

**ANTHROPOLOGICAL CONSIDERATIONS  
ON THE HUMAN COLONIZATION OF MARS: INSIGHTS FROM THE INDIGENOUS  
PEOPLES WHO FIRST SETTLED EARTH'S ARCTIC**

**Roy D. Iutzi-Mitchell\***

**ABSTRACT**

The High Arctic has been the latest region of the earth to be peopled by societies which subsist "off the land" in the sense of the proposed Mars Direct plan. At latitudes beyond 70° north, environmental factors necessarily include some of this planet's extremes for cold, wind, darkness and brightness, predictable and unpredictable food shortages, periodic shortages of fuel (for cooking, lighting, heating, and transportation), limited choices for construction materials, and associated social constraints.

Although humans had made use of arctic resources seasonally since the time of our Neanderthal forerunners, no human societies existed in the Arctic year-round until the end of the third millennium BCE. At that time Paleo-Eskimos of the Arctic Small Tool Tradition settled the North American coast of the Arctic Ocean (including Devon Island) to within 700 km of the North. No human communities exist further poleward today than the Inuhuit (Polar Eskimos) of northwestern-most Greenland (and some of whose ancestors migrated through Devon Island in the mid-19th century). (Antarctica is an extremely useful model of frontier entry in the 20th century, albeit of a region colonized but not settled by self-sustaining human communities.)

Here I examine aspects of how seasonal migrations, exploratory expeditions, and multi-year immigrations took place, both among Paleo-Eskimo and Neo-Eskimo societies, whose descendants call themselves Inuit. I provide an overview of some of the coherency among Eskimo cultural features (ethical, social, linguistic, epistemological, aesthetic, legal, technological, pedagogical, and political economic systems) fine-tuned for survival and subsistence in extreme environments over the past five millennia.

**KEYWORDS:** Arctic/Antarctic Off-planet Analogs; Education; Ethics; Eskimo Cultures; Law and Governance; Mars Arctic Research Station; Subsistence

---

\* Asst. Prof. of Anthropology and Linguistics, Ilisagvik College, Barrow, Alaska 99723-0749 USA, email: [ffri@aurora.alaska.edu](mailto:ffri@aurora.alaska.edu) .... [roydeanmitchell@hotmail.com](mailto:roydeanmitchell@hotmail.com)

## INTRODUCTION

Of Earth's many ecosystems, the High Arctic has (to date) been the last, major ecosystem occupied by entire human societies. Even though humans have been making *seasonal* use of the Arctic since the time of the Neanderthals, it was not until the fifth millennium before present (B.P.) that human societies lived permanently in the Arctic. These were the earliest Eskimos<sup>1</sup> that archaeologists have evidence of.

There are a number of environmental challenges facing any human society wishing to exist in arctic environments. Extremely cold winters are just one of these. However, equally cold winters can be found in subarctic, and indeed in colder temperate climates. None, however, has such lengthy periods of cold combine with the shortages or lack of wood, elsewhere a nearly necessary resource.

In this paper I will highlight certain aspects of Eskimo society and culture which have allowed them to survive – indeed to thrive – in one of Earth's most challenging environments. Specifically, I will talk about what is known about the people of the ASTt at the end of the fifth millennium B.P., about the so-called Thule expansion of the Neo-Eskimos one millennium ago, and about the 19th century migration from Baffin Island to northwest Greenland via Devon Island. Each of these offers us insights that, I suggest, should be considered by any humans contemplating moving onto new planets.

## PHYSICAL AND BIOLOGICAL CONSTRAINTS OF EARTH'S HIGH ARCTIC

Two kinds of cold stress confront the people of the Arctic<sup>2</sup>: hypothermia and frostbite. Hypothermia always has been the more common problem (Burch 1988:49), potentially dangerous during any time of the year. Frostbite during the winter is a rarer danger but one just as potentially fatal. Noteworthy for the historic Eskimos has been their traditional use of animal skin clothing, particularly of caribou skins with their naturally superb insulation, and grass as an insulator (grass socks, for example, as well as grass for kayak mats).

Each of hypothermic stress and frostbite stress produces its own forces of natural selection, not necessarily calling forth the same responses. I won't go into the details in this paper, but the major human biological adaptations include increased basal metabolic rate, increased peripheral circulation, and alternating vasodilation and vasoconstriction. Each of these seems to have a genetic component as well as one of acclimatization. For a basic discussion on hypothermic and hypoxic adaptations by human populations, see chapter 21 in Harrison, Tanner, Pilbeam, and Baker 1988.

The Arctic also has Earth's greatest annual variation in amounts of solar radiation. This creates stress on the human organism in terms of vitamin D synthesis, melatonin synthesis, and

UV radiation. Again, I will not explore these further in this paper other than to note that Eskimos, along with other Asian-derived populations, have a great ability to vary their skin color seasonally and made great use of vitamin D sources in their diet. Historically, seasonal lack of sunlight was associated with behavioral disorders, among them the so-called arctic hysteria. Eskimos have been aware of this behavior pattern (if not its solar-biochemical origin) and have worked to protect those suffering from damaging themselves.

In the Arctic, Eskimos societies have necessarily required humans to live in extremely small, closed shelters, often with very low supplies of fuel for light and heat, sometimes with very little food. The parallels to Mars exploration are great.

A fourth, critical, component of life in the Arctic arises from the vagaries of its food resources. Food supplies can be seasonally very abundant, but suffer from seasonal periods of extreme privation, usually in the late winter and early spring. Starvation used to be a constant threat - one that required human responses.

Across the Eskimo homeland, marine mammals have been the basis of subsistence since ancient times. Hunted from qayaqs, marine mammals were harpooned (in order first to secure them) then dispatched with lances or clubs. In some places fish nets of willow bark or baleen, along with fish traps, could be used during the entire calendar year.

Caribou and muskoxen are an important terrestrial resource across most areas of the Arctic. Both are migratory, and their presence at any given time and place always has been only partially predictable. Further, it appears to some biologists that caribou may experience population fluctuations over cycles of seventy to one hundred years, heretofore undiscovered because their periodicity has been greater than that of our lifespan.

Thus, Eskimos have had to develop strategies for dealing with great annual variations in food abundance, as well as short- and long-term differences from year to year. One of these strategies is to be highly mobile. While no known Eskimo society was ever truly *nomadic* in the technical sense, they all have been highly *mobile*. That is to say, their system of living they designed to include great ability to move, often on short notice, to procure alternative food resources as necessary.

With very few exceptions documented in the historic period from southwest Alaska (not the *High Arctic*, anyway), all Eskimo subsistence calendars have involved migration among a series of food resource locales, almost always involving both marine and terrestrial procurements. Even here, though, alternatives were explored and utilized when one particular resource was inadequate during a given year. Often an area that was a primary subsistence site for summer food resources, say, might be a secondary, alternative site for winter resources, and vice versa.

Additionally, hunters in pursuit of new game locations might locate new, previously unknown resources. This knowledge would be used in time of starvation – or of social strife

within the community – and a new settlement in a new area would result.

## **THE ARCTIC SMALL TOOL TRADITION**

The earliest human inhabitants of the High Arctic are best known by their technological system, referred to by arctic archaeologists as the Arctic Small Tool tradition (ASTt). It clearly derives from technological traditions in northeastern Siberia. Its hallmark is the amazingly fine tools crafted using a flaked-stone technology called microblade and core. This achieves the greatest known possible efficiency in deriving cutting edge tools from a finite amount of flint. But the makers of the ASTt did more than just make highly efficient stone tools; they made use of them to create *composite* tools, combining small stone components bound into wood, bone, ivory or antler parts. They did so while investing an artistic exquisiteness into their manufacture – resulting in what many archaeologists consider to be the epitome of flaked stone technology ever developed on this planet.

ASTt houses were semi-subterranean when possible, but were constructed of large stone when deep soil was not available. Alternatively, particularly in the eastern Arctic, insulated tents of animal hides allowed the creators of the ASTt to live where neither deep soil nor large stones were available. This system of arctic housing persisted throughout the Eskimo world up into this century.

With this highly efficient tool kit, the makers of the ASTt quickly occupied the entire North American Arctic. From an early ASTt site (pre-ASTt, or “Proto-Denbigh”) near Onion Portage in northwest Alaska, dated at 4,200 B.P., these people spread across the entire North American Arctic, from Alaska to Greenland, seemingly in less than 200 years (Dumond 1987). Doing what no humans had done before these people, the Paleo-Eskimos, established a set of lifeways that persisted, and evolved, up until our present time.

## **THE THULE EFFLORESCENCE**

Between the sixth and tenth centuries C.E. (current era, or A.D.), Eskimo societies in northeastern Siberia and northwestern Alaska developed a highly specialized subsistence technology focussed upon the harvest of bowhead whales. Rising population densities – both within individual villages and numbers of villages per region – were also associated with increases in rates of warfare. During the eleventh and twelfth centuries C.E. this specialized whaling culture, with the so-called Thule culture (named after Thule, Greenland, where this technological complex was first defined) spread eastward from northwest Alaska, across arctic Canada, and around Greenland. This expansion within approximately a two-century span of time mirrored the rate of growth of the ASTt three thousand years prior.

The technology of the previous Dorset technology of eastern Canada and Greenland was

largely or completely replaced by the related Thule technology. Associated with this was the replacement of the earlier Eskimo languages with the Inuit language. The degree to which the Thule Efflorescence also involved genetic replacement of the Dorset Eskimos is quite unclear at present; but we see here an example of an indigenous way of life rapidly spreading across the Arctic that is underlain with a technological and social system structured to live off the land.

## **THE 19th CENTURY MIGRATION FROM BAFFIN ISLAND VIA DEVON ISLAND TO THULE, GREENLAND**

In the 1860s a small group of Inuit began a multi-year emigration out of Baffin Island, leading them through Devon Island, thence across Davis Strait to the Thule region of northwestern Greenland. This movement involved a group of related individuals moving as a *self-sufficient unit, men and women, parents and children*, and took approximately three years. Along the way they lived off the land, just as they would have done back on Baffin Island. Their subsistence technology – their tools and techniques for using them – as well as other aspects of their culture allowed them to survive along the way as a self-sufficient unit. Upon reaching Thule, they merged with the local population there, each group sharing details of the other's culture. These Inuhuit Eskimos today are the furthest north human population on Earth, living at 78° N latitude.

## **TECHNOLOGY**

I will not attempt to describe here the entire realm of traditional Eskimo technology. However, a number of key features are appropriate, particularly with regard to Zubrin's Mars Direct model of "living off the land."

One characteristic of Eskimo technology is making innovative uses of raw materials. Where wood is not available, Eskimos use antler, ivory, or baleen. Where large pieces of raw material are not available, people lash and rivet smaller sections together. A classic example are the bows made by the Caribou Eskimos of the Central Canadian Arctic in the 19th century; the bellies of the bows are sections of caribou antler riveted together with antler rivets, and the back of the bows are of twisted caribou sinew cables. Sinew-backed, compound bows have been found at an ASTt site in western Greenland (Grønnow 1994). These ASTt bows are the earliest known bows in America; it thus appears that Paleo-Eskimos introduced bow-and-arrow technology, at least indirectly, to the American Indians.

## **SOCIETY: LAW AND SOCIAL CONTROL**

Traditional Eskimo societies are relatively small (typically 250-500 individuals) and have no formal political organization that is *not* kinship-based. Without a tribal or state political

organization, serious disputes between individuals were addressed through the medium of kinship. Within the society strong sanctions opposed overt showings of violence and encouraged specific, alternative means of social control. Good-natured teasing has been and continues to be a key component of dealing with mild-to-moderate social infractions. Public forums in which teasing was in fact *expected* included teasing cousins who are supposed to point out the faults of their counter-part, while the one being so teased is required not to show anger. This allows for public portrayal of individuals errant actions in a socially approved manner, and often results in self-correction. More stringent sanctions ranged from ostracism, to banishment, to execution. When execution was called for, the nearest kin were the ones expected to carry it out, those avoiding the moral obligation for blood feud which would have obtained otherwise.

## **EPISTEMOLOGY**

Historic and modern Eskimos have a long-standing empirical tradition. As with all human societies, many forms of common knowledge and specialized knowledge are passed both through oral tradition and through the example of daily interactions. Yet all Eskimo societies encourage the individual to examine cause-and-effect relationships and determine the veracity of traditional knowledge. Having lived in predominantly Eskimo communities for most of the last two decades, I can attest to the extremely high value that Eskimos continue to place on first-hand, empirical observations.

## **LANGUAGE**

A related aspect of empiricism occurs in the grammatical system of Eskimo languages. A grammatical particle (an enclitic) is appended to words that convey information that one has been *told* but has not directly perceived with one's own senses. This highlights the distinction between fact and hearsay in a way all-but-impossible in normal discourse in Indo-European languages. Thus, the simple statement *silaluktuq*<sup>3</sup>, 'it is raining,' directly implies that the speaker has first-hand, sensory data to support the statement. If one has hearsay information, one may say *silalukturruuq*; 'it reportedly is raining.' Further, if one surmises that it is raining, one says *silaluksungnaqtuq*, 'I infer that it is raining.' Such linguistic precision – requiring speakers constantly to convey the empirical, hearsay, or logical bases of their statements – may have proven to be a very significant component of Eskimo adaptations to one of Earth's most extreme environments.

## **PEDAGOGY**

As mentioned above, Eskimo societies continue to combine oral tradition with an emphasis on direct observation. This emphasis extends to a model of learners learning by observation and experimentation. Every member of Eskimo societies is in practice an apprentice

to many of the adults in the community. That is to say, one learns by observing and assisting, gradually being given ever-greater responsibilities for larger components of the practice being performed and learned. This gradual transition, all within in experiential learning frame, allows all individuals to develop proficiency at their own rates.

In addition to skills learned through apprenticeship, Eskimo societies also have a tradition of teaching and learning through lecture. Many of life's experiences in the Arctic can be fatal if one is not prepared. Thus, information on how to survive when the sea ice one is walking on breaks, or when one is attacked by a polar bear, cannot wait for apprenticeship learning. For this information, traditional lectures were used and still are in some regions to convey critical, life-saving information that cannot be transmitted any other way.

## **ETHICS**

I will highlight here only three components of traditional Eskimo ethical or moral thinking. One of these concerns one's duty to kin. In a kinship-based society, it is not surprising that one's highest degree of moral obligation goes to one's kin and that, furthermore, degrees of kinship relation can be used to resolve personal dilemmas involving conflicting demands. A second important factor is the traditional right of choice to live or die. Not only was the right to die when one chooses a fundamental right, but in some areas this intersected with kinship obligations, such that it was precisely the next-of-kin had the highest moral obligation to assist in suicide. Typically, these suicides would take place when an elderly, infirm individual decided that his or her life at the time had become unlivable. Cosmological modeling of the universe which involved recycling of one's multiple souls may also have contributed to Eskimo individuals being able to make *rational* choices regarding life and death in times of hardship. Thirdly, all individual interactions with other animals, plants, and material objects was, and *is* in more traditional areas of modern Eskimo country, seen to have a spiritual-and-hence material affect on all members of one's society.

## **POLITICAL ECONOMY**

Each individual Eskimo traditionally was a member of a residential family, an extended family (largely equal with one's community of residence), and of a society (again, largely consisting of kin). Production of food and technical resources was occasionally for inter-societal trade but largely for consumption within the residential family and community. Since all levels of Eskimo society were, and are kin-based, great flexibility existed in organizing economic activities within the society and in organizing political (and military) activities within and between societies.

Eskimo societies (save for those of the North Pacific Rim) were what anthropologists call *egalitarian*. That is to say, within the limits of one's age, sex, and abilities, *anyone* could occupy

any social status within the society. Again, except on the North Pacific Rim, Eskimo societies have had leaders, but not authorities (outside of the kinship system). A leader is a leader because people follow; when they cease to follow, that person is no longer a leader. In other words, a leader does not, in these cases, involve authority, with the recognized legitimacy of coercive force; rather, the community is constantly creating its leaders.

## **HUMOR**

A pervasive value in all Eskimo societies within historical times has been to recognize the importance of humor; this likely dates back at least to ASTt times. The ability to see the humor in hardship, to laugh at one's own mistakes, and to gracefully accept teasing from others – all these are seen as signs of a sane mind. Certainly in extreme environments (but perhaps in all environments), this understanding of the role of humor in the human psyche provides valuable insight.

## **CONCLUSIONS**

The early Eskimos, creators of the Arctic Small Tool tradition, possessed technological, social, cultural, and spiritual knowledge which allowed them to inhabit the High Arctic of North America on a permanent basis. Their descendants down through the modern Inuit and Yupiit Eskimos of today still thrive in what is (for most of humanity) an extreme environment. I am not suggesting that any components of Eskimo society or culture be adopted wholesale by those planning the human settlement of Mars. Rather, consideration of such settlement needs to be much broader than that which would result if one uses only late-modern capitalism, and industrial European and Euro-derived societies and cultures, as models of humanity. Human societies have a number of universal features in common; within this, however, there is a great range of possibilities in the ways that we can be human. The Eskimos of Earth's Arctic are a wonderful example of human adaptability in creating rich, meaningfully *human* lives in extreme environments. As such, we all may learn much from consideration of their amazing achievements over the past five millennia. Any planned effort to settle Mars would be well aided by including membership of Inuit and Yupiit Eskimos who alone among modern humans have recent, first-hand experience at settling extreme environments.

## **BIBLIOGRAPHY**

Burch, Ernest S., Jr., 1988. *The Eskimos*. Norman, OK: University of Oklahoma Press

Diveky, George, 1992. "The Thirty-Year Turn Around: A Teacher's View of Changing Educational and Language Policies in the NWT." Pp. 87-101 in *Language and Educational Policy in the North*, edited by Nelson H. H. Graburn and Roy D. Iutzi-

Mitchell, Working Papers of the Canadian Studies Program, Berkeley, CA: International and Area Studies, University of California at Berkeley.

Dumond, Don E., 1987. *The Eskimos and Aleuts*, revised edition. London: Thames & Hudson.

Grønnow, Bjarne, 1994. "Qeqertasussuk – the Archaeology of a Frozen Saqqaq Site in Disko Bugt, West Greenland." Pp. 197-238 in *Threads of Arctic Prehistory: Papers in Honour of William E. Taylor, Jr.*, edited by David Morrison and Jean-Luc Pilon, Mercury Series no. 149. Hull, Quebec: Canadian Museum of Civilization.

Harrison, G. A., J. M. Tanner, D. R. Pilbeam, and P.T. Baker, 1988. *Human Biology: An Introduction to Human Evolution, Variation, Growth, and Adaptability*, third edition. Oxford: Oxford University Press.

McGhee, Robert , 1996. *Ancient People of the Arctic*, Vancouver, B.C.: University of British Columbia Press.

Zubrin, Robert with Richard Wagner, 1996. *The Case for Mars: The Plan to Settle the Red Planet and Why We Must*. New York: The Free Press.

## END NOTES

---

<sup>1</sup> The term Eskimo itself is full of confrontation and misinformation. The Webster's Seventh New Collegiate Dictionary lists the word as of Danish origin, from the Cree language, and thence from Algonquian askimowew, meaning, "he eats it raw." This commonly-held notion – that the word Eskimo means Eater of raw meat – is apocryphal. In fact, the English word "Eskimo" derives from the French "Esquimauw" which, in turn, comes from a Montagnais language term applied originally to Micmac Indians (in one dialect) and to Eskimos (in another Montagnais dialect); the term in Montagnais translates as "snowshoe netters" (Goddard 1984). In north central Canada, Euro-Canadian teachers from southern Canada indoctrinated Inuit students in the 1960s that the term "Eskimo/Eaters of Raw Meat" was derogatory (Diveky 1992). Two problems with this arise. First, the translation of "Eskimo" is false. Secondly, it presumes that European cuisine is inherently superior to that of Native Americans, that there is something wrong with eating meat that has been prepared by freezing rather than by heating. Both allow Euro-Canadian cultural values to decide what is and what is not cultural or epicurean acceptability. Indeed, Alaskan Inuit and Yupiit are currently creating graffiti of "Eskimo Power" as resistance against Euro-American hegemony. Clearly, in Alaska the term Eskimo is a proud marker of identity.

<sup>2</sup> The Arctic has received numerous definitions from astronomers, geometricians, ecologists, geographers, geologists, and anthropologists. The Subarctic has approximately the same number of definitions, as it is generally defined as those regions between the Arctic and the Temperate zones. Some of these definitions are presented here.

---

The Ancient Greeks postulated that the earth was divided into three zones: the temperate Mediterranean homeland that was framed by a frigid zone to the north and a torrid zone to the south. Applying this model to the globe, some modern researchers trisect the degrees of latitude in each hemisphere, defining the polar regions as those above 60° N and below 60° S.

Astronomers define the Arctic and Antarctic Circles as the lines of latitude, poleward of which the sun shines for 24 hours at the summer solstice and where the sun does not shine for 24 hours at the winter solstice. By this definition the Arctic is all territory north of the Arctic Circle, approximately 66° 33" at present.

Ecologists generally use the northern treeline, i.e., the northward extent of timber-quality tree growth, to delimit the boundary between the Arctic and Subarctic in continental areas and the southern extent of winter sea ice to delimit the boundary between the Maritime Arctic and Subarctic.

The Arctic portions of northern lands have been defined by geographers (in an attempt more abstractly to define where treeline occurs) alternatively as those areas having a mean annual temperature of less than 10° C during the warmest month of the year, or as those areas underlain by continuous permafrost. Arctic shores and seas are defined as those covered during most winters by sea ice.

Geologists define "cold lands" as those subjected regularly to cryoturbatic forces that are mechanical forces due to cold (such as glaciation and continuous or discontinuous permafrost) which affect soil or rock.

For sociocultural anthropologists the key features for defining the Arctic are those which most directly impact human life: the absence of trees in the true arctic regions, the low bioproductivity of both the arctic and subarctic terrestrial ecosystems, and the presence of winter sea ice in the arctic maritime.

<sup>3</sup> Eskimo language citations here are from North Alaskan Iñupiaq, rendered in the international auxiliary Inuit alphabet.