Abstract

Indigenous tribal groups can operate as complex adaptive systems. Tribal members are then autonomous agents interacting intensely among themselves and with their environment. Technology, social structure, economics, education, and so on develop over time to help the tribe maintain its fitness within its environment. These developments may be due to chance discoveries, the operation of natural selection, and under certain critical conditions the intense interactions may enable the emergence of higher levels of social complexity. At times when the environment becomes less favorable for human habitation, the means of subsistence regresses to earlier forms, which necessitates a similar regression in the social structure binding the society together. This paper examines the three tribes living in the South Island of New Zealand between 1250 and 1800 ad. The three tribes were named Waitaha, Ngati Mamoe, and Kaitahu. They had to cope with changes in climate, food, and resources, as well as intra- and inter-tribal threats. Particularly during the latter stages, there was intense competition for the more productive land and sea areas. On the Chatham Islands, some 800 kilometers to the East of the South Island, the Moriori people formed their own distinctive culture, which will also be examined. The Moriori, who descended from the Maori people of New Zealand, lived in an even more harsh and isolated environment than the Maori, which significantly shaped their distinctive culture.

Introduction

This paper investigates the three main tribal groups living in the South Island of New Zealand between 1250 and 1800 ad and the degree to which they operated as complex adaptive systems, intensely interacting with their environment and with each other. The Moriori of the Chatham Islands, who emigrated from the South Island of New Zealand, will be similarly discussed.

Just because a group of people comes together and interacts, it does not necessarily mean that they operate as a complex adaptive system. Often, for example, a community will come together and interact such that emergence enables a new level of complexity to appear within the group, but some members of the group seeking personal power then distort the community for their own gain and take the community away from being able to further self-organize.

There are a number of ways in which tribal groups change over time. A tribal member might make a chance discovery, perhaps finding a new material or a new technique, which they then teach to other tribal members.
Some tribes change in the way they operate in response to an environmental change, which might be a change in the weather or an event related to a neighboring tribe. This might be part of a ratcheting effect of natural selection, with each tribal group trying to gain or maintain a dominant position on the land.

A group can also operate as a complex adaptive system, where the intense interactions between tribal members lead to self-organizing behaviors through which new levels of complex social organization emerge.

Holland (1996) defines a complex adaptive system as a dynamic network of many agents acting in parallel, constantly acting and reacting to what the other agents are doing. Control tends to be highly dispersed and decentralized. If there is to be any coherent behavior in the system, it has to arise from competition and cooperation among the agents themselves. The overall behavior of the system is the result of a huge number of decisions made every moment by many individual agents (Waldrop, 1992).

Emergence occurs within a complex adaptive system when self-organization transcends the elements from which it has developed (Letiche, 2000). A group of people can operate as a complex adaptive system in their own right, where the individual agents are human beings. The individuals act autonomously, but also cooperate to maintain the cohesion of the group. When the dynamic balance is right, a sudden leap can enable previously unpredictable levels of complexity to emerge. Through this process the group can learn and build a body of knowledge that is passed on to new group members (Capra, 2003).

Autopoietic systems (Maturana & Varela, 1991) have many similarities with complex adaptive systems. An autopoietic system is one that has a clear boundary with the outside formed by the constituents of the system and their interactions, which sustain their existence over time through those interactions (Hall, 2003). According to Maturana and Varela, an autopoietic system must have organic agents. They would therefore deny that a tribal grouping could be an autopoietic system, even though many of the characteristics of non-organic complex adaptive systems are very similar to autopoietic sytstems.

The traditional Maori tribes of the South Island of New Zealand

New Zealand is the last significant land mass in the entire world to have been occupied by human beings. The traditional occupation of the South Island of New Zealand by the Maori people has been divided into three time periods. The early period began around 1200-1250 ad with the first migration of the Waitaha people and continued until 1350 ad. The Waitaha people continued to occupy the South Island through the middle period (1350-1550 ad), which was characterized by more difficult living circumstances. During the late period (1550-1800 ad), Ngati Mamoe and Ngaitahu (or Kaitahu as they are known in their own dialect) joined Waitaha from the North Island (Waitangi Tribunal, 1991).

Maori tribal groups as complex adaptive systems

Letiche states that emergence has only occurred if the system’s structure has changed so substantially that old laws don’t apply and a “new” world exists (Letiche, 2000). The challenge is therefore to determine when the tribes were likely to have been acting as complex adaptive systems and emergence would have been evident. An “edge of chaos” dynamic is more likely to have operated at critical points in the history of the tribe, during which they can make significant progress, then followed by a much longer time when the new change is integrated into the tribal identity.
Self-organized criticality

Bak (1996) suggested that when systems reach critical conditions, a small, previously unpredictable change can catalyze a major change in the whole system. The harsh climate, the presence of rival tribes, and loss of access to resources could all move the tribal groups toward a point of criticality. During the earlier period, the human impact was generally less complex and did not reach critical levels in the way it did later. This is similar to a gentle flow of water, which is generally predictable with no turbulence. If the force of the water exceeds flow limits, however, the system must change form to contain the energy. Turbulent flows with fractal swirling vortices of energy emerge. Carneiro (as quoted in Goerner, 1994: 94) suggests that where the force (resource needs) and limitation on flow (environmental restriction) were critical, the emergence of hierarchical societies could follow. When critical factors reach particular levels, the system can longer maintain its existing state and must restructure itself to cope with the new realities or it may not survive.

The Waitaha, Ngati Mamoe, and Kaitahu tribes exhibited some of the qualities of complex adaptive systems. This next section explores how those qualities were made manifest and shows how those qualities worked to maintain their structure.

Complex adaptive systems sustain themselves by taking in energy from the outside environment and releasing unused energy back into the external environment (Lucas, 1997). The Maori tribal groups accessed a flow of physical, emotional, intellectual, and spiritual energies to maintain their structure. Negative feedback loops and positive feedback loops (Boje, 2006) both operate to create complex dynamics. Structural coupling (Maturana & Varela, 1991; Lucas, 2000), generated by the intense interactions between tribal members and with the external environment, enabled the formation and at times the emergence of tribal identities operating within self-generated boundaries.

The self-generated tribal boundaries were formed by the interaction of the many factors affecting the tribe, both internally and externally. These include geography, technology, food production, external threats, and internal dissent. Linear examples affecting tribal boundaries might be, for example, if the population decreases and the tribe’s ability to sustain and protect themselves is reduced; they may cope by reducing the tribal area in which they live, or if a competing tribe moves further away, more territory might open up.

The Waitaha, Ngati Mamoe, and Kai Tahu tribal groups had the ability to develop strategies to optimize their functioning in their environment in a measurable way (Axelrod & Cohen, 2000). Each tribe sought to gain access to a greater share of natural resources to survive and become dominant in their environment.

As is typical of complex adaptive systems, Maori society formed into nested self-similar layers. Individuals formed into whanau (family) groups, which grouped to form sub-tribes (hapu). Hapu were collected together to form iwi (tribal) groups. Several iwi groups made up a canoe (waka), relating to the ancestral canoes on which the first Maori came to New Zealand. It is likely that in the South Island Maori related primarily to their hapu (Waitangi Tribunal, 1991).

Each hapu had a rangatira or chief (often called an upoko in the South Island). Elders (kaumatua) and shaman (tohunga) were highly respected. Below them were warriors, commoners, and slaves. In spite of the sharply defined roles, the interactions between all levels of the hierarchy were significant. For example, issues were generally discussed by the whole hapu, after which the chief would decide on behalf of the tribe. Such inter-level interactions increase the likelihood of emergence.

There is a similarity in the way tribes form into groups within groups and the systems within systems found in fractals. As in all human societies, however, there were also distortions of the fractal-like hierarchy, generally...
created by those at the top to enable them to maintain their position of power.

**Legitimate and shadow networks**

Stacey (1996) identifies two networks within organizations operating as complex adaptive systems. The legitimate network is the control network of those in power. The shadow network is the informal network. The shadow network forms its own set of rules, which may support or conflict with the legitimate network. The shadow network is more spontaneous and fluid and can arise within an individual or in a subgroup, such as a *hapu*. It could, for example, develop from a disagreement within the tribe. If the legitimate network and shadow network become too dissonant, conflict is likely.

Emergent narratives would help create shared understandings from which the tribal structure formed, but the emergent narrative often tends to become frozen and distorted over time to create an “acceptable understanding of history” according to the needs of the tribal members. Those in positions of power tend to have a greater ability to define the discourse through the legitimate network.

**Small world networks**

Small world networks can function extremely efficiently and exhibit emergent behaviors (Buchanan, 2002). They require a critical number of agents linked together before a tipping point (Gladwell, 2002) is reached and complex dynamics appear. In the earlier stages of the occupation of the South Island there was only a small population distributed over a large landmass. It was unlikely that there would have been enough interactions to generate emergent behaviors. Tribal members would have often come together for social occasions such as marriages, funerals, or to discuss important tribal issues, increasing the likelihood of self-organizing narratives emerging. In a short time a distinctly New Zealand-flavored culture developed, heavily influenced by the physical environment and climate. Emergent dynamics generated by the tribal groups operating as complex adaptive systems are likely to have played some role, and perhaps even a significant role in the development of this culture.

If a group of people acts as a small world network, but there are too many linkages between the agents, the group quickly becomes less efficient. Everybody knows each other and is too involved in the lives of the others for maximum efficiency. Maintaining relationships then takes up too much energy, because too much energy is spent maintaining those links.

**Rules**

As with complex adaptive systems, individual tribal members had simple rules to obey, which generated complex behavioral outcomes for the tribe. Principles such as *tapu*, *noa*, *rahui*, *mana*, *mauri*, and *tikanga* (Irwin, 1984; Adams *et al.*, 2003) were developed by the tribal groups over time.

According to the Maori worldview, everything in the world is either *tapu* or *noa*. Anything tapu is separated off from everything noa (common) and is considered special and sacred. Sacred and traditional knowledge, death, treasured possessions, and sacred ceremonies are all *tapu*. Food and women in particular are *noa* and have the power to take away *tapu*. There are clear rules about how to act and how not to act in the presence of *tapu*. It is important not to taint something that is *tapu* by something that is *noa*. *Tapu* therefore also played a role in maintaining hygiene. Food, which is *noa*, could not be taken to a toileting area or in the presence of a dead
body, which is *tapu*, thus avoiding the risk of infection. On leaving a *tapu* area it is necessary to wash one’s hands. Thus, without any knowledge of bacteria, the Maori had an effective means of significantly reducing many possible health threats.

A *rahui* is a temporary restriction, which might be put in place to protect a food source that might be in danger of being over-harvested. *Mana* is a person’s authority or prestige, which clarifies their place and influence in the society. *Mauri* is the essential life force of a person, which must be protected and nurtured for all people to flourish in the tribe. *Tikanga* comes from the root word *tika*, meaning right, straight, or correct. *Tikanga* is the customary way in which certain social interactions happen. To do something according to *tikanga* is to do it the correct, socially acceptable way.

It is likely that these concepts formed from conversations around the fireside or in similar places where observations and theories were shared and discussed. At times new understanding would emerge from the narratives, and at other times concepts would slowly develop.

While these concepts may appear illogical according to a logical positivist perspective, they gave shape and meaning to the people living on the land and formed a coherent, effective means of structuring their lives to overcome threats to their wellbeing.

All these concepts formed a culturally consistent worldview and rule system, which ensured that each individual agent’s behavior remained within the attractors needed to maintain hygiene, safety, and social cohesion. Values act as strange attractors (UIA, 2005), and shared values powerfully align the individual tribal members and increase their commitment to working altruistically for the good of the whole tribe.

Complex adaptive systems have the ability to adapt on the basis of new learning. In the early stages of occupation, learning would have been about observing and understanding the new environment and developing the best uses of the resources available. Existing cultural knowledge would have been adapted for the new situation. Geographical features similar to those in the original homeland often took the same name. Mythical characters and stories were often retained but repositioned into the new environment, providing a sense of continuity.

As well as informal teaching of how to gather or catch food and other practical life skills, the ancient Maori had a system of *wananga* or schools of learning for passing on tribal wisdom that grew over time (Best, 1923). Young people were carefully selected to learn specific roles to play within the tribe. This would include knowledge of their tribal history, genealogy, songs, dances, religion, arts, and mythology. This would tend to develop from the legitimate network and have a stabilizing effect on the tribes. Emergent discourse would, on occasion, destabilize the tribes and allow novelty to be introduced. Being closer to the edge of chaos would make the emergence of new structures and understandings more likely.

**Autonomy and connectivity**
The tension between autonomy and connectivity is vital to the continuation of any complex adaptive system. If a system is too strongly focused on the autonomy of the individual agents, then the system loses its ability to cooperate and becomes less effective as individual agents work against each other destructively. Alternatively, if the system focuses too strongly on its connectivity, the agents lose their individuality and diversity and the system becomes inflexible. Autonomy and connectivity are not opposites, but rather complementary, something like dancing partners, continually modifying and adapting to each other in order than the joint system exhibits complex behaviors not possible by each alone. Maintaining the correct dynamic balance between autonomy and connectivity is crucial for a complex adaptive system to maintain its internal properties.

This tension was apparent in traditional Maori life. Autonomy was increased by developing unique tribal identities and decreased by the negative effects of warfare, the lack of resources, and the demands of a harsh climate. Connectivity was increased by trade, a universally comprehensible language, common genealogical links between tribes, and inter-tribal marriage. Connectivity was decreased by warfare, geographical isolation, competition for resources, a harsh climate, difficult and slow travel, and clashes over genealogical links.

Early, middle, and late periods of Maori occupation

Early period (Waitaha)

The 1200-1250 ad migration from the Pacific Islands must have been carefully planned, with many women and perhaps even children on board to create a sustainable population in their new land. Oral traditions indicate that they knew exactly where they were going, how to accurately navigate their way, and how to utilize their knowledge of the various tides, currents, and winds, as well as seasonal variations in the elements of nature needed for the journey (Dalley & McLean, 2005).

The first immigrants came from Pacific Islands with warm climates and plentiful crops. They also had pigs, chickens, dogs, and rats. On arriving in New Zealand, they set about creating similar societies, but especially in the colder south horticulture was unable to sustain the population (Sutton, 1994). The kumara and gourd were the only viable introduced crops, but neither would grow in the southern half of the South Island (Waitangi Tribunal, 1991). Of the animals only the dog (kuri) and rat (kiore) came to, or survived in, New Zealand.

Relatively quickly, hunting and gathering rather than horticulture became the main mode of obtaining food and the social structure accordingly reverted to one typical of hunter/gatherers with an itinerant lifestyle, smaller social groupings, and a more flat social structure. Complex adaptive systems can regress to earlier structures if that is the most efficient form to survive in a changing external environment.

The Waitaha had to adapt quickly to their new environment by ceasing to operate in ways that were effective in their small tropical island environment and find new resources and ways to use them to be effective in the South Island. This was certainly a time when as a group they were closer to the “edge of chaos.” While this would have increased the likelihood of the tribes acting as effective complex adaptive systems, the low population distribution, as already discussed, worked against this.
Sutton (1994) suggests that the lack of large predators caused an overabundance of bird and marine life in the South Island. In particular was the moa, a flightless bird (ratite) that ranged in size from that of a turkey through to a four-meter creature towering above the humans (Anderson, 1983). With few predators it is likely that the moa, and many other species, were easy prey to the first humans.

Anderson (1990) estimated that tens of thousands of the slow-breeding moa were alive at any given time. Moa hunting would have begun as a positive feedback loop fueled by the ease of capture and a quickly expanding Maori population. Only later when moa numbers decreased significantly did negative feedback loops emerge to reduce the kill sizes. Over-reliance on the moa as a food source is likely, bypassing the tipping point for the species and making the final demise rapid. Moa hunting, and to a lesser extent deforestation by fire, rats, or dogs eating moa eggs, as well as disease most likely caused the extinction of the moa by around 1600 ad in all but a few remote areas (Anderson, 1983; Diamond, 1998). Orbell (1985) stated that a native eagle, crow, pelican, a harrier hawk, swan, geese, duck, and rail also went extinct during the same period (Worthy & Holdaway, 2002).

For several hundred years the moa probably provided around 25 percent of the dietary needs of people in Canterbury, Otago, and Southland, with 100,000—500,000 moa being killed. Anderson (1990) records 229 moa sites in the South Island and commonly around two-thirds of the birds uncovered had major parts of their meat left uneaten.

The total human population of the South Island during the period discussed probably never increased beyond 3,000, growing from an initial population perhaps as small as 100 people (Sutton, 1994). This small population on such a large landmass meant that disputes could generally be resolved by a bifurcation of the group, with one group moving to a new uninhabited area. Waitaha had no need to develop a warrior culture. Indeed, no weapons of war or fortifications have been found in Waitaha archeological sites (Duff, 1956). The social structure was also much flatter, reducing the level of societal conflict. The distribution of wealth was more even, with less stress on possessing items of value.

The Waitaha ancestor, Rakaihautu, led the initial exploration of the land (Waitangi Tribunal, 1991). Axelrod and Cohen (2000) talk of the need of complex adaptive systems to balance exploration and exploitation of the environment. At this early stage, much was to be gained by extensive exploration of the new land, but as new unexplored areas became fewer and more difficult to access, the balance shifted more toward exploitation of those areas that had already been explored. This also links with Stacey’s (1996) ideas of the behavioral loop of discovery, choice, and action forming co-evolutionary feedback loops.

Anderson (1983) states that during the early period life expectancy was about 28 years for males and 30 for females. The most usual cause of death was pneumonia and other ailments caused by constant exposure to weather and water, and degenerative diseases of the neck and backbone, caused by the constant demands of carrying loads. This short lifespan would have made accruing a knowledge base through accumulated wisdom more difficult and made it harder to maintain tribal wisdom.

**Middle period (Waitaha)**

During the middle period the moa and many other easy food sources became extinct. Deforestation, especially through fires, both caused by humans as well as natural causes, significantly changed the environment (Ogden et al., 1998). Food became harder to acquire and coastal and marine food sources increased in significance (Anderson, 1983). The population of seals and sea elephants rapidly decreased. The human population decreased to around 2,000 and communities fragmented so that less complex social structures re-emerged. Less palatable and more labor-intensive foods such as the root of the ti tree and the fernroot became important parts
of the diet (Anderson, 1983). The previous local maximum on the phase space of the effectiveness of survival of South Island Maori based on available resources dropped suddenly, so other local maxima in the form of new food sources had to be sought to ensure the survival of the tribe.

In the south of the South Island in particular, life became an annual migratory cycle, moving in a rhythm with the seasonal harvesting of foods such as muttonbirds, eels and lamprey, forest birds, fish and seal, since there was no longer sufficient food for people to live just in one area. Housing construction was simpler in the south, with circular houses without piles being used (Tau, 2003).

The Waitaha people had to reform themselves to be able to operate as efficiently as possible in their given environment. That meant regressing to a less complex structure and begs the question of whether the process of emergence can result in a less complex structure.

**Late period (classical period) (Waitaha, Ngati Mamoe, and Kaitahu)**

In the North Island the environment and social circumstances were quite different. The population and population densities were higher, increasing the requisite variety. Gathering wild foods still predominated, but horticulture became more central to the culture than in the south. The people developed levels of social complexity not previously observed in the South Island.

Sutton (1994) suggests that the overshoot of population compared to wild food resources led to greater levels of conflict among tribes. The greater use of horticulture in the north enabled larger, permanently occupied villages to be developed. Protection was now necessary for strategic sites, buildings, possessions, and resources. This precipitated the development of a warrior class, which could be resourced from a higher surplus (Cowan & Beck, 1996). Slavery and cannibalism became evident (Salmond, 1992).

The boundaries of complex adaptive systems are permeable, so the more rapid social developments in the north affected the South Island, which is unlikely to have developed a warrior-based society on its own. Whatumamoe led a tribe known as Ngati Mamoe down from the Napier area in the North Island (Waitangi Tribunal, 1991) in the mid-sixteenth century. They came to dominate the South Island more by strategic marriages than warfare. In general they were peacefully absorbed into the South Island, but the structural coupling meant that the Waitaha people had to adapt to new tribal boundaries and having strangers among them.

As a tribe grows larger the boundaries it must maintain become increasingly stretched because there is more outer perimeter to defend. Often the extending boundary reaches a critical point when a seemingly insignificant incident initiates a “butterfly effect” (Gleick, 1994), leading to a bifurcation of the tribe into two groups. Polynesian history reveals a consistent pattern of stories of conflict between two brothers. Traditionally, the elder brother (*tuakana*) takes precedence, and so the younger brother (*teina*) typically takes part of the tribe and leaves in search of new lands in which to set up a new tribe (Adams *et al*., 2003).

Stirling (1994) tells of Porourangi and Tahupotiki, two brothers living on the East Coast of the North Island about 400 years ago. Porourangi was married to Hamo-te-Rangi, but Tahupotiki secretly loved her. When this became known, Tahupotiki had to leave to live in the South Island. The tribe did not come to the South Island in one group, but came in two main separate migrations. Ngai Tuhaitara came south under Tuahuriri and Ngati Kuri under Maru Kaitatea (Tau, 2003). The new tribe was eventually named Ngai Tahu/Kai Tahu after Tahupotiki. The Waitangi Tribunal (1991) states in regard to this story, “The movement [migration] had far more general causes than the historic incident which sparked it,” suggesting that other critical issues (Bak, 1996) were necessary in order that small initial changes led to system-wide changes.
By the late period, migrating meant displacing existing occupiers. Although the land and climate were not as attractive, the relative ease of conquering the more peaceful South Island tribes made it a tempting option. Those dwelling in the South Island had no choice but to adapt their own social structure to accommodate the presence of Kaitahu. As Kaitahu came from the north, Ngati Mamoe and Waitaha tended to move further south, so that to this day the influence of Ngati Mamoe and Waitaha is generally stronger as one moves further south.

After Kaitahu split from Ngati Porou, a new sense of autonomy and identity was needed. Patterns of tribal differentiation through clothing, song, dance, and a distinct dialect quickly developed. The dialect of the Kaitahu people is probably the most distinctive dialect of New Zealand Maori. Wherever one finds the letter ng in standard Maori it is replaced with the letter k. Thus, the name Kaitahu is known as Ngai Tahu in the north and the river Waitaki is the same as Waitangi in the north.

Bakhtin states that all language is dialogic and is thus infused with the values, culture, and environment of its speakers (Lye, 1998). The language of South Island Maori thus has its roots in the values, culture, and environment of those living on the land. It also carried its Pacific history, changing dynamically to meet the needs of its speakers. The s and l common to most Pacific Islanders were generally dropped when the Maori arrived in New Zealand, but are still found in many early written South Island Maori manuscripts.

Bakhtin talks about monoglossic centripetal forces forcing the language to be frozen, limiting the ability of tribal members to reach beyond the conceptual restraints held in place by the nature of the language, and heteroglossic centrifugal forces freeing the language from within itself, making the language more socially distinguished. These two forces would have been operating against each other in shaping the language, while the language in turn was shaping the culture and social dynamics. Bakhtin also mentions polyglossia, the contestation of languages as would have occurred when two tribal variants come in contact with each other, although in the South Island the differences in the language were relatively minor. Linguistic differences are typical of the many difficulties created as the tribes increasingly differentiated themselves from each other. An example of how they coped with the cultural divergence was the general understanding that the kawa (protocol of ritual) of the tribal area one is visiting is followed, even if that is totally opposite to one’s own beliefs and traditions. This enabled people to move through the land without generating too much conflict.

The pattern of conquest was to kill or enslave the men and marry the women (Waitangi Tribunal, 1991). This meant that the traditions of the conquered tribes were retained through the women. Like a parasite or a virus, Waitaha and Ngati Mamoe reformed as separate complex adaptive subsystems or as shadow networks (Stacey, 1996), structurally coupled to the host, thus preserving their own traditions within Kaitahu.

**Chatham Islands**

The Moriori people of the Chatham Islands originally descended from the same Polynesian people as the Maori on the mainland, probably arriving from New Zealand around the thirteenth or fourteenth century (King, 1989). Their environment was even harsher and far more isolated than the South Island. No sustainable cropping was possible and their society regressed in complexity to small family groupings with little or no social hierarchy. Tools became less advanced over time, particularly since there were no trees large enough to build canoes capable of returning to New Zealand (King, 1989).

It is even less likely that the Moriori operated as complex adaptive systems. Their society generally regressed over time, contrary to most societies that self-organize to increasing levels of complexity. The society’s structure became flatter with decreasing levels of requisite variety.
There was no such thing as a stranger among the Moriori. This made resolving conflict much easier. People also knew that if disagreements were to get out of hand, the very survival of the whole population was in question. Moriori traditions state that an ancestor named Nunuku made a ruling prohibiting killing people. Disputes were settled by combat with staffs no thicker than a person’s thumb. The combat ended as soon as blood was drawn (King, 1989). Rather than being a sign of spiritual development, this peaceful way of life was an environmental necessity for survival.

The Moriori of the Chatham Islands did not generate sufficient food surpluses to enable a hierarchical society to form, and castration was practiced to control population size. All the people needed to work to produce enough food. There were no resources to sustain a nonproductive higher class, and signs of rank such as tattoos disappeared. A chief’s house became indistinguishable from the house of a commoner. Life expectancy was around 32 years and infant mortality rates were one third (King, 1989). Emergence springing from complex dynamics was even less likely to have been evident on the Chatham Islands than on the mainland. The flat societal structure bred a level of conformity that worked against the likelihood of emergence.

Conclusion

The Waitaha, Ngati Mamoe, and Kaitahu in the South Island of New Zealand and the Moriori people of the Chatham Islands lived for hundreds of years and adapted to significant challenges in their environment. Complex distinctive cultures were developed in a relatively short time. While it is difficult to determine the actual extent of self-organizing dynamics within the three tribes, it is likely that the dynamics of complex adaptive systems were evident at times through their history and may have been behind major changes in the life of the people.

Emergence would have been occurring often in the individual lives of tribal members. For the three tribal groups the main critical times discussed when emergence was more likely to have occurred were when the Waitaha people first arrived, when food became scarce during the middle period, and when northern tribes migrated to the South Island. Particularly because of the isolation of the Moriori people, it is less likely that they experienced self-organization.

References


