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ABSTRACT. Ethical implications of Yahgan and Mapuche narratives about the birds of the austral temperate forests of South America. This paper analyzes the ethical implications of Yahgan and Mapuche stories about forest birds of southern Chile and Argentina, from the perspective of biological conservation and environmental philosophy. To allow comparisons among notions of traditional ecological knowledge, evolutionary-ecological sciences, and environmental ethics, I focus on two well known metaphors: the *tree of life* and the *web of life*. The analysis of the first metaphor allows to conclude that both modern sciences and the Yahgan and Mapuche indigenous cosmogonies affirm a common origin for birds and humans. This notion supports the *intrinsic value* of the avifauna, because birds are regarded as our evolutionary relatives. This implies that, to a certain degree, the life of birds can be subject to moral considerations based on ontological and ethical judgments commensurable with those involved in assessing the value of human life. The analysis of the metaphor of the *web of life* also reveals essential correspondences between contemporary scientific knowledge and Yahgan and Mapuche traditional ecological knowledge regarding the net of biotic interactions and ecosystem processes. Bird stories such as the Green-backed Firecrown (*Sephanoides sephanoides*) or *omora* (in Yahgan) and the Magellanic Tapaculo (*Scytalopus magellanicus*) or *tiftifken* (in Mapuche) affirm, as much as sciences, that it is necessary to preserve the community of birds, and biodiversity in general, to ensure water supply and other ecosystem services and goods in the long term. The ethical imperatives, implicit in the second metaphor, are consistent with the notion of *instrumental value*. According to it, the conservation of birds can be regarded as an instrument for human survival. Traditional ornithological knowledge and modern sciences provide support for the instrumental and intrinsic value of biodiversity; today both values appeal for a respectful living together with birds.

Key words: Avifauna, Chile, environmental ethics, ethno-ornithology, instrumental value, intrinsic value, Mapuche, metaphors, temperate forests, Yahgan.

RESUMEN. Implicaciones éticas de narrativas yaganas y mapuches sobre las aves de los bosques templados de Sudamérica austral. Este trabajo analiza las implicancias éticas de las historias yaganas y mapuches sobre las aves de los bosques del sur de Chile y Argentina, desde el punto de vista de la conservación biológica y la filosofía ambiental. Para permitir comparaciones entre nociones del conocimiento ecológico tradicional, las ciencias ecológicas y evolutivas, y la ética ambiental actual, el análisis se centra en dos metáforas ampliamente conocidas: el *árbol de la vida* y la *red de la vida*. El análisis de la primera metáfora permite concluir que tanto las ciencias como las cosmogonías indígenas yagán y mapuche proponen un origen común para las aves y los humanos. Esta noción genealógica o evolutiva realza el *valor intrínseco* de la avifauna, porque las aves son consideradas como nuestros parientes evolutivos lejanos. Esto implica que, en algún grado, la vida de las aves puede estar sujeta a consideraciones morales fundadas en juicios ontológicos y éticos conmensurables con aquellos con que juzgamos el valor de la vida humana. El análisis de la metáfora de la *red de la vida* también revela concordancias esenciales entre el conocimiento actual de las ciencias ecológicas y el conocimiento ecológico tradicional yagán y mapuche respecto a las tramas de interacciones bióticas y abióticas de los ecosistemas. Historias de aves como la del picaflor (*Sephanoides sephanoides*) u *omora* (en yagán) y la del Churrín (*Scytalopus magellanicus*) o *tiftifken* (en mapuche) afirman, tanto como las ciencias, que es necesario conservar la comunidad de aves y la biodiversidad en general para mantener la continuidad del abastecimiento de agua y otros servicios y bienes ecosistémicos en el largo plazo. Los imperativos éticos implícitos en la segunda metáfora son consonantes con la noción de *valor instrumental*, donde la conservación de las aves puede ser apreciada como un instrumento para la sobrevivencia humana. Tanto el conocimiento ornitológico tradicional como el científico afirman los valores instrumental e intrínseco de la diversidad biológica; ambos valores apelan hoy a una convivencia respetuosa con las aves.

Palabras clave: avifauna, bosques templados, Chile, ética ambiental, etno-ornitología, Mapuche, metáforas, valor instrumental, valor intrínseco, yagán.

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INTRODUCTION

Indigenous narratives correspond to oral traditions whose concepts are open to multiple interpretations. The narratives possess many layers of significance (Turner 1967, Geertz 1974), whose decodification and interpretation vary depending to the analyst's questions and perspectives (Hunt 1977). The present analysis of Yahgan and Mapuche stories about the birds of the forests of southern South American aims to essay a communication bridge among notions of traditional ecological knowledge, ecological and evolutionary sciences, and environmental ethics. For this purpose, the analysis centers on two metaphors extensively used in environmental and evolutionary sciences, both of which involve an ethical dimension: the *tree of life* and the *web of life* (see Rozzi 1999).

METHODS

Storytelling formed an integral part of Yahgan and Mapuche life. According to Gusinde (1961), in Yahgan communities there were men who narrated stories around the fires at night in the austral archipelagoes of Cape Horn. However, the stories recorded in this work, as well as the majority of those recorded by ethnographers at

the beginning of the 20th century, were told by women. In the early 21st century, sisters Úrsula and Cristina Calderón were considered the major repositories of Yahgan traditional ecological knowledge. The stories recorded with them provide the basis for the analysis of Yahgan traditional ornithological knowledge presented in this paper. Regarding the Mapuche narratives, these originate principally from stories and poems of the Lafkenche poet Lorenzo Aillapan (see Aillapan & Rozzi 2004). Field methodology and area of study are described in Massardo & Rozzi (2004).

RESULTS AND DISCUSSION

Yahgan ornithological narratives associated with the *tree of life* metaphor

From an environmental ethics perspective, the central concept of the *tree of life* metaphor is the notion "of evolutionary kinship" (*sensu* Leopold 1949). Let's consider the Yahgan story of the Green-backed Firecrown (*Sephanoides sephanioides*) or *Omora* as told by Cristina Calderón (Story 1).

Processes of transformation from human beings into birds-like those evoked in the story about the Green-backed Firecrown or

STORY 1. Yahgan narrative of the Green-backed Firecrown (*Sephanoides sephanioides*) or *Omora*, narrated by Cristina Calderón (Yahgan and English audio recording in Rozzi *et al.* 2003).

In ancestral times, when birds were still humans, a great drought occurred in the region of Cape Horn and the people were dying of thirst. Only the wily fox, known as *Cilawáia*, found a lake. He told no one and built, instead, a solid fence around it so that no one could enter. Hidden as such, he drank lots of water, concerned only with himself. However, after some time the other people discovered this lake and went as a group to ask the fox for a little bit of water. *Cilawáia* did not even listen to their supplications and expelled them with rude words. The condition of the people got increasingly worse and when they were at the point of death, they decided in their desperation to send a message to the hummingbird or little *Omora*, an occasional visitor who had saved them before in times of crisis. *Omora* was always prepared to help others and arrived quickly. Although diminutive, this little tiny bird-man-spirit is braver and bolder than any giant. When he arrived, the downcast people told him about their great sufferings, and, indignant, *Omora* raised himself and rapidly undertook the flight towards where the egotist *Cilawáia* was, and he confronted him directly saying: "Listen! What is it that the people are telling me? Have you had access to a lake full of water, but you don't want to share it with other people who soon will die of thirst!" The fox replied, "Why should I worry myself about the others? This lake has only a little water, and it barely is enough for me and my closest family. I cannot give anything to other people because soon I'll suffer thirst myself."

Upon hearing this, *Omora* became furious and without replying to the fox, returned to the settlement. He reflected briefly and rapidly rose again, took his sling and flew back to the fox. Along the way he collected several sharp stones, and when he was within sight of the fox and sufficiently near, he shouted to him: "Are you going to share your water for now and for always with the other people? Come on, don't be so selfish. If you don't spare water, they sorely will die of thirst!"

The fox answered indifferently, "They can all die of thirst. Why should I worry? I can't give water to each one of the people who live here, or else my family and I will also die of thirst." *Omora* was so offended that he could not control himself any longer and furiously fired a sharp stone with his sling, killing the fox with his first throw.

The rest of the community had been watching and became happy, running to the place. Rapidly they broke down the fence, went to the lake and drank, satiating their thirst. They drank so much that the lake became completely empty and a few birds that arrived too late barely found a few drops with which they moistened their throats. Then, the wise owl *Sirra* or *Sita*, the grandmother of *Omora*, said to the birds that arrived late, "collect mud from the bottom of the lake and fly to the peaks of the mountains, and fling the mud over them." The little birds flew, and their balls of mud gave birth to springs that became water courses that spouted from the mountains, forming small streams and large rivers that flowed through the ravines. When all the people saw this, they were extremely happy and drank great quantities of fresh, pure water, that was much better than the water of the lake, and now all find themselves safe again. Today all of those water courses still flow down from the mountains and provide exquisite water. Since that time no one has died of thirst.

omora- are encountered in numerous Yahgan stories, and constitute a primary foundation for the notion of a relationship between birds and humans. Grandmother Úrsula Calderón related stories like that of beautiful young women transforming into Black-chinned siskins (*Carduelis barbatus*) or *twin*, or of two Yahgan siblings who fell in love and were transformed into a couple of Magellanic woodpeckers (*Campephilus magellanicus*), or *lana*, while collecting fruits from the *chaura* (*Pernettya mucronata*). Such transformations imply a common ancestral lineage.

Transformations of humans into animals, or animals into humans, were conceived by numerous Amerindian cultures. Hunt (1997) referred to this type of cosmogony as a “pre-Hispanic theory of evolutionary biology.” In scientific evolutionary theory, as well as in pre-Hispanic evolutionary perspectives, humans, birds, and other living creatures share a common evolutionary origin and, as a consequence, are linked through the notion of a genealogical kinship.

In the Yahgan story of the hummingbird *omora*, we also find a notion of “inter-species kinship” relationships among birds. For example, the Barn Owl (*Tyto alba*) or *sirra* is the grandmother of the hummingbird or *omora*. In other Yahgan narratives, this spectrum of kinship and transformations is projected onto the physical world: rocks are transformed into human beings, and humans transformed into stars, the moon or the sun (see Gusinde 1961).

Interspecies kinship relationships, as well as transformations from one species to another, support a notion of a common nature that presents a parallel to the biological theory of the unity of life. Such a notion is further affirmed when the story speaks of “the time of the ancestors, when birds were still humans.” This affirmation begins the *omora* narrative and many other Yahgan stories. For example, the grandmother Úrsula Calderón relates that, in ancestral times, the inventor of canoes or *anan* was the widowed *tuto*. He then transformed into the little Magellanic Tapaculo (*Scytalopus magellanicus*), and today this bird collects and weaves vegetable fibers of roots, branches, lichens, and

mosses to carefully build his nest among roots or in tree-trunk cavities (Rozzi *et al.* 2003).

In summary, Yahgan ornithological stories present three elements that, in a broad sense, imply a notion of kinship between human beings and birds:

- 1) Yahgans note that human beings have given origin to various species of birds through diverse processes of transformations;
- 2) Yahgans recognized kinship relationships among diverse species of birds, such as those between the Barn Owl and the Green-backed Firecrown;
- 3) Yahgan cosmogony refers to an ancestral time when birds were still humans.

Yahgan ornithological narratives associated with the *web of life* metaphor

The main ecological concept of the *web of life* metaphor refers to the numerous and complex interactions among biological species, and also between those species and the physical environment they inhabit (see Carson 1962). Humans and other biological species form part of this network of interactions. Furthermore, from a biocultural perspective, the *web of life* metaphor allows one to compare the “ecological order” and the “social order.” To this end, we consider the story of the Black-faced Ibis (*Theristicus melanopis*) or *lejuwa* (Story 2).

This story evokes the association between the migratory behavior and the seasons of the year. For the Yahgans, the arrival of the Black-faced Ibis signifies the beginning of spring, and its departure involves snowstorms and cold weather. This bird has a large size and color, and emits powerful metallic vocalizations. Thus, at the end of autumn upon its departure it announces very clearly the changes of the seasons and marked climatic changes. This kind of relationship between the Yahgans and the birds involves a type of inter-specific coupling of behaviors, where birds act as signs to predict the climate.

STORY 2. Yahgan Narrative of the Buff-necked Ibis (*Theristicus melanopis*) or *Lejuwa*, narrated by Úrsula Calderon (Yahgan and English audio recording in Rozzi *et al.* 2003).

In the times of the ancestors, one day when spring arrived, a *yamana* [= man] leaned out of his *akar* or hut and saw a Buff-Necked Ibis or *lejuwa* flying in the sky. The *yamana* was so happy that he yelled to the other members of the community, “An ibis is flying over our *akar*. Look!” Immediately the others came out of their huts, shouting loudly, “The spring has come, the ibises are already in their return flight.” They jumped for joy, and they jumped hard.

Lejuwa is, however, a very delicate and sensitive woman and likes to be treated with special deference. Upon hearing the noise of the shouts, she became furious, and profoundly offended, causing a strong snow storm. It snowed incessantly; it was freezing cold; all the land was covered with ice; and all the waters froze. Many people died because they could not navigate in their canoes to search for food. Neither could they leave from their *akars* to look for firewood because all was covered with snow. More and more people continued to die. Only after a long time did it stop snowing, and the sun begin to shine.

The sun warmed so much that begin to melt the ice and snow that had completely covered the land, and consequently floods began to flow towards the channels and the oceans. The ice that covered the wide and narrow channels broke apart and melted, and the Yahgans could finally go to the shores and navigate in their canoes to collect food. On the big mountainsides and deep valleys, however, the ice was so thick that not even this sun could melt it. Even today, glaciers can be observed coming down to the sea, that remind us of the severe frost and snowstorm that *lejuwa*, who is a very delicate and sensitive woman, provoked in those times. Since then, the Yahgans treat the Buff-Necked Ibis or *lejuwa* with much respect, and when they come near the houses or *akars*, the people keep quiet, particularly the little children who are not allowed to imitate them or to cry.

The Buff-necked Ibis story also expresses a social rule that prohibits to disturb the birds. Such a rule is found in numerous Yahgan bird stories. For example, the grandmother Úrsula observes that the Fire-eyed Diucon (*Xolmis pyrope*) or *hashpúl* is a powerful shaman who should be treated with respect, and never have stones thrown at him. If this rule is broken, *hashpúl* gets irritated and provokes storms and tempests with south winds or *ilan*. This Yahgan prohibition of thrown stones at certain birds has been documented since the first registered ethnographies (Lothrop 1928). Grandmother Cristina says that no one is permitted to imitate the hum of the South American Snipe (*Gallinago paraguaiæ*) or *shakóa*. Whoever imitates or bothers *shakóa* will awaken with their toes cut by the fibers of the rushes (*Marsippospermum grandiflorum*) or *ushkulampi*. This plant grows in the southern wetlands inhabited by the Snipe; wetlands where Yahgan women collect rush fibers for weaving baskets (Rozzi *et al.* 2003). The narratives thus express an awareness about ecological interactions with these birds that should not be disturbed. Through the stories, rules and norms are established for interacting with the birds. Whoever disobeys these rules will suffer the consequences.

Stories like those of the Buff-necked Ibis, the Fire-eyed Diucon, and the South American Snipe are narrated by Yahgan grandmothers and grandfathers. In turn, the bird stories also express respect toward elders. For example, grandmothers Úrsula and Cristina tell how when the Austral Thrush (*Turdus falcklandii*), or *hakasir*, has chicks, the mother first educates the oldest, and then together they educate and feed the other sibling chicks in the trees and rivers of the forest habitats. *Hakasir* moves from branch to branch talking, whistling, and educating her child. Úrsula remembers one day when “I was laying on the ground watching, when the mother *hakasir* said to her oldest chick ‘when you have a little brother you should educate him, enliven him to work, to bathe himself.’ And then the little bird went singing, flying toward the river where together they soaked and washed themselves, then shook and returned to the same branch. This is how the *hakasir* grows up.” Úrsula adds that “if the son Thrush does not listen to its mother, if it does not obey, it is abandoned. The little Thrush remains alone and has nothing to eat. It eats bad *dihueñes* (mushrooms of the genus *Cyttaria*), rotten ones, that make him sick and he dies. On the other hand, if he obeys his mother, then he grows healthy, feeding himself on good fruits, such as the Prickly Heath (*Gaultheria mucronata*) or *amai*.”

Yahgan social relations are projected onto the narratives about the birds. At the same time, observation of the birds’ conduct inspires Yahgan habits and social norms. In order to survive, both the Thrush and the young Yahgans should obey their parents and grandparents, and learn to distinguish good from bad foods. Respect toward elders is also present in the story of *omora*, since only with the wisdom of its grandmother, the Barn Owl, is the Green-backed Firecrown able to achieve success in maintaining: (1) the *Yahgan social order*, through punishing greediness, and (2) the *ecological order*, through the conservation of the community of birds and the reestablishment and creation of freshwater streams. These stories express a close parallel between the social order of the Yahgans and the ecological order observed between the birds.

Mapuche ornithological narratives associated with the tree of life metaphor

In order to analyze Mapuche ornithological stories from the point of view of the *tree of life* metaphor, we primarily consider the Andean Condor (*Vultur gryphus*) or *mañke* (Story 3) who is the king of birds in traditional Mapuche ornithology, as well as in other Andean cultures (Primack *et al.* 2001).

With its wingspan of more than 3 meters, the Andean Condor is the largest flying bird in the Americas. For the Mapuche culture, *mañke* symbolizes the Andean Mountain Range through its grand size and by its colors: white like the snow and black like the rocks. It also flies to grand heights over the Andean peaks, embodying the fundamental Mapuche virtues. Today, verifies Aillapan, both the *mañke* and the Mapuche virtues –wisdom (*kim*), justice (*nor*), kindness (*küm*), and discipline (*newen*)– are threatened with extinction. Just like the Andean Condor is hard to see because it soars so high, also the essential Mapuche values, which elevate our spiritual lives, are difficult to appreciate and cultivate in our days.

The Mapuche have a special admiration for birds of prey. Among those, the Crested Caracara (*Polyborus plancus*) or *traru* has immense historical significance because its lineage gave origin to the greatest of Mapuche warriors, *Leftraru* (*lef* = fast; *traru* = Caracara). This brave warrior, known by the Spanish conquerors as Lautaro (1535-1557), took advantage in the battles of his knowledge of the topography of the land, his ability to predict weather events, and the speed to attack with his warriors from different flanks (Barella 1971).

STORY 3. Mapuche Narrative of the Andean Condor or *Manke*, narrated by the Mapuche poet Lorenzo Aillapan (Mapudungun and English audio recording in Rozzi *et al.* 2003).

The Condor or the *mañke* is for the Mapuche culture the King of the Birds. It is a symbol of the mountains, not only due to its great size and impressive wing-length, but also its black and white colors, which signify the snow-capped peaks and the black mountain rocks. For the Mapuche, the condor unites the virtues of being *Kimche*, a wise person, *Norche*, a person who loves justice, *Kümeche*, a good-natured person, and *Newenche*, a powerful, lordly person. This King of Birds is the national bird of Colombia, Ecuador, Bolivia, and Chile. *Mañke* was once abundant on *Manquehue* Mountain, which means place (*hue*) of the condors (*mañke*), in the center of Santiago, the capital of Chile. It is still found today throughout the territory of the austral forests, but paradoxically, this king of birds, this national symbol of four countries, finds itself now threatened with extinction.

The story of Lautaro shows how certain essential attributes, such as quickness and wisdom, are conserved through the common lineage of birds and human beings. These attributes belong to both. Thus, for example, the Black-throated Huet-huet (*Pterotochos tami*), or *wed-wed*, is thought of like a buffoon or a crazy man that, with his vocalizations, narrates stories while accompany travelers through the forests along ravines (Rozzi *et al.* 2003). The Southern Lawping (*Vanellus chilensis*) or *tregul* is a bird that acquires various human or animal forms: “it is a man that comes with his sex dangling, it is a woman that walks another way, it has four legs, it can be a dog or a fox” (Aillapan & Rozzi 2001). The flight and song of the *tregul* courtship are mimicked during the Mapuche ceremony, *ngillatun*. Participants dance in circles as the *tregul* does, with arms open toward the north, the west, the south and the east, in order to invoke the Grand Spirit of Universal Fertility (Aillapan & Rozzi 2001).

The identification between birds and humans is expressed, then, in multiple aspects of the Mapuche culture, generating a living sense of familiarity in the bird-human relationships. Furthermore, representation of birds as humans, and vice-versa, implies that these beings possess common characteristics, an assertion consistent with the scientific paradigm of the “unity of life.” Analogous to scientific evidence based on the similarities of cellular structure, embryological development, and anatomical patterns found among vertebrates, the Mapuche worldview establishes similarities between human beings and birds based on observation of certain behavioral patterns.

Mapuche ornithological narratives associated with the web of life metaphor

Among the ecological interactions expressed through the Mapuche stories, the trophic relations stand out that generate matter and energy flows between the “beings of air, water, and earth” (Aillapan & Rozzi 2001). For example, for the Mapuche worldview, “the hypnosis that the Ringed Kingfisher (*Megaceryle torquata*) or *challwafeññum* exercises over the fishes unchains the flow between beings of the water and those of the air through the food chain.” For Aillapan, the woodpeckers are seen as “birds that pass the day attached to a tree, pecking at and removing larvae that, in turn, are fed by the sap and tissues of the trees.” Thus, a “cord of life” is established that flows from the minerals

in the mountain soil through the sap of the trees, the blood of the insects and the birds.

The Mapuche worldview pays attention to all the members of the food chain. Carrion birds such as vultures or *kañin* are admired as “full time cleaners of the cities, beach and open countryside” (Aillapan & Rozzi 2001). Birds of prey and men are notable hunters. The ecological webs between birds and humans is finely interwoven and have a rhythm that imposes an ethical imperative: the rhythm of the birds must be heard and respected (Story 4).

Based on the call of the Magellanic Tapaculo (*Scytalopus magellanicus*), Aillapan questions the notion of progress. At the end of his poem about this millenary bird, Lorenzo sings: “it is said that the native people are behind the times, so I will set my watch forward” (Aillapan & Rozzi 2001). In this way, this poem based on the call of the Tapaculo or pocket-watch bird, *Tiftifken* –which, like the Mapuche, has inhabited the forests of southern Chile since its beginnings– ridicules the notion of progress that is so sacred to the conquistadors. The hurry and acceleration of the rhythm of life is as easy and as mechanical as it is accelerating the “tic-tock” of a clock, but why should we do such a thing? What sense does it make to abandon the forests’ own rhythm, in order to accelerate it in a race that dissociates from the forests thereby driving to suicide all their living beings, including birds and humans? (Aillapan & Rozzi 2001). Thus, the notion of the *web of life* acquires in the Mapuche worldview a normative character: one must listen and respect the rhythm of nature.

Implications for environmental ethics and biocultural conservation

The metaphors of the *tree of life* and the *web of life* synthesize central concepts for evolutionary and ecological sciences, and for environmental ethics (Rozzi 1999). Darwin (1859) utilized the first metaphor (*tree of life*) at the end of his chapter on natural selection in “The Origin of the Species” in order to communicate that: “The affinities of all the beings of the same class have sometimes been represented by a great tree. I believe this simile largely speaks the truth. The green and budding twigs may represent existing species; and those produced during each former year may represent the long succession of extinct species... As buds give rise by growth to fresh buds, and these, if vigorous, branch and overtop on all sides many a feebler branch, so by generation I believe it has been with

STORY 4. Mapuche Narrative of the Magellanic Tapaculo (*Scytalopus magellanicus*) or *Tiftifken*, narrated by Lorenzo Aillapan (Mapudungun and English audio recording in Aillapan & Rozzi 2001).

Millenary bird that begins giving the hour from the daybreak, throughout the morning, to the noon-time and into the afternoon. Its song gives the hour in accordance with nature, the cosmovision, the universe and relaxation, great mountain range, plains, rivers, lakes, volcanoes and seas, great spirit, the principal one, our four guardians that take care of the Mapuche world as an ‘Earthly Universe.’ that is the simple territory of the four winds, that is the north, south, east and west without ends where live *Dumpall*, power of the sea, *Pillan*, Mapuche spiritual force, *Anchumallen*, female heat, *Witranalwe*, the treasure. These four guardians of the Sacred Earth tell the hour with the “pocket-watch bird”.....The pocket-watch bird, *Tiftifken*, indicates the human pair, always in action and harmony with nature.

the great Tree of Life, which fills with its dead and broken branches the crust of the earth, and covers the surface with its ever branching and beautiful ramifications” (Darwin 1859, pp.129-130). These metaphorical lines communicate synthetically that:

- 1) all living creatures share a common origin, and
- 2) humans are part of a evolutionary course of diversification, where some groups of organisms are born, others are transformed, and others disappear.

The ethical implications of this notion are captured lucidly by Leopold (1949), who expresses that: “it is a century now since Darwin gave us the first glimpse of the origin of species. We know now what was unknown to all the preceding caravan of generations: That men are only fellow-voyagers with other creatures in the odyssey of evolution. This knowledge should have given us, by this time, a sense of kinship with fellow creatures; a wish to live and let live; a sense of wonder over the magnitude and duration of the biotic enterprise” (1949, pp.116-7).

This ethical sense based in a notion of evolutionary kinship discovered by modern sciences seems to us now close to the ethical sense contained in the indigenous Yahgan and Mapuche cosmogonies. From the point of view of contemporary environmental ethics, the three cultural perspectives (Yahgan, Mapuche, and scientific) highlight the intrinsic value of the birds, because the birds are our distant evolutionary relatives. This implies that, to some degree, the existence of birds and that of humans are comparable. Consequently, the lives of the birds can be subjected to moral considerations based on ontological and ethical judgments commensurable with those through which we judge the value of human life. This conclusion has great relevance for conservation biology arguments based on the intrinsic value of the life of human beings, the birds, and the diverse biological species that co-inhabit the planet.

The *web of life* metaphor complements the evolution arguments with ecological notions. In “The Origin of Species,” Darwin (1859) utilized the metaphor of the *web of life* to illustrate the “complex network of [ecological] relationships,” describing how: “bumble-bees alone visit the red clover (*Trifolium pratense*) as other bees cannot each the nectar. Hence I have very little doubt, that if the whole genus of bumble-bees became extinct or very rare in England, the heartsease and red clover would become very rare, or wholly disappear. The number of bumble-bees in any district depends on the number of field-mice, which destroy their combs and nests... Now the number of mice is largely dependent, as every one knows on the number of cats” (Darwin 1859, pp. 73-4).

In this web of biotic interactions, the pink clover leaf plants depend directly on the bumble-bee for their pollination, and indirectly on predators of mice, like cats, to hunt these rodents that destroy the nests of bumble-bee pollinators. Comprehension of the interdependency between species currently represents a key notion for conservation biology’s approach to the levels of community and ecosystem (Thompson 1997). More recently, conservation sciences have emphasized the role of human participation in this type of network of biotic interactions (McDonnell & Pickett 1993). Poetically, Carson (1962) expresses that: “the earth’s vegetation is part of a web of life ... [and] although the modern man seldom

remembers the fact, he could not exist without plants that harness the sun’s energy and manufacture the basic foodstuff he depends upon for life” (pp. 63-4).

This evocative image of the *web of life* is analyzed today in quantitative terms by ecological economics (Daily 1997). More extensive applications of this metaphor establish that biological species as well as physical components of ecosystems (such as the water, the soil, and the atmosphere) must be protected in order to allow the continuation of the flow of goods and services that emanate from ecosystems, and that are essential for the well-being of current and future generations of humans (Norton 1991).

Considering again the Yahgan story of the Green-backed Firecrown or *omora*, we can now appreciate clearly how this relation teaches us that:

- 1) social well-being and conservation of biological species go hand-in-hand, and
- 2) solidarity ends up being better than selfishness; it leads us to a better life for everyone.

The story of the hummingbird *omora* reveals substantial coincidences between concepts from the ecological sciences and Yahgan traditional ecological knowledge. From the perspective of contemporary science, conservation of the community of birds contributes to ecological processes such as pollination, seed dispersal, insect population control, predation of rodent populations, or nutrient cycles through the guano of the birds that transport mineral salts between marine and mountainous ecosystems. In turn, maintenance of these ecosystemic processes contributes to the conservation of vascular and non-vascular plants in the hydrographic basins. This vegetation plays a key role in the regulation of hydrological flows, preventing floods, and avoiding droughts. Therefore, in order to maintain the water supply in the long-term, both the Yahgan story of *omora* and the scientific ecosystem analysis recommend the protection of biodiversity in ecosystems of the southern extreme of the Americas.

From the perspective of contemporary environmental ethics, the ethical imperatives implicit in the Yahgan narrative (to conserve the community of birds in order to ensure the supply of water) are consistent with the notion of instrumental value. In accordance with the traditional story and the notion of instrumental value, the conservation of the birds is an instrument for human survival. Traditional ecological knowledge contained in the story of the hummingbird *omora*, as well as in other Yahgan and Mapuche narratives of birds, like the actual knowledge of ecological and evolutionary sciences, nourishes and informs the notions of instrumental and intrinsic values of biological diversity. Today, both environmental values appeal to global society for a respectful and conscious co-inhabitation with birds.

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