouragement to get anything like cheerful work.”³⁶ Compounding his frustrations, the map that Robert Campbell, an HBC officer and explorer, had earlier sent him was poorly detailed and inaccurate in many places. On the 19th of July, the party set off up the river, poling in canoes where the river was deep enough and packing where it was too shallow or swampy. Since the old HBC portage trail evidently no longer existed, Dawson kept a keen eye out for evidence of Indians, and maintained hope throughout that he would run into some who could help him find another trail. Seeing smoke ahead on the 21st of July raised Dawson’s hopes, but on closer approach it turned out that the smoke came from a forest fire, and there were no other traces of recent human occupation. As they proceeded the crookedness of the river that they followed and mossy soil that surrounded it deeply frustrated the party, and Dawson described them as a “mournful looking procession after our last few days of bushwhacking.”³⁷ Reaching Findlayson Lake, the party found some very old and run-down HBC caches, and evidence of Indian inhabitation, but nothing recent enough to suggest that they might be nearby. Here they cached the extra equipment plus some food for the Coast Indians’ return, and pressed on, taking a “blind lead” through the forest.³⁸ Finally, on the 29th of July, the party reached the Pelly River, a “great triumph . . . in the face of so numerous difficulties.”³⁹ Dawson let the boatmen go the next day.

³⁶ 27 July, 1887, “Private Diary 1887.”

³⁷ 24 July, 1887. “Private Diary 1887.”

³⁸ 27 July, 1887. “Private Diary 1887.”

³⁹ 29 July, 1887. “Private Diary 1887.”

While he worried before about not finding any Indians to guide him through the portage route, Dawson was now concerned about running into hostile Indians on the headwaters of the Pelly, where the groups involved in the skirmish had supposedly retreated. The party felt “constant anxiety as to attitude of Indians when we may meet them” that was “more wearing than the actual physical difficulties” of the journey.⁴⁰ Luckily, the party now travelled comparatively easily, poling in a canvas canoe and portaging where the rapids were too strong. Despite the easier going, they had only a vague sense of where they actually were and how long it would take them to reach Ft. Selkirk, their rendezvous point with Dominion Lands Surveyor William Ogilvie. The Campbell map continued to mislead them about the lengths of stretches of the river and missed some of the rapids and canyons along the way. After losing “all faith in Campbell’s map” they met an Indian man and his son on August 8th, who told them through broken Chinook that they were near the forks of a river, which they guessed was probably the Macmillan.⁴¹ They found this man’s demeanor reassuring, and some miners that they ran into later informed them that the rumors of violence were completely unfounded (an unscrupulous miner had spread them before being run out of the country). The party progressed on to the ruins of Ft. Selkirk at the confluence of the Pelly and Lewes Rivers, where they constructed another canoe to ascend the Lewes. Using maps from Frederick Schwatka’s 1883 military reconnaissance survey, telegraph survey maps, and information garnered from miners and Indians that they encountered along the way, they ascended to Lake Lindeman, where they engaged a few packers, got them to draw up some maps, and ascended the Chilkoot pass to the coast.⁴²

⁴⁰ Aug 3, 1887. “Private Diary 1887.”

⁴¹ Aug 7, 1887, “Private Diary 1887.” Dawson originally wrote “Johnson’s” (one of his assistants) name but struck it through and replaced it with “Campbell’s”.

⁴² 29 July – 20 Oct, 1887. “Private Diary 1887.”

Dawson's experiences surveying the Yukon region showcase not only the kinds of physical labor that he relied on, but the difficulties that he inevitably encountered when he could not find guides to lead him through unknown country. It also shows us that the information that he garnered from non-native sources, which we would assume that he would find "trustworthy," didn't always wind up being that helpful. European maps, route information, and rumors of Indian violence could wind up being dead wrong – indeed, Dawson was lucky in a few cases that they didn't get him or his companions killed. Yet Indian information did much more than just improve the safety or comfort of Dawson's surveys. It was often precise, detailed, and much more up to date than the sometimes decades-old maps and reports that previous explorers left. The scientific and national contexts of Dawson's work in the Canadian west – the GSC's commitment to inventory science, the pressures that the federal government placed on them to discover valuable minerals, the epistemological status of science and the heroic tropes associated with scientists – make his applications of Aboriginal knowledge all the more intriguing.

INDIGENOUS KNOWLEDGE

Near the end of the Yukon trip, Dawson had to wait a few days on the banks of Lake Lindeman for three Indian packers, busy moving miners' gear across the Chilkoot Pass, to take him and his crew to the coast. Annoyed by the delay, Dawson opted to "utilize part of the day in getting all the information I can geographical & otherwise from the one young Indian here."⁴³ Dawson inserted the map that the young man, 'John,' drew for him, along with several other maps that he had collected from various people along the way, into one of his field notebooks (Fig. 1). John's map illustrates the series of lakes and rivers that lead from Lake Laberge to what is now

⁴³ Sept 18, 1887, "b) Private Diary 1887."

known as Tagish Lake and the first part of the Chilkoot pass. Most of the lakes and rivers that it shows have no name associated with them; instead, Dawson marked them with descriptions like “½ day long.” The map notes landmarks such as “Tahkish Houses” or “mountains with much snow in summer,” places where the Indians fished for salmon, and a rough boundary of the “Takish Country.” At the end of a cluster of lakes in the southern section of the map, Dawson marked trail information next to a few possible routes out of the interior. One notes “2 days journey good trail. One place along mt where valley swampy,” another, “lake in Homan valley same size as L. Liard. abt. ½ day up on foot. Not good for canoes.”⁴⁴ Since he had guides to take him over the well-worn Chilkoot pass, we can assume that Dawson probably did not solicit this map for his own navigational purposes. Rather, he likely included the map as an aid to future explorations and to jog his memory for the report writing that awaited him in Ottawa. The map had another important purpose: it illustrated portions of the country that he did not personally visit, allowing him to comment on additional territory without spending more time (and money) in the field. Given the frost that now greeted the campers in the mornings, Dawson must have been pleased to pack in a bit more description before calling the season’s frustrations to a close. This was not the first time that Dawson snuck in information on places that he did not actually visit –if the season was dragging on, if the trails were too challenging, or if he could not find a guide that would accompany him at a low enough rate, he usually contented himself with what notes he could get off of local informants, many of whom were Aboriginal.⁴⁵

⁴⁴ John’s map is the 8th inserted map in one of Dawson’s field notebooks: Library and Archives Canada, GSC, Field Notebooks of GMD, 1887, Notebook #2762.

⁴⁵ For ‘Tahkish’ vs. ‘Takish’ see fn. 8 in this text; Dawson also received some information on the portion of the country around the Hootalinkwa River from some miners that had been prospecting up the river earlier in the season; For Dawson’s surveys as preliminary to future explorations, see Zaslow.



Figure 1 Unknown, “Map by Indian ‘John’ a Takish, 18 Sep 87. At L. Lindeman.” Library and Archives Canada, Field Notebooks of G.M. Dawson, 1887, Notebook #2762, 8th Inserted Page.

Dawson extracted two valuable services from Aboriginal sources of information like John’s map. On the one hand, the map points out various things that could help or hinder surveyors in the field. Alternate routes, good canoeing rivers, hazards, fishing spots to supplement bland provisions – all of these bits of information increased the speed, safety, and comfort of Dawson’s expeditions. John’s map also helped Dawson to achieve his professional obligations as a GSC scientist. Inventory science, the intensive collecting and cataloguing of information on the natural world, was still the main thrust of Victorian science at this time and a central emphasis of the GSC. Aboriginal people had extensive stores of natural knowledge about the regions in which they lived,

certainly more than even the most observant naturalist could collect in one season. They provided precise and detailed information on climate, biota, geography, and the geology of their territories. This knowledge could be extremely broad. It covered landscapes that they visited every day but also described distant regions that had been traversed more often in generations past – indeed, some of the natural knowledge that Aboriginal informants possessed stretched deeply into history. Dawson incorporated some Aboriginal oral traditions that described dramatic geological phenomena that had occurred millennia before he arrived in Western Canada as supplemental evidence in his publications, particularly the seismic phenomena that had shaped the landscape and impacted local human history. Indeed, his use of these testimonies makes the ways that scientists are now employing Indigenous knowledge in ecology and medicine seem much less original.⁴⁶

The ways that Dawson used Aboriginal knowledge complicates some of the criticisms that historians have leveled against nineteenth-century field scientists. We have assumed that naturalists treated Indigenous knowledge flippantly or with derision, particularly the different ontological status that many Aboriginal people accord to the natural world as a socialized or sentient space. These criticisms are usually just, and, as we shall see, Dawson ridiculed the mythological associations that Aboriginal people made with nature. However, this assumption renders colonial science ahistorically, and neglects an especially powerful tactic that scientists employed to justify the imperial project and secure their own credibility. Treating nature as an inanimate space was not a fully-formed idea when scientists first explored the new world in the early modern era. Rather, Europeans codified this way of looking at the natural world throughout the colonial project. Julie Cruikshank provides a powerful example in *Do Glaciers Listen?:* surging glaciers in sixteenth-century France prompted villagers to place crosses at the precipice of glacial

⁴⁶ A recent news article on GSC work in the Canadian Arctic points out that geologists are incorporating traditional knowledge from Inuit elders with a distinct tone of novelty. “New Map of Arctic Could Point to Canadian Gas, Minerals.” *Canadian Broadcasting Corporation* May 7, 2009.

moraines to conscript divine help in halting their advance.⁴⁷ In the nineteenth-century, scientists increasingly privileged the disembodied study of nature, and the idea of objectivity gained currency. As historians of science have demonstrated, objectivity – the idea that scientists can distance themselves from the objects that they study and discipline their observations – is a self-aggrandizing trope that scientists have used to increase the credibility of their observations and to exclude certain types of people, especially women, the working class, and non-Europeans, from the privilege of being called scientists. Unfortunately (or luckily), these excluded actors happened to know a lot about the properties of the natural world, particularly at the distant sites of empire where scientists were essentially dependants. Marginalized people supplied volumes of information to explorers and imparted their unique natural philosophies in the meantime, whether scientists actively solicited this knowledge or not. The knowledge that came out of this encounter often bears the marks of its Indigenous origin, but it does not sit well with the heroic narratives that historians conventionally attach to scientific explorers (scientists as heroes that brave harsh terrain and benighted savages to shed light on the dim corners of the new world) or the postcolonial critiques that have been leveled against scientists (scientific explorers as agents of colonialism that saw Indigenous knowledge as superstition and Indigenous landscapes as vacant territories to be transformed). Rather than assuming that scientists easily disregarded Indigenous influences, we must look carefully at the practices of representation that were becoming heavily codified in the nineteenth-century through which scientists secured their own status while simultaneously effacing Indigenous knowledge from the scientific documents that they produced.⁴⁸

⁴⁷ Cruikshank, 5.

⁴⁸ For critiques of the ideal of objectivity see L. Daston and P. Galison, “The Image of Objectivity.” *Representations* 40 (1992): 81-128; D. Haraway, “Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective.” *Feminist Studies* 14 (1988): 575-99; See also Braun, *Intemperate Rainforest*; C. Thrush and R.S. Ludwin, “Finding Fault: Indigenous Seismology, Colonial Science, and the Rediscovery of Earthquakes and Tsunamis in Cascadia.” *American Indian Culture and Research Journal* 31(4) (2007): 1-24 ; N. Safier, *Measuring the New World: Enlightenment Science and South America* (Chicago: University of Chicago Press, 2008); N. Safier, “The Confines of the Colony: Boundaries, Ethnographic Landscapes, and Imperial Cartography in Iberoamerica.” in *The Imperial Map: Cartography and the Mastery of Empire*. (Chicago: University of Chicago Press, 2009).

Scientists did not incidentally erase Indigenous knowledge from their publications or journals, nor did they accidentally ascribe a lower status to Aboriginal epistemologies. This erasure had far-reaching harmful consequences that Aboriginal people still struggle with today. We must recognize that the low status that scientists accorded to Aboriginal epistemologies of nature served the imperial discourses that scientists operated in and supported. In the nineteenth-century, scientists increasingly drew a sharp distinction between Indigenous and scientific epistemologies, labeling the former as superstition or mythology. Many historians have followed suit, and relate Indigenous epistemologies as defunct types of knowledge that colonialism lamentably but unavoidably destroyed, along with Aboriginal land tenure. A false dichotomy between the Indigenous and the modern informs this type of narration and positions Indigenous cultures as relics of a timeless past that contact with Europeans inevitably altered and irreversibly contaminated. Aboriginal historians have leveled scathing criticisms against these kinds of narratives because they always in some measure attribute the transformation of Indigenous philosophies and lifestyles to the superiority of European culture, including scientific epistemologies. Ultimately, they deny Aboriginal epistemologies a place in the modern world. Yet many Indigenous epistemologies and ontologies of nature have withstood the transformations that colonialism wrought, and are undergoing resurgence due to the hope that many modern Aboriginal people draw from reinvesting in traditional lifestyles and philosophies. For our purposes, the Indigenous/modern dichotomy obscures the ways that Aboriginal knowledge infused the scientific productions that emerged from contact between Europeans and Indigenous people.⁴⁹

⁴⁹ P. Raibmon, *Authentic Indians: Episodes of Encounter From the Late-Nineteenth-Century Northwest Coast* (Durham and London: Duke UP, 2005); P. Raibmon, "The Practice of Everyday Colonialism: Indigenous Women at Work in the Hop Fields and Tourist Industry of Puget Sound." *Labor* 3(3) (2006): 23-56; C. Thrush, *Native Seattle: Histories from the Crossing-Over Place*. (Seattle and London: University of Washington Press, 2007); R. Kuokkanen, *Reshaping the University: Responsibility, Indigenous Epistemes, and the Logic of the Gift*. (Vancouver: UBC Press, 2007); A.C. Wilson, "Reclaiming our Humanity: Decolonizing and the Recovery of Indigenous Knowledge." in *Indigenizing the Academy: Transforming Scholarship and Empowering Communities* D. Mihesua and A.C. Wilson, eds. (Lincoln and London: University of Nebraska Press, 2004), 69-87; D. Mihesuah, "Should American Indian History Remain a Field of Study?" in *Indigenizing the Academy*. 142-59.

Indigenous knowledge permeates Dawson's journals and published writings. Dawson took pains to record ethnological information on Aboriginal culture, including the explanations that his guides provided for how certain features of the landscape came to be formed. He actively sought the original names for landscape features and corrected the titles that other explorers had given for them. Indeed, he is somewhat exceptional in that he almost never renamed areas or natural features if he could learn their original title, and nearly always offered the Aboriginal name alongside European place names in his reports. In his journals he credited the guides that led him to mineral localities or other points of geological interest, though rarely by name. Dawson occasionally defended certain kinds of Indigenous knowledge, and spoke out against some of the worst abuses that white settlers perpetrated against Aboriginal people. The law allowing squatters to preempt land that Indians occupied for extremely low prices particularly disturbed Dawson, and he criticized the small sums that the BC government paid Indians to purchase stretches of land.⁵⁰ Despite incorporating Indigenous knowledge throughout his career, Dawson did not countenance all of the information that Aboriginal people provided him with, nor did he accord equal status to their epistemologies. The ways that Dawson related Aboriginal ontologies and ways of knowing the natural world effaced their contributions from the science that he produced and relegated their epistemologies, along with their culture, history, and rights to own and occupy their traditional territories as they saw fit, to a past that modernity was rapidly bringing to a close.⁵¹

GSC reports do not provide complete or perfectly accurate information on the regions that came under exploration. Depending on how well a season's surveying went, reports gave varying amounts of detail, and treated regions that they deemed more important or were able to gather

⁵⁰ For preemption see 19 Sept, 1877, *Journals Vol. II*, 402; For land purchases see "Sketches of the Past and Present, Condition of the Indians of Canada." *Canadian Naturalist* 9(3) (1877): 135-6.

⁵¹ Cruikshank; Parrish; For Dawson's opposition to land appropriation see GMD, "Sketches of the Past and Present." *Canadian Naturalist* 9(3) (1877): 129-159.

more information about more precisely than others. The terrain that surveyors worked in inevitably challenged their ability to make careful observations for every mile of trail that they covered. Although surveyors used sophisticated instruments to map and describe landscapes precisely, these instruments rarely performed up to expectations in the less-than-ideal conditions of field work. Dawson usually brought a barometer, a thermometer, a compass, and a sextant into the field for navigation and mapping. These delicate instruments broke easily, and Dawson rarely took extras along with him. Cloudy weather often prevented Dawson from making observations for latitude, so he could not keep track of his movements precisely. Dawson usually estimated distances by track surveying or dead reckoning, and did not consistently record the distances that he travelled every day. Regardless of how many packers he employed, Dawson occasionally had to labor along with the rest of the crew, especially during sections of bad trail. On these occasions, he recorded less detailed observations or nothing at all. Dawson also passed over sections of trail that did not seem particularly interesting or important, or filled these sections in with information that he received from various outside sources. Although treated the information that he garnered from outside sources skeptically, he generally added this information wholesale into his published reports.⁵²

The information that Aboriginal people provided Dawson helped him to avoid taking extra time to make his own observations, but it also equaled and often surpassed the information that he received from previous explorers, settlers that he spoke to, and even other GSC surveyors. During the Yukon survey, D. Johnson, a man Dawson hired to help the expedition, described the length of an arm of the Takko River as far shorter than what the Telegraph survey and the map that a miner drew for him suggested, leading Dawson to question Johnson's map. The military reconnaissance

⁵² Braun argues, correctly, that Dawson often treated Indigenous information as rumor, but neglects to mention that he usually treated *all* outside information as rumor. Dawson recorded the details about the system of rivers and lakes that fed into the Frances River that one Indian guide provided him through the medium of a map drawn on the underside of a canvas boat in charcoal in his *Yukon Report*, 104B-105B.

maps and descriptions from Frederick Swatka's Yukon expedition also frustrated Dawson throughout the Yukon trip, and he described one of Swatka's observations as a "thorough fraud."⁵³ By contrast, Indian guides usually drew maps "very correctly," and supplied additional useful information into the bargain.⁵⁴ Towards the end of his 1877 Shuswap Lake survey, Dawson opted against making a side trip to survey nearby Adam's Lake because his guide demanded too much money and he had been informed that the trail was inundated in many parts. Instead, he recorded a long note from Indian information that described the length of the lake, its rough bearings in latitude, the rivers attached to it, the types of trees that grew around it, the agricultural suitability of the land surrounding it, the kinds of fish that inhabited it, and its potential as a transport route to Kamloops. The Canadian government sought detailed year-round climate information on survey regions for the promotion of agricultural settlement, and Aboriginal people supplied volumes of this useful information. Surveying near Fort George in 1879, Dawson recorded information on the peculiar winter behavior of François Lake, which

remains unfrozen long after the snow covers the surrounding country, & (as I understand it) in Some mild winters does not freeze at all, generally however ice forms, which may remain only a short time late in the winter & then 'wake si-a warm – illihie' goes away.⁵⁵

Dawson also relayed information on the species that inhabited the regions that he surveyed by observing what animals and plants Aboriginal people used for food or other purposes and from what they told him about local biota. In 1877, for example, Indians near the Salmon River in the interior of BC informed him that "a species of small salmon . . . does not go to or come from the Sea, but is now ascending from the lake to spawn."⁵⁶ These salmon were undoubtedly Kokanees,

⁵³ 19 Sept, 1887, "Personal Diary 1887."

⁵⁴ 11 Sept, 1876, *Journals Vol. I*, 257.

⁵⁵ RPN, 16 Sept, 1876, *Journals Vol. I*, 259.

⁵⁶ 6 Aug, 1877, *Journals Vol. II*, 367.

which are indeed a freshwater variety. Information from one of his guides allowed Dawson to comment on the recent extinction of caribou and elk herds from the region north of Kamloops Lake, since his informants insisted that these animals had been abundant in the region in recent memory. As Dawson discovered, Aboriginal people also possessed detailed and extensive knowledge of local geology.⁵⁷

In *The Intemperate Rainforest*, Geographer Bruce Braun argued that Dawson believed that Aboriginal people had no knowledge of what resources their territories contained. According to Dawson, as Braun puts it, “as a people without Geology, they had no legitimate claim to the resources of the land, because . . . [he] assumed that that they were unaware of what was there.”⁵⁸ While Dawson certainly did not support Aboriginal peoples’ territorial claims, he recognized that they had detailed and specific knowledge about the geology of the regions that they inhabited, and used this knowledge to find valuable resources or to describe mineral locations and other geological features that he did not manage to visit. Since they often did not know the English names for minerals, Dawson inferred the presence of certain minerals from the descriptions that Indians made of natural phenomena, as he did during the Queen Charlotte Islands survey when he concluded that “bitumen, or something like it oozes” from a hot spring on one of the islands.⁵⁹ More often, Aboriginal people led him directly to mineral deposits, retrieved mineral samples for him, or described deposit locations and route information that allowed him to find mineral localities that included deposits of copper, iron ore, limestone, antimony, arsenic, and silver. Most significantly, guides led Dawson to several deposits of coal and lignite, an industrially-important,

⁵⁷ For Johnson Map, see RPN, 27 Aug, 1887 “Personal Diary 1887”; For more inaccuracies, see *Yukon Report* 153B; for Adams Lake, see RPN, 13 Aug, 1877 *Journals Vol. II*, 372; for other climate information borrowed from Aboriginal people, see GMD, “Memorandum on the Queen Charlotte Islands, British Columbia.” *Sessional Papers* (No. 123) Appendix 9 (1880); identification of salmon as Kokanee from Cole and Lockner, fn. 201, *Journals Vol. II*, 367.

⁵⁸ *Intemperate Rainforest*, 59.

⁵⁹ 9 July, 1878, *Charlottes*, 37.

soft form of coal. Coal deposits were extremely important finds for GSC surveyors. When they did not find significant deposits of valuable resources – and there was no resource that rapidly-industrializing Canada coveted more than coal during the nineteenth-century – the federal government inevitably threatened to shut down the GSC, cut its funding, or fire its employees. Because it was so important to the continued existence of the Survey, Dawson overcame his usual parsimony with Aboriginal employees when it came to coal or other valuable minerals. On one occasion he “got an Indian to go for a specimen of ‘fire stone’ about which had formerly heard reports, by giving him \$2.00. [He] Brought back a very good sample of lignite, which may be important.”⁶⁰ Aboriginal knowledge of local geology, then, not only enabled Dawson to make important scientific discoveries but also helped to ensure the Survey’s continued existence. A debate over the presence of jade deposits in western North America further exposes Dawson’s confidence in Aboriginal local knowledge of minerals and resources.⁶¹

The origin of the jade that many west coast Aboriginal societies used for sharp implements intrigued a number of anthropologists and geologists in the nineteenth-century. Explorers had not yet come across major deposits of jade *in situ* along the west coast, leading some geologists to speculate that Aboriginal people had brought the mineral along with them across the Behring land-bridge or engaged in trading networks with tribes in high Asia before the Behring land mass descended below the sea. Jade seemed to have been highly prized before Europeans introduced metal tools to these societies, and its use in burial suggested to ethnologists that Aboriginal people also valued it for spiritual purposes. Some anthropologists argued that the value that Aboriginal

⁶⁰ 9 July, 1876, *Journals Vol. I*, 225.

⁶¹ For other minerals see 3 June, 1877, *Journals Vol. II*, 316, 12 June, 1877, *Journals Vol. II*, 322, 19 July, 1878, *Charlottes*, 41, RPN, 5 Sept, 1878, *Charlottes*, 77; For GSC Funding see Zeller, *Inventing Canada*; Christie; Waiser; for information from Aboriginal informants on coal localities that Dawson did not visit, see GMD, “General Note on Mines and Minerals.” 18, 42; Dawson also describes a reported coal and lignite deposits that could be found along an Indian trail in his report on the Bow and Belly River district, suggesting that he perhaps obtained this information from Aboriginal informants. GMD, “Preliminary Note on the Geology of the Bow and Belly River Districts, North West Territory, with Special Reference to the Coal Deposits.” GSC (Montreal: Dawson Brothers, 1882), 14.

people attached to jade suggested that it came from distant sites – in other words, that they prized it so highly because they did not have any source from which to retrieve more of the material. The debate centered on the question of whether Aboriginal people retrieved jade from deposits that Europeans had not yet discovered. Geologists that favored the distal origin theory assumed that Aboriginal people did not or could not know about valuable minerals like jade if they did not occur close to Indian villages, and further assumed that Aboriginal people did not engage in distant trading networks for the mineral. Particularly at issue was whether they could believe “the reiterated testimony of the natives,” such as that given “by the natives from Kotzebue Sound to Cape Barrow, [who say that jade is] to be obtained in the mountain chain which extends along that coast.”⁶² According to a paper by German anthropologist A.B. Meyer, several scientists “will not acknowledge the fact of the occurrence [of jade] until it has been reported by an European eye-witness.”⁶³ Using Meyer’s arguments and evidence from his own explorations in BC, Dawson concluded that the jade used in Aboriginal implements came from deposits somewhere in the mountainous cordillera, a suspicion that he confirmed later when he found pebbles of jade *in situ* during the Yukon journey. Dawson argued that Aboriginal people valued jade so highly because it was “the best non-metallic material from which to manufacture tools with permanent cutting edges” before Europeans introduced metal implements rather than that they prized it because of “superstitious or sentimental feelings.”⁶⁴ Dawson pointed to two jade boulders found on the lower Fraser that had tool marks on them and an apparent adze-manufacturing site discovered near Lytton. These boulders and fragments bore similar characteristics of sand and wind erosion that stones found near swift bends of the Fraser showed, suggesting that they might have retrieved jade

⁶² Ibid.

⁶³ GMD, “Note on the Occurrence of Jade in British Columbia, and its Employment by the Natives, with Quotations and Extracts from a Paper by Prof. A.B. Meyer, on Nephrite and Analogous Minerals from Alaska.” *Canadian Record of Science* 6 (2) (1887): 12.

⁶⁴ Ibid, 2.

in a similar spot. This archaeological evidence lent weight to the oral testimonies that Dawson, Meyer and others had gathered, confirming that Aboriginal people had knowledge of minerals that could be found near their villages and also at distances farther away.⁶⁵

Dawson discovered that the knowledge that Aboriginal people had of geology and geography included the actions of the landscape as well as its more tangible features like mineral localities. During his first survey with the GSC in BC in 1875, Dawson puzzled over the deep piles of mussel and oyster shells that a New Westminster settler had pointed out to him along a terrace above the Fraser River. These shell heaps, or kitchen middens, were waste accumulated from years of human inhabitation, and came from mollusk species that “do not now inhabit the Frazer or its estuary.”⁶⁶ Dawson came across a few of these shell middens near Victoria, and observed one pile forming near a small Aboriginal village in the interior. Dawson was also aware of several other old shell piles that sea action had eroded away from the surrounding clay soils, some of which occurred well below the high tide line. Observing that “the Indians would scarcely choose for camping a place liable to overflow, and if the shells were merely thrown there, they would have been scattered from time to time by the high tides,” Dawson speculated that these shell middens evinced a radical change in the level of the coast sometime in the post-glacial era.⁶⁷ Since he could find no indication that tide levels had changed “more than a few feet” recently, Dawson decided that more dramatic changes had probably occurred within the last several thousand years.⁶⁸ On top of archaeological evidence from shell middens, historical evidence from George Vancouver’s eighteenth-century exploration journals, and some geological observations that he had made of deep-sea marine fossils embedded in high terraces near the coast, Dawson added evidence from the

⁶⁵ GMD *Yukon Report* 38; GMD, “Notes on the Shuswap People of British Columbia.” *Transactions of the Royal Society of Canada* (1891): 18-19.

⁶⁶ RPN 19 March, 1876, *Journals Vol. I*, 158, italicized in original.

⁶⁷ GMD, “Note on Some of the More Recent Changes in Level of the Coast of British Columbia and Adjacent Regions.” *Canadian Naturalist*, (1877): 3.

⁶⁸ *Ibid.*

testimony of Aboriginal peoples to the article that he published on changes in the elevation of the Pacific coast.⁶⁹

“The various Indian tribes of the coast and interior,” Dawson writes, “like all peoples, have their stories, more or less unreal and grotesque, of deluges, or *the deluge*.”⁷⁰ One of these stories that ethnographer James G. Swan had recently collected from the Makah tribe of Cape Flattery, however, conformed so closely to Dawson’s developing theory of dramatic sea-level changes that he included it in his article more or less in its entirety. The story described an event, sometime in the distant past, when the sea-water in the inlet between Wäatch Village and Neeah Bay receded over four days, then submerged the whole country to nearly the highest mountains of Clayoquot Sound. Four days later, the water returned to its normal level, but only after causing enormous destruction to the Wäatch settlement and carrying a small group of people North past Nootka sound. Swan noted that the swampy prairie land between Wäatch and Neeah Bay showed conclusive evidence of inundation, and that the tribe now inhabiting Port Townsend claimed descent from the Makahs, validating the story. Dawson proposed that though the story was “no doubt much exaggerated, [it] probably embalms the memory of some real event, either of the nature of an earthquake wave, or depression and reelevation due to the not yet wholly extinct volcanic forces of the coast.”⁷¹ In tandem with the geological evidence, these stories suggested to Dawson that many dramatic inundations of sea-water punctuated the distant history of the coast, along with land elevations and milder depressions due to seismic activity. In another instance, Dawson incorporated Aboriginal traditions to suggest “that at a former period the [Great] glacier [on the Stikine River] stretched completely across the valley, the Stikine passing beneath the ice

⁶⁹ For shell heap found in interior of BC see 20 May, 1876, *Journals Vol. I*, 190; See also 1 March, 1876, *Journals Vol. I*, 166-7.

⁷⁰ GMD, “On the More Recent Changes,” 6.

⁷¹ *Ibid*, 7.

through a tunnel-like opening.”⁷² Dawson also used a tradition from the Nass people that described an ancient volcanic eruption to suggest that post-glacial lava-flows or volcanic rocks might be found, even though he had only observed much older rocks of this type.⁷³ Although he prefaces these stories with derisory comments about the mythological associations that Aboriginal people made with natural phenomena, and required additional evidence to conclusively prove Aboriginal stories of geological events, Dawson seems to have had some respect for Aboriginal oral traditions that described deep stretches of time. Indeed, the great importance that Aboriginal people placed on the interactions between humans and changing landscapes intrigued Dawson enough that he included these stories in many of his notes and reports.

‘TIME IMMEMORIAL’: SCIENTIFIC EPISTEMOLOGIES AND THE ERASURE OF INDIGENOUS KNOWLEDGE

As anthropologist Peter Nabokov argues in *A Forest of Time*, “nonbuilt environments” play a “full-bodied role” in many North American Aboriginal oral and historical traditions.⁷⁴ In a similar vein, Julie Cruikshank notes that “Yukon storytellers *merge* natural histories of landscape with social histories and pursue their analogies in a local human ecology.”⁷⁵ While we must be careful to not overgeneralize about Aboriginal philosophies towards the nonhuman environment, it is fairly safe to say that nonhuman actors frequently play a powerful role in Aboriginal oral traditions, which in turn emphasize interactions between the natural world and human beings, often over great expanses of time. The boundaries between human and nonhuman or other-than-human entities tend to be much more permeable than European ontologies of nature allow, and they rarely describe nature as wholly inanimate. Northwest Coast traditions about the causes of earthquakes,

⁷² *Yukon Report*, 53B.

⁷³ GMD, “Sketch of the Geology of British Columbia.” *Geological Magazine* 8(4&5) (1881): 6.

⁷⁴ P. Nabokov, *A Forest of Time: American Indian Ways of History*. (Cambridge: Cambridge UP, 2002), 132.

⁷⁵ Cruikshank, 8.

for example, attribute seismological activity to battles between bird-spirits that manifest themselves as thunder.⁷⁶ Human actions often influence natural phenomena, which in turn impact human history, as in Yukon traditions surrounding the actions of glaciers, which punish social transgressions but also affected tribal migrations, playing an active role in the formation of important clan divisions. Aboriginal oral traditions narrate a very different role for the natural environment than most European forms of historical reckoning do, and heavily emphasize place. It is not surprising, then, that when Dawson asked questions about features of the natural landscape, the answers that he received from Aboriginal people often described how these features had changed over long stretches of time, or narrated the role that they played in the human history of the region. These explanations highlighted the agency that powerful other-than-human beings had in creating natural features, differing sharply from the kinds of powerful forces that Dawson attributed landscape change to like erosion, seismic activity, heat, and pressure.⁷⁷

In the course of seeking geological and geographical knowledge about the regions that he explored, Dawson recorded several oral traditions that described how certain features of the landscape came to be formed. During his 1888 Shuswap survey, Dawson's guide told him several stories that centered around the Shuswap culture-hero Kwil-ī-elt', who killed off the many monsters that once terrorized the region, brought important foods like salmon and elk to the Shuswap people, and left his mark on several features of the landscape. One of these stories refers to two prominent stones on the Thompson below Savona that are the remnants of "two bad women with supernatural powers" who Kwil-ī-elt' transformed into stone because they "danced upon a high rock & turned to stone" passersby who stopped to look.⁷⁸ Four women of even greater

⁷⁶ Thrush and Ludwin, 6.

⁷⁷ Yukon traditions on glaciers from Cruikshank, *passim*; See also D. McNab, *Circles of Time: Aboriginal Land Rights and Resistance in Ontario* (Waterloo: Wilfrid Laurier University Press, 1999).

⁷⁸ GMD RPN 4 October, 1888, "Private Diary 1888."

supernatural power later turned Kwil-ī-elt' and his two friends Klē-sa' and Took-im-in-ēlst' to stone when they made the same mistake of stopping to watch the dancing women. According to his guide, three large pillars still stood somewhere in the Fraser valley as evidence of their foolishness and as a reminder of the powerful supernatural forces that sculpted the homeland of the Shuswap people. Dawson recorded many stories like these in his field notebooks, and summarized several of them in his formal ethnographic texts, but he did not agree with the agency that his Aboriginal guides and informants ascribed to the landscapes that he surveyed. Nor did he believe in the supernatural powers of the other-than-human beings that Aboriginal traditions populated the natural world with. For Dawson, this agency represented mythological or superstitious ways of explaining natural phenomena that were ethnologically-interesting but did not stand up to scientific visions of what the landscape contained, and the forces that had shaped it.⁷⁹

Although Dawson's publications did not ascribe power to other-than-human beings in molding the regions that he surveyed, the visions of nature that he articulated were equally situated in culturally-specific ways of seeing, representing, and interacting with the natural world. The GSC was tied up in a project of modernizing the Canadian landscape – of using its natural resources to create a productive, prosperous state that would sustain heavy settlement and compete economically with other nations. This vision abstracted human connections – and human history – from the natural environment, which it resituated in discourses of resource extraction and development. These notions of landscape, and particularly the practices toward the natural environment that these ideas encourage, have long dissatisfied environmentalists. Indeed, many have looked to Indigenous philosophies of nature, albeit problematically, as correctives to the exploitive resource practices that cause irreparable damage to the environment.⁸⁰ For our purposes,

⁷⁹ GMD, RPN 2 Oct, 1888, "Private Diary 1888."

⁸⁰ For problems with Indigenous environmentalism see S. Krech, *The Ecological Indian: Myth and History* (New York: W.W. Norton, 1999); D. Ranco, "The Ecological Indian and the Politics of Representation: Critiquing *The*

the modernist project that Dawson's work supported always colored the ways that he described the landscapes he surveyed. Dawson's reports tend to focus on the resource contents of the regions in question and their potential for heavy agricultural settlement and industrial development. They diminish the human history of an area or obscure it altogether, although Dawson usually offered some minor commentary on the Aboriginal people who inhabited the areas that he described. Dawson nearly always emphasized change when describing the cultural landscape of the regions he surveyed. In technical language, his reports describe what the landscape looked like at the present with an eye towards what transformations the region could support in the near future. On observing some grains that drifted from an Indian camp near the Salmon River, for example, Dawson remarked that they demonstrated "what may be expected of these higher valleys & even parts of the plateau, with care, cultivation & irrigation."⁸¹ In so doing, they endorse the colonial project then transforming Western Canada, and imply that European settlement constituted the true beginning of history in these regions, a process that would inevitably reduce Aboriginal land tenure since their possession of the land could not compete "with the requirements of modern civilization."⁸² Chalking the dispossession of Aboriginal people up to the irrepressible forces of history obscures the role that institutions like the GSC, and imperial scientists like George Dawson, played in enabling this process. Along with Aboriginal forms of land tenure, Dawson dismissed Aboriginal epistemologies and natural philosophies as incommensurable with modern science and modern life.⁸³

The way that Dawson related the information that Aboriginal people supplied him with, particularly when supernatural ontologies of nature packaged this valuable information, accorded a

Ecological Indian in the Age of Ecocide." in *Native Americans and the Environment: Perspectives on the Ecological Indian*. ed. M.E. Harkin and D.R. Lewis (Lincoln and London: University of Nebraska Press, 2007), 3-31.

⁸¹ 1 Sept, 1877, *Journals Vol. II*, 386.

⁸² GMD, "Sketches of the Past and Present," 129.

⁸³ Zeller, *Inventing Canada*; Braun, "Buried Epistemologies.;" Braun *Intemperate Rainforest*; W. Cronon, "The Trouble with Wilderness; or, Getting Back to the Wrong Nature." in *Uncommon Ground.*; Haraway.

lower status to Aboriginal forms of knowledge and natural ontologies. When he inquired about recent mudslides on the Thompson River during his 1888 Shuswap survey, for example, his informant told him “a long mythological story concerning it,” but nothing that Dawson found important enough to record on the mudslide itself.⁸⁴ Labeling Aboriginal knowledge surrounding valuable resources superstition, Dawson suggested that the petroglyphs and paintings covering certain lignite deposits in Alberta suggested that these formations “have been probably from time immemorial objects of superstition to the Indians inhabiting this region of the plains.”⁸⁵ Dawson often effaced the mythological content of Indian information from his publications, as he did in his discussion of coast level changes, which provides the geological substance of Indian stories extracted from their “unreal and grotesque” details. When he incorporated Indigenous information, particularly in his published works, Dawson implied that the supernatural causation that Aboriginal people attributed to natural phenomena called into question the veracity of all of their natural knowledge. Doing so in official reports and publications enabled Dawson to distance himself and his own observations from supernatural epistemologies of nature, privileging the kinds of information reconnaissance that he and other scientists performed in Western Canada.⁸⁶

Dawson accorded credibility to the GSC’s scientific enterprise and undermined the contributions that Aboriginal people made by representing their input differently than those that Euro-Canadian people had made. When Dawson used Indigenous knowledge, he often ridiculed the people that had provided him with it, or downplayed their contributions to his work. On the other hand, Dawson usually celebrated or praised the contributions, no matter how obscure, that white people had made to the survey. One of the ways that Dawson did so was by naming features

⁸⁴ GMD 26 August, 1888, *Private Diary 1888*.

⁸⁵ GMD, “The Lignite Formations of the West.” *Canadian Naturalist* 7(5) (1874): 246.

⁸⁶ For ‘time immemorial,’ see also GMD, “Notes on the Indian Tribes of the Yukon District and Adjacent Northern Portion of British Columbia.” (1888): 204B.

of the landscape after people that he wished to commemorate. He commemorated both Aboriginal and non-Aboriginal people in this way, but ascribed very different meanings to this form of celebration. On 7 July 1888, Dawson recorded a brief note describing an encounter that he had along the trail with an old Aboriginal woman who “was particularly grave & eloquent in laying down all facts as to route to be followed, & looked most comical perched on a little base together with a big pack of household stuff as she did so.”⁸⁷ The next day, Dawson found the trail to be very carefully marked, as the old woman “had evidently taken great pains to point out our route distinctly.”⁸⁸ To commemorate the help that this old woman provided him, Dawson named the stream that he followed westward two days later ‘Witches Creek.’⁸⁹ This name reframes the interaction in which Dawson received the information that helped him to locate the creek, and along with his comments at the time, suggests that this woman was meddling or otherwise irritating, the knowledge that she bestowed upon Dawson a trifle that he remembers as humorous. In contrast, Dawson proposed naming a mountain in the valley feeding the south-east end of Mud Lake “Mount White” after Thomas White, a Member of Parliament who supported the Yukon survey. In the report that the GSC released following the expedition, Dawson remarked in a footnote that naming a mountain after White would honor this man “to whose initiative the despatch of the expedition . . . was largely due.”⁹⁰ Dawson’s renaming of Mount White commemorates the ‘initiative’ of this MP and marks his contributions to this important scientific endeavor, in turn implying that he was an enlightened and hardworking man who advanced knowledge of Canada’s western extremities. The woman that provided him detailed information and tangibly aided his surveying, on the other hand, remains nameless to posterity, an anonymous witch whose mannerisms amused Dawson. Both clearly benefitted the survey, but Dawson accords

⁸⁷ GMD 7 July, 1888, “Private Diary 1888.”

⁸⁸ Ibid.

⁸⁹ GMD 9 July, 1888, “Private Diary 1888.”

⁹⁰ GMD, *Yukon Report* 164, fn. 3.

much greater value to White's contribution.

Dawson treated his interactions with Aboriginal people in the field similarly in his journals and notebooks. He usually represented these interactions in two major modes. First, he often describes friendly, almost cozy, episodes in which he enjoys the company of Aboriginal people, learns about their 'customs' and languages by the fireside, and practices his Chinook in the exchange of a few trifling items. In these instances, he often remarks on the hospitality of his hosts and occasionally commemorated their kindness with a photograph (Fig. 2). Alternately, Dawson presents these meetings as annoyances that slow his progress down and mark Aboriginals as lazy, stingy people who were unconcerned with (and uncomprehending of) the scientific imperatives of the survey. Both of these modes minimize the scope of Aboriginal participation in Dawson's surveying and distance them from the actual production of knowledge, presenting them as backgrounds in which Dawson successfully performed his cultural *savoir faire* to manipulate information out of Aboriginal people. Dawson successfully negotiates the balance of local politics and earns the trust of Aboriginal people, who only observe their own 'customs' without learning anything new in the bargain. Dawson implies that he is removed from the narrow cultural constraints that, by extension, we assume control the behavior of his Aboriginal hosts. He also erases the agency that Aboriginal people retained over the production of knowledge, which they demonstrated in insisting, however tacitly, that Dawson follow their own customs of politeness and economics. When Dawson successfully retrieved information from Aboriginal people or hired them to pack or guide, regardless of whether the process was enjoyable, enlightening, or frustrating, he attributes his success to patient negotiation of Aboriginal customs. By contrast, Dawson found the ways that Aboriginal people emulated European customs bizarre or comical, or,

more sinisterly, as evidence that Aboriginal culture was becoming subsumed through contact with a superior race.⁹¹



Figure 2 G.M. Dawson, “Haida Indians of Ya-Tza Village, Graham Island, Queen Charlotte Islands, B.C. Chief Edenshaw Standing Second from Left” 23 August, 1878, Library and Archives Canada, a038154.

Just what did Dawson find so comical in the earlier example about the woman’s ‘grave & eloquent’ manner of offering him trail information? Dawson doesn’t provide any details about

⁹¹ Dawson’s report on the Kwakiutl (Kwakwaka’wakw – for Dawson this included roughly the tribes inhabiting the North of Vancouver Island and nearby coasts) People, for example, opens on a particularly intimate note: “[I] was in constant and intimate association with this people, and enjoyed many excellent opportunities of obtaining facts respecting them, of hearing their traditions and stories, and of becoming familiar with their mode of life and habits of thought.” GMD, “Notes and Observations on the Kwakwaka’wakw People of the Northern Part of Vancouver Island and Adjacent Coasts, made during the Summer of 1885; with a Vocabulary of about Seven Hundred Words.” *Transactions of the Royal Society of Canada* (1887): 1. See also “On the Haida,” 103B; Dawson articulates his theory that contact with European people caused the destruction of Aboriginal societies throughout his ethnologies, and also makes comments to the same effect in various notes and publications. Dawson did not feel that this process would destroy all Aboriginal cultures completely, and he argued that contact would not affect all tribes equally. The Haida, according to him, seemed particularly apt to weather contact relatively unscathed, notwithstanding the enormous toll that disease epidemics had recently taken on the islands. See GMD, “Sketches of the Past and Present”; A. Mackenzie, with an introductory note by GMD, “Descriptive Notes on Certain Implements, Weapons, etc., from Graham Island, Queen Charlotte Islands, B.C.” *Transactions of the Royal Society of Canada* 2 (1891): 46; GMD, “Memorandum,” 142; GMD, “Draft Lecture on Evolution?” McGill University Archives, MG 1022, n.d. 5.

what she actually told him, nor does he elaborate on why her mannerisms seemed so funny. It could be that Dawson thought that her serious manner in remitting information to be used for scientific reconnaissance contrasted with her identity as an Indian perched astride a bag of household items. A comment that Dawson made on another occasion supports this reading:

One very friendly Siwash with a square peaked Cap, proud of a little English, marched down into the Cabin, lifted a Chart, unfolded it, & began turning his head to one side, pointing places with his finger, & pretending to look very knowing, but really appearing very Monkeyish.⁹²

Something struck Dawson as ironic in Aboriginal pretensions to scientific knowledge. What Dawson finds comical or monkeyish is the seriousness with which Aboriginal people treated their own knowledge – in this case that the man claimed a similar epistemological status that the disciplined and serious demeanor of GSC scientists denoted. According to Dawson, this man was only “pretending to look very knowing,” but because he was Aboriginal, could only be imitating, in an irritating way, the behavior that marked serious scientific endeavor. Ultimately, a false dichotomy between serious, modern European scientific culture (represented in the chart in the above passage) and Aboriginal forms of knowledge (represented by the monkey) lends this episode its supposed comedic value.⁹³

According to Dawson, the information that Aboriginal people supplied him about the landscapes he surveyed represented ancient or timeless forms of knowledge rooted deeply in Aboriginal experiences with the environment, rather than modern forms developed through the careful study of the natural world. Dawson often remarks that Aboriginal people had possessed certain types of knowledge about their natural surroundings, or engaged in certain cultural

⁹² GMD, 3 Aug, 1878, *Charlottes*, 52.

⁹³ Philip Deloria makes a similar argument in *Indians in Unexpected Places*. (Lawrence: University of Kansas Press, 2004).

practices, since “time immemorial.” “The use of copper,” for example, “and to some extent the method of manufacturing it into various articles by hammering, has been known from time immemorial to most of the Indians of this part of the west coast.”⁹⁴ Similar phrasings crop up throughout Dawson’s commentary on Aboriginal society, such as when Dawson argued that

The Indians of the interior of British Columbia are not unlike those of this part of Canada, hunting & roaming through the woods, fishing in the lakes, & collecting at certain seasons as their ancestors have done time out of mind, to certain localities favourable for the capture of the salmon.⁹⁵

While many Aboriginal historical traditions and cultural practices have certainly existed in more or less the same form for thousands of years, Dawson suggests here that Aboriginal knowledge of and ways of interacting with the natural environment were static and unchanging prior to contact with European people.⁹⁶ This well-worn stereotype accords an extremely low status to Indigenous epistemologies. As Richard White argues, “whites readily grant certain nonwhites a ‘spiritual’ or ‘traditional’ knowledge that is timeless. It is not something gained through work or labor; it is not contingent knowledge in a contingent world.”⁹⁷ Dawson ascribes to Indians a haphazard form of knowledge that differs from the active, accumulative forms of knowing that characterized European scientific progress. For example, he remarked that “the little paths they call trail here, wind and twist seeking for lines of least resistance, or following the track by which the first Indian originally scrambled across the country.”⁹⁸ Dawson argues that Aboriginal forms of knowledge could not change or build upon themselves, and consequently “most of the native peoples seem to

⁹⁴ GMD, “On the Haida,” 149.

⁹⁵ GMD “MSS on BC,” 41.

⁹⁶ For cultural practices that preceded and withstood colonialism, see H. Bohaker, “*Nindoodemag*: The Significance of Algonquian Kinship Networks in the Great Lakes Region, 1600-1701.” *William & Mary Quarterly* 63(1) (2006): 23-52.

⁹⁷ R. White, “Are you an Environmentalist or do you Work for a Living? Work and Nature.” in *Uncommon Ground: Rethinking the Human Place in Nature*. Ed. William Cronon (New York: W.W. Norton, 1996), 175.

⁹⁸ GMD to AD 3 October, 1875, *Life and Letters*, 117.

have lived thus, in a narrow Known circle of doubtful security, fenced in on all sides by the monstrous creations of their own imaginations.”⁹⁹ Dawson carries this sense of Aboriginal knowledge (and culture) as static or timeless in his ethnological notes, which aim to save elements of Aboriginal culture before contact with Europeans caused them to disappear entirely.¹⁰⁰ Becoming truly modern, and attaining all the epistemological and cultural advantages that modernity imposed, required radical transformation, in which “the Indian as such cannot . . . survive.”¹⁰¹

Dawson’s credibility depended on articulating Indigenous epistemologies as other-than-science, but enforcing the alterity of Aboriginal natural philosophies, not to mention forms of land tenure, also naturalized the territorial appropriation that geological surveying enabled. Dawson seems to have realized that expanding Canadian jurisdiction and settlement into Native territories required moral justifications that centered on the status of Indian knowledge and ways of life. As he pointed out, false stereotypes about Indian notions of property (or, more properly, the lack of Indian notions of property) infused the arguments that many settlers used to justify their appropriation of Indian land. These arguments did not stand up to Dawson’s observations on Aboriginal economics – rather, the people that Dawson encountered had very strong and well-defined notions of property, which they were clearly willing to defend violently. Nor did the ways that various Canadian jurisdictions had compensated Aboriginal communities for land purchases seem adequate. Dawson pointed out that settlers often took advantage of the demoralized state of Indigenous communities that had recently experienced disease epidemics, rarely lived up to the

⁹⁹ GMD, “Notes on the Discovery of the Northwest, 1881.” McGill University Archives, G.M. Dawson’s Papers, MG 1022, 37-8.

¹⁰⁰ GMD, “Notes and Observations on the Kwakwaka’wakw,” 1 explicitly suggests that Kwakwaka’wakw culture was disappearing. Dawson certainly did not invent this trope, see S. Conn, *Museums and American Intellectual Life, 1876-1926*. (Chicago: University of Chicago Press, 1998); S. Conn, *History’s Shadow: Native Americans and Historical Consciousness in the Nineteenth-Century*. (Chicago: University of Chicago Press, 2004).

¹⁰¹ GMD, “Sketches of the Past and Present,” 158; For a similar argument, see Grek-Martin.

compensation packages that they had agreed to, or simply undervalued Indian land. As these conventional arguments fell short, Dawson turned to the differences between Euro-Canadian epistemologies and natural philosophies to excuse the spread west. Doing so allowed Dawson to suggest that, while the appropriation of land was not just in any meaningful sense of the term, and it wasn't even strictly legal most of the time, expansion west was irrepressible by the state and irresistible by Aboriginal people.

CONCLUSION

Historians have too long allowed polarized arguments about colonial scientists to overshadow the active role that Indigenous people took in shaping the knowledge that these explorers produced. In Dawson's case, the question of his heroism has distracted scholars from tackling the ways that he interacted with Aboriginal people in any but superficial ways. Dawson certainly deserves our admiration for his hard work, intelligence, and bravery, particularly given the challenges that his severe disabilities posed. At the same time, we cannot ignore the role that he played in advancing the Canadian colonial project, nor can we excuse the racist perceptions of Aboriginal people that he articulated. We should not, however, allow the ways that Dawson represented Indigenous people further alienate them from modernity. Aboriginal people had (and have) vast and detailed knowledge about the natural world that they deployed in powerful philosophies that enriched their lives and sustained them as a people throughout their painful experiences with colonialism. Examining the ways that scientists like Dawson borrowed and interacted with these environmental perspectives ultimately showcases the tremendous strength of Aboriginal natural philosophies to influence explorers whose world views differed from their own.

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