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What Do Indigenous People Have to Tell Us about the Cultural Landscapes They Have Created?

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1.1 Introduction

Cultural landscapes are the imprint of human land-uses on physical and biological processes at both the small scale of meters and the large scale of kilometers and at both a seasonal scale and the scale of millennia.

Indigenous populations of the Americas have experimented for over 30,000 years with adaptations to different environments, but all of these populations experienced similar constraints. These populations were usually small, with a few exceptions in which agriculture played an important role. They also had oral traditions, no written language, no metal tools, few domesticated animals or beasts of burden, only the native plants to cultivate and domesticate into agricultural production, and no previous human land-use on the areas that they first occupied. These boundaries are fairly constraining and should be remembered in any discussion of the limits in creating cultural impacts. However, within these constraints, Indigenous populations have developed multiple cultural landscapes after generations of experimenting with different technologies, cultures, and spiritual rules on how to produce a sustainable environment.

Indigenous knowledge evolved because of this people's continuous, attentive exposure to local landscapes. This experiential knowledge has been accumulated through hunting, fishing, food gathering, agriculture, other forest and grassland crafts, and outdoor living. Through these ways of living and cultures, there have been many generations of exposure to local and regional knowledge and there has been an oral tradition for passing on this knowledge. Knowledge has also been passed on about cultural and spiritual matters related to the relationship with the local landscape. This knowledge about the landscape allowed the development of landscape-scale practices to sustain the Indigenous lifestyle. Kinship and gender play roles in this knowledge. Knowledge is accumulated by observation and by experimental manipulation

of the environment. Special knowledge is often carried by valued individuals who are known for their depth of understanding of the land, cultural and spiritual endowment, communication, and leadership skills. All of this is passed on by oral tradition.

The environments of the Americas changed radically during the 30,000 years over which Indigenous people established themselves. Consequently, the cultural landscape's footprint changed as they discovered more sustainable methods or they migrated, assimilated into other groups, or went extinct. It appears that, through these evolutionary adaptations, Indigenous people produced an interactive system of empirical information about how to adapt and survive in any particular location and a set of cultural and spiritual norms to remain within that adaptive boundary while still being willing to adjust to the often rapidly changing environments. In modern terminology, Indigenous populations must have experimented with modifications of their cultural landscape so as to maintain a sustainable number of ecosystem services.

Notice that this is considerably different from the traditional view that European colonizers had of the Americas when they arrived. European colonizers saw a land that they thought was largely empty of people. This was because the introduction of contagious European diseases prior to their arrival or at the same time had killed more than 50 percent of the Indigenous population. The reaction of European colonizers, like the Pilgrims, was to say, "and God made the land empty for us." They commented on how open the forests were and how bountiful the nut-bearing trees were and sometimes they noticed that there were areas that looked remarkably like crop fields. This was because European colonizers believed that Indigenous people were Stone Age peoples with no written language and therefore with no sophisticated culture and certainly not with European religious values. Some of this misunderstanding was not helped by the fact that the decimation of populations of Indigenous people by the epidemic diseases allowed the loss of many Indigenous secular and sacred practices because of the loss of elders and knowledge keepers, the main carriers of oral tradition.

The situation was further exacerbated by colonial efforts to destroy Indigenous oral culture by not allowing them to speak their language, carry out ceremonies, or practice old methods of land management (e.g., controlled burns to manage vegetation cover of the landscape). Europeans did not seem to recognize that Indigenous people had created several very important domestic crops from native plants in the Americas. There are a large number of these domesticated plants, not just the most famous three sisters of corn, squash, and beans. The myopia of Europeans to these cultural landscapes seems today unbelievable considering some of these would certainly have been familiar in Europe, as many studies today confirm (Rackham, 1980; Birks *et al.*, 1988; Williams, 2003).

Today, natural and social sciences are companions to Indigenous knowledge. Science is not about Truth with a capital T and is not the only form of knowledge. In fact, the name “science” is a relatively new term from the mid-1800s. Before this, science was divided into natural history and natural philosophy. The role of natural history was mainly to observe, describe, and find some natural order (classification) of objects in terms of their essential characteristics. The role of natural philosophy was to study and try to understand the processes in the natural world. Today, natural philosophy has largely been replaced by the term science. However, there are some science disciplines that still have viable natural history components.

Science today is a systematic methodology of inquiry used to obtain an understanding of how the natural universe works. It has a long history in Europe and an even longer history in China, India, and Arabia. Today, science is a worldwide way of understanding the natural world through empirical knowledge, contributed by all peoples of the world. Science seeks to consider relationships and processes by observing, measuring, manipulating, experimenting, and forming models. Models play an important role in science and are generally of two types: representations of actual things designed to study processes, for example laboratory flumes, and sets of assumptions about the processes. Models of this latter type are often mathematical equations. Mathematics is used because it allows one to check the logic in the model of the processes and to display the relationships more clearly in the processes.

However, to be successful, models cannot just be logical-mathematical equations but must have empirical content and have the possibility of being falsified by comparison with the phenomena. Giving equations empirical content is usually done by what are called correspondence rules, that is, the use of either previous science to define the empirical data or new and empirical ways of measuring. This research program looks for logical and empirical consistency with the universe. Notice that natural science does not allow or deal with objects that, by their very definition, can never be observed or falsified.

1.2 Overlap between Indigenous Knowledge and Science

In brief, this section discusses the overlap and some differences between science and Indigenous knowledge. This discussion is not definitive, and other comparisons are available (e.g., Aikenhead and Mitchell, 2011).

1. In many ways, science and Indigenous knowledge do things in very similar ways. The difference is primarily that Indigenous knowledge is transmitted through an oral, not a written, tradition and not only includes empirical observations but is also united with metaphysical worlds.

Science has a written procedure for passing on science knowledge and often uses mathematics to represent these ideas, has methods for collecting data, and empirically tests if the data conform to the ideas being tested. Finally, the results are evaluated by independent scientists who may try to reproduce the results. These ideas, methods, and tests are then organized into a paper that is sent to be considered for publication in a scientific journal. These journals send the paper out to be reviewed by knowledgeable scientists from anywhere in the world on the particular subject. These referees explain their concerns and make suggestions. Some of these papers are found deficient in either their ideas, methods, or testing. About a third of the papers submitted to journals are found to not meet the standard of rigor and are not published. Science tries to synthesize the current scientific knowledge through this review process in the refereed, scientific journals and in further conversations that occur in the literature about previous papers and in gatherings, workshops, and conferences.

Indigenous knowledge uses an oral tradition and material objects (e.g., sacred bundles) to pass on ideas, methods, and how to collect and retain knowledge. The ideas are preserved by elders who have demonstrated their understanding and ability to pass on information carefully and from wide experience. Information is often passed on in songs as is and has been done in many parts of the world, for example the Iliad, the Odyssey, and the Kalevala. In Indigenous knowledge, information is passed on usually to younger individuals who have shown understanding, leadership, wise judgment, discipline, and an ability to learn the information and the traditions. Often, a circle of elders will tell a story from each of their understandings and backgrounds.

2. Indigenous knowledge is a place-based understanding of the world with both empirical and spiritual components. Science, on the other hand, has only an empirical understanding of the world. Other ways of knowing are left to others. Science has been organized internationally in recent centuries. Scientists meet to present and discuss information and also do so through scientific journals. Science, from its beginning, has always been a group process in which everyone may contribute. It works toward knowledge that is generalized so that it can apply to other parts of the empirical world.

Indigenous knowledge is organized locally, with a place-based understanding. Some Indigenous knowledge is not totally place-based, as many Indigenous groups have, in their long history, moved to different places and have traded goods and ideas, often over long distances. They still carry some of this knowledge from other places and other groups. However, Indigenous knowledge has an empirical and rational approach to understanding the environment combined with a spiritual understanding.

3. Science within its frame of knowledge defines the natural world as knowable. It therefore does not explore anything spiritual and unmeasurable. Indigenous knowledge is fundamental to Indigenous peoples' understanding of the physical and biological worlds and is a holistic view with no separation between empirical knowledge, arts, religion, animistic, etc., that is, other ways of knowing.

4. Science knowledge is collected in a qualitative and quantitative manner so that it can be transferred to others in a form that can be evaluated. Indigenous knowledge, because it encompasses empirical and spiritual components, generally does not see the world as reducible to empirical understanding only. It sees the world as intertwining both the empirical world and the spiritual world. The Indigenous way of knowing does not prevent science from cooperating with Indigenous knowledge, in the same way that science does not prevent an appreciation of other spiritual and artistic traditions.

5. Both science and Indigenous knowledge see the world as dynamic and changing. The difference is primarily the role that spiritual knowledge plays in Indigenous knowledge. Furthermore, Indigenous knowledge believes in a relationship between all of the natural world, whether it is human, animal, plant, rock, mountain, or even a particular view. All of the world has spiritual content and should be respected, and the world is seen as animistic. Science defines the natural world only through its knowable parts.

6. Indigenous knowledge sees time as flowing into the past and into the future in a cyclic manner in terms of both days and seasons.

In conclusion, science and Indigenous knowledge share an empirical understanding of nature, but Indigenous peoples also have an integrated spiritual view. This spiritual view should not interfere with cooperation between and respectfully sharing the different kinds of knowledge, and such cooperation can lead to working together productively.

1.3 Objectives and Chapters

This book's overarching objective is to consider how Indigenous populations have lived and managed the landscape, specifically how the landscape's footprint is a result of the combination of Indigenous peoples' empirical knowledge and spiritual culture.

Science has carefully tried to remove unmeasurable things/interactions. Indigenous knowledge deals with observable and experiential attributes but also the spiritual realm. This discrepancy is apparent in the fact that, although science does not say there are not other ways of knowing, the scientific approach explores only within certain limits. Science has been very effective at knowing within these

limits, but its practitioners are not without ethical and moral values. However, we all have a certain world view that has hidden biases and, through the existence of a diversity of knowledge, we can be made aware of this.

How do we combine the areas of intersection between science and Indigenous knowledge without losing the totality of both? Each author in this book has been asked to provide background on both Indigenous knowledge and science, so that the overlap, similarities, and differences between them, as they understand them, are explained.

The chapters are divided into four groups. The first group deals with reintegrating cultures and the natural landscapes and the role of kinship and oral tradition in more distant pasts. The second group of chapters approaches the landscape as a living university of learning and managing, the ethnobotany of how to grow and hunting and trapping more responsibly, and assessing and projecting the harvest. The third group deals directly with managing fire in an anthropogenic plant community and how to integrate Indigenous agriculture in hydrology and dry regions. Finally, the fourth group consists of studies of how science and Indigenous knowledge can be taught in schools using land-based studies.

References

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