Knowing Ways/Ways of Knowing: Reconciling Science and Tradition

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Roberta Robin Dods

Abstract

The '"facts" that enter our knowledge are already viewed in a certain way and are, therefore, essentially ideational' (Feyerabend 1988: 11). In recognizing this we come to understand that there has arisen for traditional peoples what has been called, in a parallel context of the analysis of postmodernism in Western society, a 'crisis of narratives' (Lyotard 1987: 73). Why this is the case can be examined through a discussion of two ways of knowing: the *traditional* and the *scientific*. The paper begins with a discussion of some concepts as proposed by Lyotard (1987), continues with various basic distinctions between traditional and scientific ways of knowing, and then concludes by suggesting their compatibility and utility for the development of a wider perspective in both anthropology and archaeology.

Keywords

Archaeology; scientific knowledge; traditional knowledge; *savoir*; *connaissance*.

Introduction: *savoir* and *connaissance*

Traditional cultures or traditional segments of post-traditional societies work in worlds of 'knowledge (*savoir*)' as opposed to *the* world of 'learning (*connaissance*)' (Lyotard 1987: 78). You will note that there is an interesting use of the plural set against the singular[1] in Lyotard's distinction of worlds of *savoir* and of *connaissance*. The world of *savoir* can be reduced neither to science nor to learning, as we understand these terms in the world of Western science or the academy. In this context *savoir* is reminiscent of the Lévi-Strauss discussion of mythical thought as 'an intellectual form of *bricolage*' (1966: 21). What has meaning in the world of *savoir* is not a form of knowledge located in a set of denotative statements but rather sets of knowing that include 'notions of "know-how," *savoir-faire* "knowing how to live," *savoir-vivre* "how to listen" *savoir-écouter*' (Lyotard 1987: 78–9). It is *the* way things are done, much like the Japanese concept of *do*. Knowledge becomes a question of competence, not merely the simple determination and application of the criterion of truth. Important is

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> the determination and application of criteria of efficiency (technological qualification), of justice and/or happiness (ethical wisdom), of the beauty of a sound or color (auditory and visual sensibility).... The consensus that permits such knowledge to be circumscribed and makes it possible to distinguish one who knows from one who doesn't (the foreigner, the child) is what constitutes the culture of a people.
>
> (Lyotard 1987: 78–9)

By means of contrast, *connaissance* 'is a set of statements that, to the exclusion of all other statements, denote or describe objects and may be declared true or false' (Lyotard 1987: 78). Here, for Lévi-Strauss, *connaissance* would be based 'on the distinction between the contingent and the necessary' (1966: 21).

Science, as defined in Western tradition (WT), is a subset of learning or *connaissance*. Not only is it set out in denotative statements, but also two additional supplementary conditions of acceptability are imposed. First is the condition of possible re-testability and this under 'explicit conditions for observation', and, second, the observed must be presented in 'the language judged relevant by the experts' (Lyotard 1987). That this language comes to delineate an area of exclusivity, a cadre of privileged people, further isolates it from the experience of those whose lives are framed by the realm of *savoir*. This is the political content that is addressed in various discussions on the ownership of traditional knowledge. The justifiable fear, as expressed by Mead (1998–9: 8–10), is that the fruits of *savoir* will be consumed (or *consumerized*) by the practitioners of *connaissance* without appropriate recognition of their source or intellectual ownership.

The problem, from the perspective of Lyotard (1987), appears to be that 'narrative knowledge does not give priority to the question of its own legitimation and that it certifies itself in the pragmatics of its own transmission without having recourse to argumentation and proof'. In traditional knowledge (TK) systems the 'incomprehension of the problems of scientific discourse is accompanied by a certain tolerance: it approaches such discourse primarily as a variant in the family of narrative cultures'. However, in the world of Western tradition (WT), where science is a subset, the converse is not supported as the 'scientist questions the validity of narrative statements and concludes that they are never subject to argumentation or proof'. Therefore such statements become classified 'as belonging to a different mentality: savage, primitive, under-developed, backward, alienated, composed of opinions, customs, authority, prejudice, ignorance, ideology'. Thus do the worlds of *savoir* have their narratives of know-how defined as 'fables, myths, legends, fit only for women and children' (all quotes from Lyotard 1987: 80), seemingly separating mythos and logos into mutually exclusive realms. This also marks the distinction between the oral and the written, a point about language found in both Rousseau (1817) and Morgan (1877). However, such compartmentalization of ways of knowing is not necessarily a feature of traditional culture.

Thus we are left with a stated conflict between these two ways of knowing. This conflict is summed up by Lyotard when he notes that with the 'pre-eminence of the narrative form in the formation of traditional knowledge....It is impossible...to judge the existence of validity of narrative knowledge on the basis of scientific knowledge and vice versa [*because*] the relevant criteria are different.' This does not mean that he dismisses TK, far

from it. For he continues by saying: 'All we can do is gaze in wonderment at the diversity of discursive species, just as we do at the diversity of plant or animal species' (1987: 79–80).

Hopkins (2000), in her discussion of traditional medicine, is more pragmatic when she suggests this separation into two forms of knowing does not necessarily need to be the case, for the traditional can be examined by and through the scientific. This becomes clear when we accept Feyerabend's challenge that 'the invention of alternatives to the view at the centre of discussion constitutes an essential part of the empirical method. . ..A scientist who is interested in maximum empirical content. . .will adopt a pluralistic methodology' (1988: 29). But, however much this pluralistic approach is vaunted, the practitioners of 'science' can have difficulty embracing narrative knowledge, the discourse of the traditional worlds.

Western scientific knowledge (WSK) and traditional ecological knowledge (TEK)

It is essential for this analysis to understand that TEK 'differs substantially from Western Scientific Knowledge (WSK), itself a component of WT, in terms of the nature of the data collected, the approach to the acquisition of knowledge, and the areas of primary concern or focus' (Berkes et al. 1992: 3–4). When the components to the development of TEK are understood it becomes immediately apparent that it is not incompatible with the objectives of WSK. An important illustration of this can be found in the work of Riddington with the Athapaskan of Northwest Canada. In his article on indigenous technology and world view he argues that the Beaver Indians (*Dunne-za*) value technical knowledge over material artefacts: 'possession of information was far more important than physical possessions' (1982: 473). He goes on to note that

> [t]he Beaver people viewed human experience as a life-sustaining network of relationships between all components of a sentient world. They experienced their world as a mosaic of passages and interactions between animate beings in motion against the backdrop of a terrain that was itself continually in process, through the cyclical transformations of changing seasons.
>
> (Riddington 1982: 473)

For the hunter, knowledge of the environment, exploitative strategies and technology are vitally important. Nelson (1973) reinforces this view with his study of Alaskan hunters (Kutchin), and from this we can generalize to others. He notes that hunters and gatherers are 'uncommonly knowledgeable about their environment and intelligent in their approach to exploiting it' (Nelson 1973: 301). This knowledge he characterizes as having a number of 'essential contributing aspects': knowledge; objectivity and empiricism; curiosity; communication; understanding of the environment; and access to a number of exploitative techniques (Nelson 1973: 301). To this I would add the benefit of the social group(s) of kin and non-kin associations that through their flexibility are contributing factors to successful exploitation strategies. He continues by noting that the best hunters are the ones with '*intense scientific curiosity* about their environment and the ways of exploiting it' (Nelson (1973: 305, emphasis added).

Traditional ecological knowledge and archaeology

Methodologically and philosophically, traditional ecological knowledge (TEK), a component of TK, is an integral part of the analysis of the archaeological remains of prehistoric, protohistoric and historic peoples and cultures, where appropriate materials to support such an analysis are available. For example, in northern Canada we are fortunate to have written records ranging from incidental documents to documents of exploration, trade and government, to structured ethnographic records, variously dating from the early contact period continuing into this century. Increasingly, there is also being gathered into printed form (although video tape/tape recordings/wave files are being substituted in some cases) the oral traditions and memories of the elders, if not directly because of their loss to us through death, then through the memories of those who knew them (e.g. Behne 1997 on traditional canoe building). In some cases the rich detail of these collections is reminiscent of the relentlessness of the Boasian approach to the dilemma of continued culture loss or mutation. A considerable amount of such material is being collected specifically for court cases on land-claims issues. As such, significant components of the recording of the past deal with possession and use of traditional territory, rights of occupation, rights of use of habitats and other relationships to the land. It must be admitted that not all of these materials, past and present, are of excellent quality. None the less, a great deal of it is indispensable to an understanding of the past. We do know that the early materials speak directly of the peoples of the past who lived in these areas of Canada at the time of European contact. It is assumed, rightly, that these same early documents also provide an insight into the lives of the indigenous peoples before the advent of European contact and colonization. The archaeological and historical records document a physical and cultural continuity to present day indigenous populations, the people of the First Nations in this Canadian example.

Thus the direct historical approach is applicable here if it is applicable anywhere (see earlier applications in Dawson 1977; Wright 1968). Here metaphor, the transfer of value assumptions between two domains (Cohen 1994: 5), analogy and homology do not suffer from the problem of being thrice removed – removed by time, removed by space and removed by cultural tradition, which is the case when they are used to illuminate another culture, place/time altogether. An excellent example of this can be seen in Ruth Whitehouse's provocative *Underground Religion: Cult and Culture in Prehistoric Italy* (1992). It illustrates both the benefits and pitfalls of this 'multi-faceted' (1992: 4) approach. Whitehouse has effectively used ethnographic analogy, based on South Pacific examples, to aid in the development of her interpretation of cultural manifestations of a distant European place/time. However, she could as effectively have used alternative sources of analogy, homology and metaphor, for example Pueblo/Anasazi materials from the south-west USA. These would have produced, in my opinion, altered but equally compelling results.

Most importantly, we may have the people themselves, who can tell us directly how things are (or were) and why they are (or were) that way. Even if you want to engage in an emic–etic (Harris 1968: 571, 575) discussion on the merits of this knowledge, it does not detract from the fact that some, indeed sometimes much, of such information is

invaluable to the researcher of today. It is true that this direct contact information may have been transmuted by the colonial experience and the coming of mass communication, but still there are compelling instances and pieces of information that are vital to the 'ah-ha' process – that moment when the researcher has insight into the workings of the mind of another and thus into the culture that shaped that mind. Further, the analyses of the informant are components of the operational frameworks that mark them as members in a shared cultural experience. This makes such information vital regardless of its 'fit' with our views of these worlds past and present. Thus TEK is immediate to our needs as we look for an interpretation of the past since TEK is a 'cumulative body of knowledge and beliefs handed down...by cultural transmission' that illuminates 'the relationship of living beings (including humans) with one another and with their environment' (Berkes et al. 1992: 3).

Components of TEK

A review of some of the components of TEK illustrates their usefulness to the archaeologist when attempting the 'act of remembrance' and the process 'of engaging perceptually' with a world 'pregnant with the past' (Ingold 1993: 152–3). TEK or native science is a:

> combination of religious belief and technological thought...[that] refers to a body of knowledge that is ideally a holistic, religious perspective, grounded in information that is observed with a method that may be called moral empiricism. That is, the cosmos has a unity and integrity that is creator-given, and it is the task of humans to discipline their minds and actions to recognize and understand the workings of the natural processes that we may see around us.
>
> (Berkes et al. 1992: 22)

In this respect four aspects of TEK will be considered: the *diachronic*; the *qualitative*; the *spiritual*; and the *holistic*. They have their counterparts in WSK in the *synchronic*, the *quantitative*, the *mechanistic* and the *reductionist* modes of inquiry.

Diachronic ~ *synchronic* Since indigenous people must know their territory with deep intimacy, they develop diachronic information. This is crucial if the short and long rhythms of nature are to be understood, used or planned around. The conflict between the diachronic and the synchronic views of time is detailed in Lewis (1989) when he discusses the Australian Aboriginal view of fire. The Euro-Australian synchronic approach sees fire as a dangerous event bounded by the concerns of the moment while the indigenous diachronic viewer sees fire as part of the long-term process that is a part of care for the land. Of course the data collected from any archaeological site are a compilation of the events of the people who lived there, and this may stretch over many years and give us insight into the diachronic process as well as the synchronic events. It reflects the decisions made in the diachronic interval by the peoples who lived there. This idea of time as both synchronic and diachronic is not anathema to the archaeologist who is trained to recognize both and deal with both. So here there should be no incompatibility between the two approaches.

Qualitative ~ quantitative The archaeologist, somewhat from necessity, works in the quantitative. How can we help but deal with the numbers of, or the measurement of, items that are considered data? In TEK it is suggested that quantification creates a detachment from the item that is an object of study, thus detracting from developing an 'intimacy' with natural systems. This does not mean that indigenous populations do not quantify. It is just that quantification is not the end, but the means – but that is also a WSK objective. People know the relationship between animal population sizes and the environmental parameters that are needed to support these populations and harvesting decisions are contingent on these numbers. Although numbers supplied to government agents may not be actual numbers (of course this is a political issue), still there is within the indigenous communities themselves an accurate understanding of the biomass they must rely upon. So accurate are their numbers for the actual populations that in 1861 the first estimate ever carried out for Canada and Lesser Snow Geese populations in the Hudson Bay and James Bay regions was based on the figures supplied by TEK of harvesting limits in relation to actual goose population size. Cree hunters had a 1:20 ratio of killed to live geese as their working model of harvesting while maintaining a viable migrating/breeding population. From this an estimate of 1,200,000 geese was made (Barnston 1861). It is believed that this estimate was fairly accurate when compared with the figures used for this population today.

Spiritual ~ mechanistic The understanding of systems is produced by the people who are most affected by this knowledge, the ones who live the life that is dependent on this very knowledge. The information is therefore quite subjective and very life specific. It is not the objective, removed data used by a 'cadre of...detached researchers' (Berkes et al. 1992: 4). For the researcher, such as an anthropologist, working directly in another culture, the nature of this detachment becomes clear. No matter what happens (barring death), the researcher as an outsider will eventually be returning home. The people among whom he or she lived and worked would be continuing with what they had always done. The experience of the study group was a moment out of the researcher's time while the experience of the researcher was merely a moment in the group's time, a time that pre-dated the arrival and post-dated the departure of the outsider. Further, the group's experience of the 'now' of the researcher being there was interpreted through a schema that on the part of the researcher was never fully recognized or comprehended in the diachronic continuance of the group's life. Similarly, we, as archaeologists, are looking at the minutiae. They become the moments out of time. Without the rights or privileges of the insider to the direct knowledge of their meaning, we separate things into categories that arise from our own schema. Sometimes we forget or lose sight of the fact that there was an integrated whole, and that this whole may have had an interpretation counter to the mundane, verging on or completely in the spiritual, within its own time and place. This is perhaps the area where there is the most discordance between TEK and WSK.

Holism ~ reductionism Basically this is a continuation of the observations offered directly above. To expand on this theme we need to think of the cognitive styles that have produced the way observation is carried out. Perhaps of use here would be the analysis of *global cognitive style* (the holistic approach or field-dependent style (TEK)) and *articulated cognitive style* (the field-independent style (WSK)) (Cole and Scribner 1974). In the former instance people have a tendency to see interlocking relationships in which they are a part –

or 'the relationship of living beings (including humans)', cited above. In the latter instance people seem to make firmly defined distinctions between self and the world. They also tend to do the analyses of their world on smaller and smaller bits of information about this world, which they tend then to organize and reorganize in diverse ways in the search for meaning. Understanding that these are learned styles of cognition teaches us that both views of the world are valid, although different. The preferential use of one style over the other does not, however, preclude the use of the other style in specific cases. We can do this if we recognize these styles and how they are different organizing principles. Such recognition gives us the freedom to 'try on' the other style to see if it gives us a better 'fit' in the interpretation of the phenomena we are observing. We achieve this better fit when we are able to access categories of information unnoticed before, or additional information in those categories already delineated for investigation.

For the anthropologist and the archaeologist none of these four distinctions should be oppositional statements as rigid *either/or* categories as somewhat framed and discussed by Berkes et al. (1992), although, to give the Berkes team credit, they do make the point that TEK can be used to develop policy on the environment in conjunction with WSK. But this does not detract from their main theme of two distinct and separate forms of understanding and inquiry. Rather, the two should be seen as complementary forms of inquiry. Colorado calls this the utilization of an intercultural (bi-cultural) research model that she points out is in tune with UNESCO's new international order concept (1988: 49; 62–6). It is the *both/and* approach. TEK and WSK are not incompatible if they can be seen as this complementary process, a process that will provide insight into the categories, distinctions, classifications, choices, schemas, metaphors, world views or whatever of the lives of those of the past (e.g. Overholt and Callicott 1982; Vecsey 1983). Further, coming to this understanding of TEK we can transcend the Western view of the *primitive other* by looking 'at technology as being knowledge, *the knowledge that people use for practical purposes*, then there is much more than just [stone tools]...or the ways hunters can locate and kill game' (Lewis 1989: 955).

I think some anthropologists have been doing this more or less explicitly, for example Tanner (1979). Some archaeologists have been engaging in this process in perhaps a more implicit way, such as Cleland (1966) and Stoltman (1978). Regardless, it has been part of our interpretative process and as such we need to understand how these forms of knowledge allow us to know and what it is that they allow us to know. By coming to this understanding we can effectively use TEK with confidence and, further, we can apply the insights we gain in this use to the development of general principles, and then to the general models that WSK so values. These general models can then be used to interpret aspects of other cultures where we have no indigenous knowledge to use for this interpretation. This then can be done without the tripartite problems of metaphor, analogy and homology seen in the displacement in time, displacement in space and displacement in cultural tradition dominating the analysis. Duden (1991), *à la* Hartley, observes in her book *The Woman beneath the Skin: A Doctor's Patients in Eighteenth-Century Germany* that the past is a different country even within the same cultural tradition, that people there did things differently. None the less we want to assume that we share a commonality with those who came before us. This assumption, Duden (1991) contends, is false. We may have nothing in common with those of the past but this should

not deter us from attempting theory building on the nature of unknown cultural processes. The unknown does not ultimately and irrevocably always mean the unknowable.

We have the potential to proceed from two perspectives founded in two different organizing principles for the understanding of the natural, cultural, social and spiritual worlds of others and ourselves. Perhaps this is the ultimate solution for any emic–etic debate on the nature of meaning. Indeed this is exactly what Rappaport (1979: 97) suggested in his discussion of the cognized model (emic; TEK) and the operational model (etic; WSK). What is important, according to Cohen (1994: 6), is that each inquiry has its own integrity, internal coherence and results that can be 'tested'. Both WSK and TEK meet these criteria and, on the level of individual peoples and cultures, it is their day-in day-out survival that is the ultimate validation of utility and re-testability. He further states: '[t]he intellectual climate. . .includes standards of knowledge and a system of values that constitute a set of metaphors which determine a style of doing science acceptable to the members' (Cohen 1994: 13). This, too, is the case for both WSK and TEK.

This can therefore be likened to Popper's (1979: 39) view of an infinite number of 'logically possible worlds' and the problem of demarcation between those things investigated by empirical sciences (WSK) and those things considered part of 'metaphysical' systems (TEK). Such demarcation does not necessarily occur in other cultures, and certainly this was/is the point for the Algonkian peoples of northern Canada. They do not demarcate the physical from the metaphysical, and yet Algonkian peoples were/are able to give very pragmatic descriptions of their physical world; or, as Winterhalder (1993: 322) observes, '[h]unters-gatherers may find no great disparity between their means and ends because they are rational creatures who, to the extent possible, make optimising choices'. It is their interpretation of what these pragmatic observations mean, or do not mean, that causes the problem for the researcher from the WSK tradition. Thus our demarcation, as applied, can shift boundaries over a field of greater or lesser breadth than we may assume. In this way we can generate the problem of subsuming more, or including less, than was involved in the original system. Through a move to an accordance of the TEK and WSK approaches we can shift towards a model where there is as little as possible discrepancy between the boundary of the original system and the boundary of our interpretation of that system. From my perspective, the objective is to create, through the use of a pluralistic methodology (Feyerabend 1988: 29), an interpretation that would honour the data – and, more, resonate for the people we are re-presenting.

Conclusion

For anthropologists, and particularly archaeologists, the furthering of an acceptance of different points of view on the same 'facts' and the ability to work on a synthesis of the TK and WT forms of inquiry can only add to our ability to work out a 'story' that remains as true as possible to the material and meaning we are addressing in specific analyses. This will be more or less a straightforward process where we have historical, proto-historical, ethnographic and/or direct interview materials to work from. However, when moving beyond the boundary of written documents and oral tradition into the realm of deep time and very different traditions the analogues (same function, different origins) and the

homologues (same origins, different functions) will have to be cautiously worked out. The choice of the analogous and homologous comparative materials will have to be carefully considered. Indeed, we need not ask 'Whose facts?' because all would have a place in the inquiry.

We should keep returning to the idea of contextualization on multiple levels: the context of what is being done is the context of archaeology, of anthropology, of a 'social science'. In the academy they have pattern and structure: they are forms of *connaissance*. That which is being observed happened in the context of the life of individuals, of a society, of a culture frequently other than the one from which the observations are being made. The observed was constructed in the worlds of *savoir*. For archaeologists this is a place/time that can never be visited or observed directly, a place/time that can never be completely re-tested in the sense of repeatable experiments under the same control conditions. But it had a pattern and a structure – one that operated within the constructs of that society, for those people. This was their context. Now to some indefinable extent that context as pattern and structure is there to be un-covered, dis-covered, re-constituted and re-constructed, although the details are obscured by distance and time. The peoples of this other place had the knowledge that made them members of that group. The archaeologist is attempting to gain membership in a group where there may be no teachers to bring him or her through intellectual 'childhood' to an 'adult' understanding. The inter-subjective relationship of participant observer and informant is turned into a one-sided conversation, a conversation with the self. This is the 'culture shock' of the archaeologist.

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Note

1 The plural/singular split can be found in other areas of comparative cultural analysis. For example: savages and/or barbarian *vs.* the civilized, as exemplified by Morgan's ethnical stages (1877), is a system of classification where the condition of being civilized is a singular state.

References

Barnston, G. 1861. Recollections of the swans and geese of Hudson's Bay. *Canadian Naturalist and Geologist*, 6: 337–44.

Baynes, K., Bohman, J. and McCarthy, T. 1987. *After Philosophy: End or Transformation?* Cambridge, MA: MIT Press.

Behne, C. T. 1997. An interview with David Gidmark: preserving the knowledge and skills of birchbark canoe building. At http://www.wcha.org/wcj/wc_v19_n3/interview.html

Berkes, F., George, P., Preston, R. and Turner, J. 1992. *The Cree View of Land and Resources: Indigenous Ecological Knowledge*. TASO (Technology Assessment in Subarctic Ontario) Report, Second Series, No.8. Hamilton: McMaster University.

Cleland, C. A. 1966. *The Prehistoric Animal Ecology and Ethnology of the Upper Great Lakes Region.* Anthropological Papers 29. Ann Arbor, MI: Museum of Anthropology, University of Michigan.

Cohen, I. B. 1994. An analysis of interactions between the natural and social sciences. In *Boston Studies in the Philosophy of Science,* Vol. 150 (ed. I. B. Cohen). Dordrecht: Kluwer, pp. 1–99.

Cole, M. and Scribner, S. 1974. *Culture and Thought: A Psychological Introduction.* New York: Wiley.

Colorado, P. 1988. Bridging native and Western science. *Convergence*, 21(2–3): 49–72.

Dawson, K. C. A. 1977. An application of the direct historical approach to the Algonkians of Northern Ontario. *Canadian Journal of Archaeology*, 1(1): 151–81.

Duden, B. 1991. *The Woman beneath the Skin: A Doctor's Patients in Eighteenth-Century Germany.* Cambridge, MA: Harvard University Press.

Feyerabend, P. 1988. *Against Method*, revised edn. New York: Verso.

Harris, M. 1968. *The Rise of Anthropological Theory.* New York: Crowell.

Hopkins, C. 2000. Traditional medicine conservation. *Tok Blong Pasifik*, 54(1): 12–13.

Ingold, T. 1993. The temporality of landscapes. *World Archaeology*, 25(2): 152–74.

Lévi-Strauss, C. 1966. *The Savage Mind.* Chicago, IL: University of Chicago Press.

Lewis, H. T. 1989. Ecological and technological knowledge of fire: Aborigines versus Park Rangers in Northern Australia. *American Anthropologist*, 91(4): 940–61.

Lyotard, J.-F. 1987. The postmodern condition. In *After Philosophy: End or Transformation?* (eds K. Baynes, J. Bohman and T. McCarthy). Cambridge, MA: MIT Press, pp. 73–94.

Mead, A. T. A. M. P. 1998–9. Misappropriation of Indigenous Knowledge: the next wave of colonisation. *Tok Blong Pasifik*, 52(4): 8–10.

Morgan, L. H. 1877. *Ancient Society.* New York: Holt.

Nelson, R. K. 1973. *Hunters of the Northern Forest: Designs for Survival among the Alaskan Kutchin.* Chicago, IL: University of Chicago Press.

Overholt, T. W. and Callicott, J. B. 1982. *Clothed-in-Fur and Other Tales: An Introduction to an Ojibwa World View.* Washington, DC: University Press of America.

Popper, K. R. 1979. *The Logic of Scientific Discovery.* London: Unwin Hyman.

Rappaport, R. A. 1979. On cognized models. In *Ecology, Meaning, and Religion* (ed. R. A. Rappaport). Richmond, CA: North Atlantic Books, pp. 97–144.

Riddington, R. 1982. Technology, world view, and adaptive strategy in a northern hunting society. *Canadian Review of Sociology and Anthropology*, 19(4): 469–81.

Rousseau, J. J. 1817. *Essai sur l'Origine des Langues.* Bélin edition.

Stoltman, J. B. 1978. Temporal models in prehistory: an example from Eastern North America. *Current Anthropology*, 19(4): 703–46.

Tanner, A. 1979. *Bringing Home Animals.* London: Hurst.

Vecsey, C. 1983. *Traditional Ojibwa Religion and its Historical Changes.* Philadelphia, PA: American Philosophical Society.

Whitehouse, R. D. 1992. *Underground Religion: Cult and Culture in Prehistoric Italy.* Accordia Specialist Studies on Italy 1. London: Accordia Research Centre.

Winterhalder, B. 1993. Work, resources and population in foraging societies. *Man* N.S., 28(2): 321–40.

Wright, J. V. 1968. The application of the direct historical approach to the Iroquois and the Ojibwa. *Ethnohistory*, 15(1): 96–111.

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