Traditional Knowledge Is Science

by George Hobson

I was brought up in southern Ontario, and for reasons that I will never know, my father talked to me about the Six Nations Indian Reserve near Brantford, Ontario. This was what I might call my introduction to native studies. In 1960, I made my first trip to the high Arctic to conduct a scientific project. It was five years later, when I went to Povungnatuk to assist in the setting out of a seismograph station on the Ottawa Islands, that I realized that there was "traditional knowledge", although those words were not used at the time. The owner of a peterhead boat agreed to take our small crew and equipment to the islands, but we had to wait until the time was correct-not when the weather was clear, but when the spirits were favourable to allow us to go to that sacred place. This was one of my first introductions to Eskimo culture.

Western science has been defined as a systematic approach, a methodological approach to answering questions. Science is equated with knowledge, and it is the development of knowledge that promotes the solution of problems. The "western" scientist knows that science is based upon the principles of repeatability and predictability. In terms of the northern experience, science also equates to *traditional* knowledge, and southern scientists must never forget that traditional knowledge *is* science.

Western scientists have a tendency to reject the traditional knowledge of native peoples as anecdotal, non-quantitative, without method, and unscientific. From our scientific ivory towers we tend to ignore basic knowledge that is available to us. However, as southern scientists, it is absolutely necessary that we develop a system to provide traditional knowledge with a "scientific" framework that allows native and scientific knowledge to interact in a complementary fashion. Southern scientists must learn that "western" scientific knowledge and native knowledge and experience both have validity, that both must be used if the objectives of scientific research in the North are to be achieved. An effective system must be developed to collect and classify native knowledge, particularly with respect to northern resources, environment, and culture. Means must be found to interpret such knowledge so that it will be meaningful in other contexts without losing its essential native content and value.

Often overlooked is the fact that the survival of northern aboriginal peoples depended on *their* knowledge, *their* special relationship with the environment, and *their* ways of organizing themselves and their values. Traditional knowledge was passed on from one generation to the next. Today, aboriginal peoples are aware that they must integrate traditional knowledge into the institutions that serve them; it is essential to their survival as a distinct people, and it is the key to reversing the cycle of dependency which has come to distinguish aboriginal communities. Only recently has the value of traditional knowledge been recognized beyond the communities-even internationally-as western scientists attempt to manage the environment and renewable resources. Traditional knowledge is the accumulated knowledge and understanding of the place of human beings in relation to the world in both an ecological and spiritual sense.

The use of traditional knowledge is increasing in the North, but southern scientists are not yet making full use of its potential. I ask several questions: Why is it not part of the education process of the southern scientist to become familiar with traditional knowledge? How can science as undertaken by southerners be explained and demystified for northerners? How can southerners be encouraged to use traditional knowledge? Must we forever regulate the participation of northerners in southern-inspired projects?

Somehow northerners must become an integral and operational part of the planning, execution, and interpretation of southern science undertaken in the North. Several years ago I attended a workshop in Anchorage, Alaska, where three native people and one white Alaskan discussed how science should be conducted in Alaska and how native peoples might participate. How can we achieve that level of involvement in Canada so that the native peoples can become an integral part of southern science conducted in their backyards? How do we get that involvement in a voluntary manner as opposed to a legislated one? The southern scientist must give more relevance to traditional knowledge and must involve northern peoples in all phases of research, including planning, execution, and interpretation. There are those with advanced degrees who would readily employ native people in the field to collect data but balk at the suggestion that traditional knowledge may be used in project design or the interpretation of data. Let them educate you while you educate them.

We as southern scientists must communicate and co-operate. We must involve aboriginal people in our research. And we must ensure that aboriginal culture is not adversely affected by our science even though native people must be, and indeed want to be, involved. We must always remember that native people have a deep interest in scientific research. As part of the communication process each and every scientist should be an ambassador to the public explaining his work and sharing his knowledge. It is part of the Eskimo culture to share, and that is what a scientist must do. It is just good basic policy.

Traditional knowledge *is* science, and the sooner southern scientists make use of that traditional knowledge, the better it will be for their research. Aboriginal people wish to be involved in science and they will be involved in research whether through legislation, the permit process, or voluntary action. Partnerships are a vital part of the strategy we must adopt in together seeking imaginative, innovative, and perhaps unexpected, solutions.

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Excerpts from SCIENCE AND TRADITIONAL KNOWLEDGE -Report from the ICSU Study Group on Science and Traditional Knowledge

The relationship between traditional knowledge and science has always been very close in ethnobiology and in the broader field of ethnoscience. Ethnobiology is the study of the reciprocal interactions between people and biological organism and of traditional knowledge about these interactions; while ethnoscience is the study of interactions and of traditional knowledge of the physical and biological world (Martin 2001). Traditional knowledge informs and profoundly influences ethnobiology and ethnoscience. Traditional knowledge is often adapted by science and re-applied in contemporary contexts and through contemporary management (Cunningham 2001). Thus, traditional knowledge is useful to science and to contemporary society.

Historically, the scientific study of traditional knowledge has a long history in the Western tradition, built on Greek, Roman, and Islamic foundations. The development of traditional knowledge in botany progressed with the establishment of botanical gardens and the publication of herbals and botanical treatises in Renaissance Europe beginning in in the sixteenth century and spreading rapidly (Ambrosoli 1997). Linnaeus' codified use of Latin binomials for plant and animal nomenclature was founded on his studies of traditional Lap knowledge and naming (Balick and Cox 1997). Systematic study of traditional knowledge has no less history or impact in other parts of the world (Minnis 2000) such as the Egyptian, Chinese, South –Asian, and the Incan empires. Modern ethnobiology dates to the late 19th century (reviewed in Cotton 1996) and flourishes today as one of the most popular biological and anthropological subdisciplines at many universities. Dedicated scientific societies and journals on ethnoscience proliferate including the International Society of Ethnobiology (ISE), the Society of Economic Botany, the Society of Ethnobiology, as well as many regional societies.
Traditional knowledge has informed modern science in many areas, most notably in taxonomy, medicine, agriculture, natural resource management, and conservation. Here, the impact of traditional knowledge on these sciences is detailed to recognize the positive influence and to argue for the recognition of traditional knowledge by ICSU. For example, in taxonomy many species new to science have been pointed out by traditional peoples knowledgeable in the flora and fauna of their environment (e.g., new species of primates were recently discovered in Central and South America, new ungulates in Southeast Asia, and new plant species throughout the tropics under the guidance of traditional people and their knowledge).

Medicine is influenced by traditional knowledge in many ways. Western medicine is founded on Greek traditions, and in other parts of the world such as China (Lin 2001) and India (Mishra 2002) traditional medicine is actively supported and researched. As many as 80% of the world's people depend on traditional medicine for their primary health care needs (WHO et al. 1993). The combination of traditional and scientific knowledge is evidenced e.g., in the USA where 25% of all prescriptions contain plant materials (Farnsworth and Soejarto 1985). The use of traditional knowledge in bioprospecting for new pharmaceuticals is an active scientific pursuit (Chadwick and Marsh 1994). Disowning the role of traditional knowledge in medicine would disenfranchise 80% of the world's population, ignore much of modern medicine, and curtail discovery of new drugs and treatments of diseases for which we still have no satisfactory cures.

Agricultural sciences and natural resource management are being influenced by traditional knowledge, through modern ethnoscience research. Traditional knowledge is providing scientific insight into crop domestication, breeding, and management (Conklin 1957, Boster 1984, Nabhan 1985, Brush 2000, Johns and Keen 1986, Salick, Cellinese, and Knapp 1997). Principles and practices of swidden agriculture, agroecology, agroforestry, crop rotations, pest and soil management, and other areas of agricultural science are documented by ethnoscientists (Conklin 1957, Bunch 1982, Hecht and Posey 1989, Smole 1989, Salick 1989). Traditional knowledge informs science about natural forest management (Posey 1985, Peters 1990, Pinard 1993, Pinedo-Vasquez et al. 2001, Salick 1992). Scientists are beginning to understand management of biodiversity through ethnoscience studies (Nabhan 2000, Salick et al. 1999, Irvine 1989, Johnson 1989). Our appreciation of the subtle and often unarticulated indigenous strategies in natural resource management has been fostered through ethnobotanical studies of indigenous knowledge. This has inestimably promoted scientific advancement in natural resource management.

Conservation strategies can be based on traditional knowledge and resource use (Redford and Padoch 1992, Redford and Mansour 1996). Application of the ethnosciences to conservation (Cunningham 2001) enables effective management and partnerships without which conservation is doomed. From the harvesting of individual plant or animal resources to the management of entire landscapes and ecosystems, learning from local people allows conservationists to integrate their programs with real human needs and practices.

Conservation by exclusion and isolation will not be sustained in the face of growing poverty and hunger. Applying ethnosciences and traditional knowledge to sustainable development is a further step with great potential (Bennett 1992) but also fraught with problems including land tenure, genetic resource ownership, intellectual property rights and benefit sharing (ten Kate and Laird 1999). Recognizing the worth and value of traditional knowledge to science is only a first step, thereafter involving scientists in issues of professional ethics (Cunningham 1996). (Accessed on 10.6.16 at http://www.icsu.org/publications/reports-and-reviews/science-traditional-knowledge/Science-traditional-knowledge.pdf)