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Words as Archaeological Objects: A Study of Marine Lifeways, Seascapes, and Coastal Environmental Knowledge in the Yagan-English Dictionary

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Abstract
Reverend Thomas Bridges' Yagan-English dictionary (1879) has hitherto been little explored outside of linguistics but is highly valuable as a complementary source to archaeological, ethnohistorical, and ethnographic records in Tierra del Fuego (Argentina and Chile). The dictionary contains 22,800 entries and yields rich information concerning the marine lifeways of the Yagan and their and intimate knowledge about Fuegian seascapes. The idea behind this paper is that environments have strong bearings on linguistic vocabularies. Treating words as archaeological objects that map onto landscapes, we identify important landforms for Yagan marine foragers and Norwegian fisher-farmers in a comparative study of word frequencies in Bridges' dictionary and Ivar Aasen's Norwegian dictionary (1850). Moreover, we explore in detail how marine lifestyles and Fuegian seascapes emerge in Bridges' dictionary and discuss the dictionary's relevance for historical archaeology in Tierra del Fuego.

Keywords Landscape Archaeology · Marine Foragers · Fisher-farmers · Word Frequency Analysis · Thomas Bridges · Tierra del Fuego

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Introduction: Language and Landscape Archaeology

> We do not (…) know what exactly we stand to lose—for science, for humanity, for posterity—when languages die. An immense edifice of human knowledge, painstakingly assembled over millennia by countless minds, is eroding, vanishing into oblivion (Harrison 2007: 3)

In *Landmarks*, Robert Macfarlane (2015:16–18) shows how a Gaelic wordlist called "Some Lewis moorland terms: A peat glossary" paints a vivid and detailed picture of Scottish moorlands and Hebridean peat culture. It showcases how a seemingly featureless landform harbors many more things than expected. People who weave intricate, long-standing relationships with specific landforms can often recognize discreet nuances that enable them to distinguish ostensibly similar things. Their language also tends to contain far more terms to name and consolidate the materiality that makes up these places, than those of people with superficial relations to the same landforms.

Around the globe, there are many dictionaries containing rich ethnographic information whose relevance stretches far beyond the field of linguistics. Reverend Thomas Bridges' (1842–98) Yagan-English dictionary is certainly one of these (Bridges 1987). The dictionary hosts about 22,800 entries and is undoubtedly a unique source for archaeology and ethnography in southern Tierra del Fuego, conveying fragments of marine lifestyles, material culture, and intimate environmental knowledge emerging from the Yagan people's long-lasting relationships with Fuegian seascapes. However, in the absence of a digital version, the dictionary has remained largely unavailable for research. The language, Yagan, was spoken by nomadic canoeists living in the archipelagic seascapes of southern Tierra del Fuego in Argentina and Chile (also referred to as Yamana, Yaghan, and Yahgan). Like their ancestors, who inhabited the archipelago for more than seven millennia, the Yagan who lived in the late nineteenth century were marine foragers. They relied on marine resources and lived in branch huts on the shore, nurturing a close relationship with the sea—as is evident from ethnographic and archaeological sources (Orquera and Piana 2009, 2015), and the dictionary: the word *canoe* appears in almost 4% of the English translations.

The overall idea in this paper is that languages somehow map onto landscapes—that there is a correlation between the lexicon and a specialized environmental knowledge. We can think about the correlation in the following way: the more time and effort people spend at certain places, the more knowledge they build about them, and the more things they name. Just like we would expect higher concentrations of archaeological remains linked to activities and/or settlements in such environments (depending on preservation conditions), we would also expect these places to be more densely *settled* by language. Thus, we know that meteorologists use far more words (and instruments) for describing clouds and their properties; that archaeologists have a rich nomenclature concerning stone implements in museum collections; that ships contain far more things for sailors than for parachutists; and that peat is not just peat for the Hebrideans. A dictionary will contain more words that "speak about" landforms that were particularly salient and important for those who spoke the language—whether the sky, the laboratory, a ship, Scottish moorlands, or Fuegian seascapes. Conversely, it will be poorer in words pertaining to landforms not often visited (Larsson 2018:181).

The Yagan-English dictionary has long been acknowledged as a valuable source for studying the Yagan *language* (Aguilera 2007:215). However, few studies have dealt systematically with its ethnographic content and examined its value for the archaeology of the region (Husøy and Swensen 2016; Swensen 2014). The present study constitutes an attempt to amend the situation and aspires to contribute both to archaeological studies in Tierra del Fuego and to the field of historical archeology through an emphasis on certain significant similarities between words and archaeological objects. Thus, the relevance of this paper for historical archaeology should primarily be considered within the methodological and interdisciplinary perspective, through the strengths gained from combining texts, material culture, and other sources of information (Andrén 1998; Orser 1996:24–26)—such as linguistic information.

The study is part of the Norwegian-Argentinean research collaboration *Marine Ventures* and its strategy of broadening archaeological perspectives in comparative studies of human-sea relations, emphasizing high-latitude seascapes in Tierra del Fuego and Norway (e.g., Bjerck 2017; Bjerck et al. 2016a; Bjerck and Zangrando 2013). Former team member Elisabeth Swensen took the first steps toward digitizing the dictionary. In her MA thesis, she compared foraging in the dictionary with archaeological and ethnographic records, rendering the dictionary more available for further research (Swensen 2014).

In this paper, we compare the Yagan-English dictionary with Ivar Aasen's (1813–96) *Ordbog over det Norske Folkesprog* (Eng.: *Dictionary of the Norwegian Dialects*) from 1850 (Aasen 2000). Aasen's dictionary encompasses Danish explanations of words from spoken dialects in Norway collected during his personal journeys in the 1840s. Words from coastal western Norway are overrepresented (Hoel 1994) (i.e., words belonging to the vocabularies of coastal fisher-farmers). While the similarities between the coastal environments in Tierra del Fuego and Scandinavia are striking (Fig. 1; Bjerck and Zangrando 2013; Blankholm et al. 2009), the economies and lifestyles differed significantly in the nineteenth century.

The purpose of this paper is to demonstrate that (ethnolinguistic) dictionaries can be significant sources for (historical archaeology, emphasizing how they can contribute to coastal landscape archaeology, environmental knowledge, and entanglements between people and environments (including material culture). *Firstly*, to identify the landforms or environmental niches that are most conspicuous in the Yagan-English dictionary. To assess the validity and relevance of the results, we discuss potential biases that were observed during the digitization process and apply word frequency analyses to compare Bridges' dictionary with Aasen's evenly sized Norwegian dictionary. *Secondly*, to shed light on how Fuegian environments emerge in English translations of the 2,700 Yagan nouns enlisted in the dictionary. *Thirdly*, to discuss the wider relevance of the dictionary for archaeology.

Seven Millennia of Marine Lifeways in Tierra Del Fuego

The northern coast of the Beagle Channel marks the northern confines of the Yagan homeland, which covers Tierra del Fuego all the way south to Cape Horn (Argentina and Chile, see Fig. 1). Here, the submerged foot of the Andean Mountain Range

Fig. 1 Tierra del Fuego (left) and Norway (right). The Yagan inhabited the harsh environment in southernmost South America, from the northern coast of the Beagle Channel to Cape Horn. In many respects, it is an environment that resembles coastal Norway, which was predominantly settled by fisher-farmers in the nineteenth century. Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community. Illustration: Jo Sindre P. Eidshaug

creates a mosaic of islands and islets, fjords and channels, bays, coves, and inlets. Situated at the southern tip of South America, this is a cold, rainy, and windy place. Its richness in marine fauna is sharply contrasted by its poverty in terrestrial fauna (Orquera and Piana 2009:63), and the mountainous hinterlands in the Cape Horn region are mostly inaccessible and unproductive (Piana and Orquera 2009:106).

Abundant shell middens testify to the importance of the marine domain in southern Tierra del Fuego. While their shapes and sizes vary, ring-shaped shell middens are most ubiquitous, typically appearing in clusters close to the sea (Barceló et al. 2002; Bjerck et al. 2016b; Piana and Orquera 2010; Risbøl et al. 2023), forming massive, chained or hive-like organic structures that fold along the curvatures of the adjacent coastlines (Fig. 2). The middens owe their distinct shape and regularity in size to repeated depositions of waste around dwelling huts that typically had a base diameter of 3–4 m. The annular midden walls, which usually are higher than 0.4 m and can rise to heights above 1 m (Bjerck et al. 2016b), offered advantageous wind protection. Archaeological excavations have shown that the clusters of ring-shaped middens formed because of recurrent reuse of the same places, even after long hiatuses (Piana and Orquera 2010; Zangrando 2018). Over time, the clusters expanded as dwellings were erected adjacent to older midden walls.

Seaborne mobility was important for developing and sustaining a marine lifestyle, along with abundant marine resources and technology oriented toward marine hunting and fishing (Orquera et al. 2011; Orquera and Piana 2009; Piana and Orquera 2009). The shell middens usually contain faunal remains of shellfish, mammals (pinnipeds, cetaceans, otters, and guanacos), fish, and birds; bone, shell, and lithic artifacts and production waste; soil; charcoal and hearths; and—occasionally—burials (Piana and Orquera 2010). The marine lifestyle associated with shell middens

Fig. 2 One of many clusters of ring-shaped shell middens visible on the shores of Tierra del Fuego. The picture is from a cluster located in Cambaceres Bay (Harberton, Isla Grande), facing the more open and exposed eastern part of the Beagle Channel. Photo: Jo Sindre P. Eidshaug

in southern Tierra del Fuego was fully developed around 7000 BP (Orquera et al. 2011; Zangrando et al. 2022).

Historically, the Yagan and their neighbors on the Pacific Coast (Chile), the Kawéskar, were referred to as "canoe people" and contrasted with "foot people," such as their northern neighbors inhabiting the steppes of Isla Grande de Tierra del Fuego, the Selk'nam, who also had a terrestrial based diet (e.g., Furlong 1917; Lothrop 1928). Crucially, archaeological data suggest a certain cultural continuity in Tierra del Fuego—between marine lifeways in the "archaeological past" and those of the Yagan known from ethnographic accounts. Luis Orquera and Ernesto Piana (2009:71) attribute this relative stability, which lasted for seven millennia, to the successful, specialized littoral adaption that depended on an abundant maritime fauna, protected waters, and forested areas that (among other things) provided raw materials for making canoes. Sadly, the 1880s (the decade following the completion of the dictionary) witnessed several outbreaks of infectious diseases (tuberculosis, measles, typhus, and smallpox) that resulted in a tragedy where about 90% of the Yagan lost their lives (Orquera and Piana 2015:86–91).

Dispersed across the remote archipelagos of southern Tierra del Fuego, Yagan has been considered a language isolate (Regúnaga 2019; Seifart and Hammarström 2018; Viegas Barros 2018). The linguistic relationship with their coastal neighbors, the Kawésqar, even seems distant—and it remains hypothetical (Viegas Barros 1994, 2023). Despite its isolation, defining the environment of a language is no easy task: does it exist within a symbolic, natural, sociocultural, and/or cognitive ecology (Steffensen and Fill 2014:7)? For our purpose, it is more fruitful to flip the coin and ask what environments we can encounter *within* a language (e.g., see Larsson 2018:181–209), referring specifically to the seascape and accompanying marine lifeways as materialized in the Yagan language. What landforms and environmental niches are notably detailed in the Yagan vocabulary? In this paper, we draw on recent object-oriented ontologies (Bryant 2014; Harman 2016, 2018), which invite us to be attentive to the myriad things and beings and how they work in their environments.

Landscapes in Languages, Words as Objects

Indeed, landscapes are *not* merely vast, immovable things like mountains, islands, forests, or lakes—for which many, but not all, languages have generic terms (Burenhult and Levinson 2008; Mark et al. 2011). Landscapes include myriads of smaller things, occasionally human-made, and some of them are unabashedly elusive (cf. Harman 2016). Most of these things persist, work, and co-work—creating messy webs of interactions (Ingold 2011a, 2016)—almost without notice, and only rarely are they drawn into our consciousness before they once again slip and recede into the background (Heidegger 2010). How many of these elusive things, whether tiny, small, or medium-sized, that have worked their way into a vocabulary depends on the language (Harrison 2007). For Yagan, Bridges (1894:78) noted that "all vegetable productions which attract notice either as a nuisance or a blessing have names; but others have no names." Just like some people only see birds, others see crossbills, pied flycatchers, wrens, chaffinches, or three-toed woodpeckers. And with a stranger's gaze at a foreign language, we can learn to be alert about things that otherwise would escape our attention.

To pursue a correlation between the lexicon and specialized environmental knowledge, we apply a methodology that treats words as objects derived from Levi Bryant's (2014) onto-cartography. In a section devoted to extended minds and bodies, Bryant (2014:84–93) shows that there is no clear-cut distinction between the mind and the material world. His argument draws on Andy Clark's hypothesis of the extended mind (Clark and Chalmers 1998), which purports that the mind delegates many problems to the external world (e.g., how paper aids mathematical problem-solving, personal notebooks store elusive beliefs, or the Internet helps recalling the periodic table of elements). The crucial point is that the material world is engaged so deeply in cognitive activities that it plays a far more important role than representation and manipulation (Bryant 2014:85–87). Moreover, it implies that the material world genuinely participates in filling the "meanings" of *words*. Thus, the words *tree* and *spear* are not just abstractions that represent trees and spears in the material world: actual trees and spears are deeply and respectively involved in filling the meanings of the words *tree* and *spear*. In Yagan, the noun *dūa* denotes a stony beach, but only the part that is black and above the section containing barnacles. The stony and rocky beach below *dūa*, which is spotted white with barnacles and only uncovered at good ebb tides, is known as *dönux*. *Dönux* is also associated with superior mussels, and therefore pleasure and good harvests. While these two discrete parts of the beach—which have different capacities and can "take on" distinct uses—each has a strong bearing on the meaning of the two respective terms, they also tend to become more persistent, tangible, and visible once they are named (Macfarlane 2015).

By the same token, the referential theory of meaning also implies that words can "hook onto" physical things (Michaelson and Reimer 2022). However, the theory has been criticized for problems caused by words lacking physical referents (e.g., thoughts, love), inscrutability (Quine 2013), and vagueness (i.e., that singular referential terms have multiple equally compelling candidates) (Unger 1980). Although such discussions mostly fall beyond the scope of this paper (and Bryant's (2014) onto-cartography differs with its defense of the material and nonhuman world), Unger's (1980) critique identifies a major challenge regarding the correlation between the lexicon and specialized environmental knowledge: spears and trees can occur in multiple environments. The Yagan used spears for hunting seals, birds, fish, crabs, and whales (Swensen 2014:47) (i.e., in different marine environments) and while trees appear on the coasts of both Tierra del Fuego and Norway (including farms), the hinterlands are far more densely forested. Obviously, our study offers a coarse-grained spatial resolution: as words cannot be georeferenced with the same centimeter precision as archaeological features, they must be pinned to larger units, such as distinct landforms or environmental niches. And with a notion of words as objects, we aim to restore the way words "settle" the landscape in a *settlement pattern*.

The blurred distinction between words and objects also pertains to *archaeological* objects. For illustrating how words act like archaeological objects (and substantiating the relevance of the linguistic information from the Yagan-English dictionary), we may draw an analogy between shell middens and linguistic vocabularies. Our knowledge about Fuegian sea nomads relies heavily on material remains that—intentionally or not—are *heaped up* in coastal shell middens. Shells from mussels harvested at ebb tide; broken harpoon points from unsuccessful hunting expeditions; guanaco bones from selected body parts and heaps of avifaunal remains from seasonal ventures; flintknapping debris; hearths; and all material wealth pulled from the sea and deposited onshore—shell middens consist of both contextual (e.g., distinct, dateable horizons from stratified deposits) and non-contextual (e.g., rudimentary knowledge about predepositional object biographies) information, and they only contain material fragments that made it to the middens in the past and survived the wear and tear of time. Similarly, a dictionary—as a rough assembly of words belonging to a language—compiles and archives another type of informative objects that have been pulled out of obscured contexts: words. Much like artifacts are heaped up in myriad shell middens, words are *heaped up* in linguistic vocabularies—and they both carry memories and information about human environments.

Language and (extensive entanglements with) artifacts have each been proclaimed the most distinguished characteristics of modern humans (Renfrew 1988:1; Schiffer and Miller 1999:2). However, there are many other respects in which words resemble objects. *Tūkū* (bark bailer)—artifact, *ökör̆ž* (dwelling)—site, *waia* (bay)—landscape feature: words and archaeological objects both operate on different scales. Just like guns, speed bumps, and other nonhumans (Latour 1999), words can also have agencies—capacities to instigate actions and change the course of events. Even more so, perhaps, the written word than the spoken word, as it lingers through materialized media (Bryant 2014:31–32). Like ruins (Olsen and Pétursdóttir 2014), lithic artifacts (Bjerck 2022), and other archaeological vestiges (Olsen 2010), words carry memories and meaning—fragments of former realities. Word biographies are most salient in place names and etymology, which both shed a dim light on the birth and early years of the words. For instance, pre-Christian mythologies are present in month and weekday names and the planetary system; and the peculiar Yagan place name *Wápisatumánakulum*, which translates to "the dead whale floated away" (Lothrop 1928:181), "remembers" an incident in past (Bjerck 2022). However, much like reliquary shrines (Heen-Pettersen and Murray 2018), repeatedly reused shell middens (see above), and other things (Hahn and Weiss 2013), words have itineraries that span farther than just their birth and eventual death, being affected by, as well as having various effects upon, the worlds with which they interact across the span of time. This is also true for place names, which can have quite active roles in communities (Basso 1996). Words and archaeological objects are equally real, but their meanings for humans and their effects upon the world are prone to changes across time, place, and context (cf. Bryant 2011; Harman 2016). And as much as discourse and meanings of words can change over time (e.g., Foucault 1970), archaeological artifacts and monuments mix with and can take on quite different roles in the present (e.g., cityscapes, laboratories, or museum collections)—than they did in past societies (Bjerck 2022:118ff; Olsen 2010:107ff). For this study, it is the worlds or environments with which words frequently interact, those they "settle," that are most compelling.

Nevertheless, archaeological records and textual sources like dictionaries typically have divergent formation histories, which require careful consideration (cf. Fiore et al. 2014; see also Andrén 1998:145ff), and there are yet other important discrepancies between material, textual, and linguistic remains. In many respects, however, such discrepancies already exist within the panorama of archaeological assemblages and sites: shell middens, farm mounds, Paleolithic caves, shipwrecks, tar kilns, ruined POW camps, urban cultural deposits, etc. Like shell middens and other archaeological assemblages, linguistic vocabularies are fragmentary and have peculiar characteristics and challenges. For instance, whereas size and age affect weathering of shell middens in Tierra del Fuego (Zangrando et al. 2021), not all words pertaining to pre-Christian ritual life and private gendered (female) habits are likely to have been transmitted by informants to Reverend Thomas Bridges (Swensen 2014:24–26). Thus, the core argument is that words are not *categorically* different from other archaeological objects. Rather, documents and words can act like other archaeological objects in many respects—as underscored by González-Tennant (2016), in his "excavation" of folklore in Rosewood, Florida—and they can certainly also be relevant for archaeology, including those listed in ethnolinguistic dictionaries. Thus, we expect that major trends devised from settlement patterns, zooarchaeological assemblages, and from the Yagan-English dictionary each are useful indicators that provide new insights into marine lifeways in Tierra del Fuego. As sources with different formation histories, we can expect material and linguistic sources to be corroborative in some respects but mostly complementary (Fiore et al. 2021, 2014). For instance, linguistic remains may cover aspects of the past that are less tangible but also material realties affected by poor preservation conditions (e.g., organic materials).

In approaching the dictionary as an assemblage of archaeological objects, this study can be conceived as a form of documentary archaeology. Echoing Mary Beaudry's (1988:1) call for historical archaeologists to "develop an approach towards documentary analysis that is uniquely their own," an important avenue in documentary archaeology is using an archaeological approach to all potential sources (Wilkie 2006). By combining various types of information (e.g., material, textual, oral) and dissolving the boundary between material and textual remains—treating archives as archaeological sites, and documents as artifacts—documentary archaeology can produce new insights and fruitful perspectives that are more inclusive of marginalized and "less visible" individuals and groups (e.g., González-Tennant 2018:97–99; Wilkie 2021:10, 20–23).

Bridges' dictionary carries bits and pieces of Yagan realities. That is not to claim that it permits access to Yagan peoples' own memories, their personal perceptions and experiences. However, putting these fragmentary pieces together we aspire to learn something from the Yagan and the deep knowledge about seascapes they assembled over millennia (cf. Berkes 2018).

Digitizing Thomas Bridges' Yagan-English Dictionary

The Yagan-English dictionary (hereafter BD) was compiled by Reverend Thomas Bridges, who was stationed as a missionary in Ushuaia most of his adult life. He came with his family to the Anglican missionary station on Keppel Island (Falkland Islands/Las Malvinas) in 1856, well over a year after it was established. The relationship between the mission and the Yagan was at best turbulent and there was much discontent among the first two Yagan groups who were brought to Keppel (Chapman 2010; Hazlewood 2000). Bridges saw that many problems arose from the mission's failure to overcome the language border, and through his close relationship with the Yagan couple Okokko and Camilenna, he had recorded 7,000 Yagan words by 1863 (Hazlewood 2000:307). Bridges worked with the dictionary his entire life, in Ushuaia from 1871, and eventually on Estancia Harberton, from 1887 (Fig. 3).

Thirty-five years after his death in 1898, Ferdinand Hestermann and Martin Gusinde transcribed, edited, and published Bridges' dictionary under the title *Yamana-English: A Dictionary of the Speech of Tierra del Fuego* (Bridges 1987). It was based on a manuscript from 1879 and is regarded the most complete of the three known manuscripts of the dictionary (Gusinde 1933): an 1866 version (Bridges 1865–66), an 1879 version (Bridges 1877–79a, 1877–79b), and a "new and last" version, begun 1879 (Bridges 1879), that may have been incomplete by his death. The 1866 version was the only bidirectional dictionary, containing one section on Yagan-English and another on English-Yagan. With about 12,000 words enlisted (Lothrop 1928:119), it is substantially shorter than the 1879 version—even though the latter only comprises translations of Yagan to English.

Yagan consisted of five dialects and the dictionary is based on the central dialect spoken in the Beagle Channel's central part and in the adjacent Murray Channel

Fig. 3 Estancia Harberton, on the northern coast of the Beagle Channel, Tierra del Fuego, Argentina, founded by Thomas Bridges in 1886. It became Bridges' family home after he resigned from his post at the mission in Ushuaia the same year. He continued to work with the dictionary until his death in 1898, but there is no known manuscript post dating 1879. There is no Yagan name for the port of Harberton, but each of its ten settlement sites had a name (Bridges and Lothrop 1950:93). Photo: Jo Sindre P. Eidshaug

(see Fig. 1), given that Bridges considered "the language as spoken there was … in its purest form, being the mean between its varieties spoken Southward, Eastward and Westward" (Bridges and Lothrop 1950:112).

A major part of the present study was the comprehensive work of creating a searchable digital version of Bridges' dictionary. For that we used the 1987 reprint of the published dictionary and made corrections based on Bridges' handwritten manuscript from 1877–79 (the manuscript and the publication use different phonetic systems and, although they follow almost the same order, they are not organized alphabetically). The process was time consuming as it required a meticulous manual inspection to correct mistakes originating from the automated conversion of a scanned copy. Moreover, known errors had not been corrected in the 1987 reprint (Goodall 1987). Still, the main challenge was that Hestermann and Gusinde relied so heavily on abbreviations of both Yagan and English that some entries were rendered completely unintelligible. For instance:

> *mötūmū-gata* Do. home, in or E. and do. anything as water in a pail. *m.-tū* Do. home, in or E. and ditto. *m.-š-gāmata (mötaiāgi-g.)* Do. as above and ditto. *m.-šgaiateka* Do. as above and ditto. *mötū-nana*, *m.-nu-nata* tr. Do. as above and do. and ditto (Bridges 1987:342)

To render translations more independent and intelligible, we consulted Bridges' original manuscript (Bridges 1877–79a, 1877–79b), replacing Hestermann and Gusinde's "ditto" (abbreviated "do.") and Bridges' "as above" with full words or sentences wherever possible (Table 1). Yagan words included in the translations were retained.

Table 1 Excerpt from the Yagan-English database with full entries. The database is still under revision and lacks a column that contains phonetics

Id	Yagan word (searchable)	Yagan word (Anthropos)	Gram[a]	English translation	PRef[b]	MRef[c]
12,819	*motumugata*	*mötūmūgata*	*v*	To go or come home, in or east and *ūmūgata* anything as water in a pail	342	309
12,820	*motumutu*	*mötūmūtū*	*v*	To go or come home, in or east and *ūmūtū*	342	309
12,821	*motumusgamata, motaiagigamata*	*mötūmūšgāmata, mötaiāgigāmata*	*v*	To go or come home, in or east and *ūmūšgāmata*	342	309
24,525	*motumusgaiateka*	*mötūmūšgaiateka*	*v*	To go or come home, in or east and *ūmūšgaiateka*	342	309
12,822	*motunana*	*mötūnana*	*v*	To go or come home, in or east and *ūnana*	342	309
12,823	*motununata*	*mötūnunata*	*v.tr*	To go or come home, in or east and *ūnunata*	342	309

[a]Grammar: *v.*: verb, *tr.*: transitive

[b]Reference to published dictionary (Bridges 1987)

[c]Reference to original manuscript (Bridges 1877–79a, 1877–79b)

The digitized version of Bridges' dictionary consists of an Excel database with 24,570 entries, of which around 22,800 Yagan words are unique (depending on how they are counted). The intention is to make the digitized version available online in 2024.

Ivar Aasen's Norwegian-Danish Dictionary

Whereas Bridges' engagement with Yagan language was deeply embedded in the missionary work, Ivar Aasen's (Fig. 4) purpose with a dictionary was openly political and part of the Norwegian nation building (Haugen 1976). Norway regained independence from Denmark and adopted its constitution in 1814. Aasen's program involved reconstructing a written Norwegian language based on spoken dialects that could replace Danish (Aasen 1909). With the dialect from his home region (Sunnmøre) as a point of departure, Aasen traveled and collected words from different parts of Norway in 1842–46, resulting in his first dictionary: *Ordbog over det Norske Folkesprog* (AAD), published in 1850. Given that it was based mostly on words collected from his journeys in coastal western Norway (Hoel 1994)—resembling Tierra del Fuego with its myriad islands and fjords (Fig. 5)—we found Aasen's dictionary well suited for a comparative study of word frequencies. Note that the written language in Norway was Danish at the time, and Aasen also used Danish when explaining the words listed in the dictionary.

For the analysis, we used a new edition from 2000, edited by Kristoffer Kruken and Terje Aarset. All Norwegian dialect words were omitted from the analysis

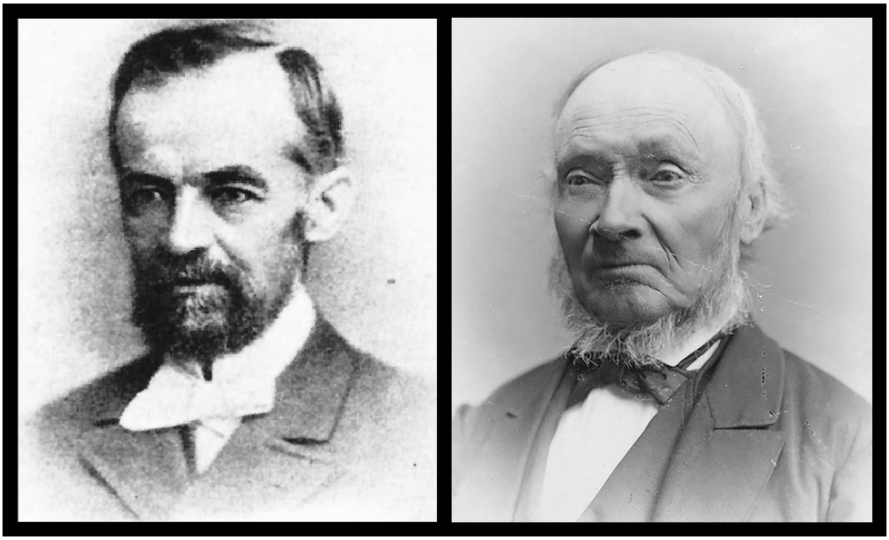


Fig. 4 Left: Thomas Bridges. Photo: Unknown (before 1887). Right: Ivar Aasen. Photo: Carl Christian Wischmann (1871)

Fig. 5 Terdal near Florø in western Norway—a traditional coastal farm with infields surrounded by ample outfields, fjord, and outer coast, balancing a wide range of marine and land-based resources. Photo: Hein B. Bjerck

(semi-bold and italics), so that it only concerned Danish explanations of Norwegian words.

The dictionary contains at least 23,560 original Norwegian words (possibly more than 25,000), depending on how entries are counted (Kruken and Aarset 2000, XXII).

Word Frequency Analyses

Recording how many times different words occur, word frequency lists provide valuable backdrops for understanding a linguistic corpus (Baron et al. 2009; Brown and Shackel 2023)—just as counting artifacts are used for interpreting archaeological sites (without the spatial information). Nevertheless, word frequency analyses are approximations and bound to be uncertain (Popescu 2009). In both English and Norwegian/Danish, words can belong to more than one word category, being, for example, both verbs and nouns (e.g., *the place* and *to place*; *the fish* and *to fish*). However, compound words are far more frequently written as one word in Norwegian/Danish compared to English (e.g., *fiskesnøre*=*fishing line*). Although some inconsistencies can be resolved manually, it does not necessarily make the analysis more correct, it only changes the criteria (Popescu 2009:7).

We used the Excel functions UNIQUE and COUNTIF to record frequencies of *single words* occurring in English translations in BD and Danish explanations in AAD. We then selected high-frequent nouns and lemmatized singular and plural forms. Inconsistencies among the most frequent words were controlled manually and "incorrect" entries removed (e.g., *place*, which is mostly used as a verb in BD). Irrelevant generic terms, like *person*, *people*, *human*, *thing*, *object*, *line*, etc. were also removed. The 50 most frequent nouns in the dictionaries were visualized in word clouds.

To highlight differences between the dictionaries, the coefficient of difference was calculated from the formula ($Freq_{BD}$ – $Freq_{AAD}$) / ($Freq_{BD}$ + $Freq_{AAD}$) (Hofland and Johansson 1982; Leech and Fallon 1992). It yields values between 1.00 and -1.00 that indicate a degree of "overrepresentation" of a word in either BD (1–0) or AAD (-1–0). Extreme values (1, -1) indicate that a word occurs only in one dictionary, while the middle value (0) indicates equal representation in both dictionaries. Provided that this paper focuses on high-frequency words, the comparison was limited to the results from the previous word frequency analyses (i.e., nouns that are among the 50 most frequent in BD and/or AAD). Chi-squared tests were applied to determine the significance of the difference between the two frequencies (cf. Baron et al. 2009). The results were further limited to those with the highest level of significance ($p < 0.001$) (for a discussion of significance levels when comparing word frequencies between linguistic corpora, see Baron et al. 2009). Given the "rough" nature of word frequency analyses, we have not adjusted for the minor difference in sample sizes (N_{BD} = 302,196, N_{AAD} = 318,717). The differences are also too small to affect the visual presentation of the results.

Potential Biases

As much as artifact assemblages do not provide the complete picture of material culture, dictionaries do not reflect the full vocabulary of language—only rough estimates of the speakers' vocabularies. Moreover, enlisted words and explanations or translations both result from values, opinions, interpretations, and/or choices made by the author(s) (Mugglestone 2011). Bridges' and Aasen's dictionaries are no exceptions.

A notable bias also results from the very nature of translation. Yagan and English have different structures. This is particularly relevant for verbs, which comprise almost three quarters of BD. Firstly, verb compounding is a common feature of verbal morphology in Yagan (Adelaar and Muysken 2004:571; Bridges 1894), resulting in repetitions in the English translations. For instance, the verb *šalapa*, "to do in anger, vexation, or displeasure," prefixed to *wönigū*, "to hit with a stone or other object," generates the verb *šalapawönigū*, "to hit with a stone in anger." However, *šalapa* and *wönigū* are also compounded with other verbs, leading to multiple repetitions of words like "anger," "hit," and "stone." Although repeated words may also be important, it renders the frequency analysis biased toward compound verbs to such an extent that it may obscure the comparison toward nouns and other word categories.

Secondly, Bridges frequently used examples to explain Yagan verbs, because one-to-one relationships between verbs of the two languages are often missing and quite a few English verbs are covered by several, specific verbs in Yagan. The examples are always following "as" and can be of an "ethnographic" nature or unrelated to life among the Yagan before the missionary era (Bridges 1987;188, 458, italics added):

kötāpöna To go or come up and die, *as Moses in Mt. Nebo, or as a person at the head of an inlet.*
tūčinnasana To cover over lightly with boughs and twigs *as natives their new canoes to preserve them from the sun or as women their faces.*

Given that repetitions in verb translations and extensive use of examples amounts to a certain fuzziness—and that nouns more often relate to particular landforms—we carried out a second word frequency analysis that was restricted to English translations of Yagan nouns. The results indicate that none of the said biases or ambiguities related to verbs affected the output substantially (compare Figs. 6 and 9).

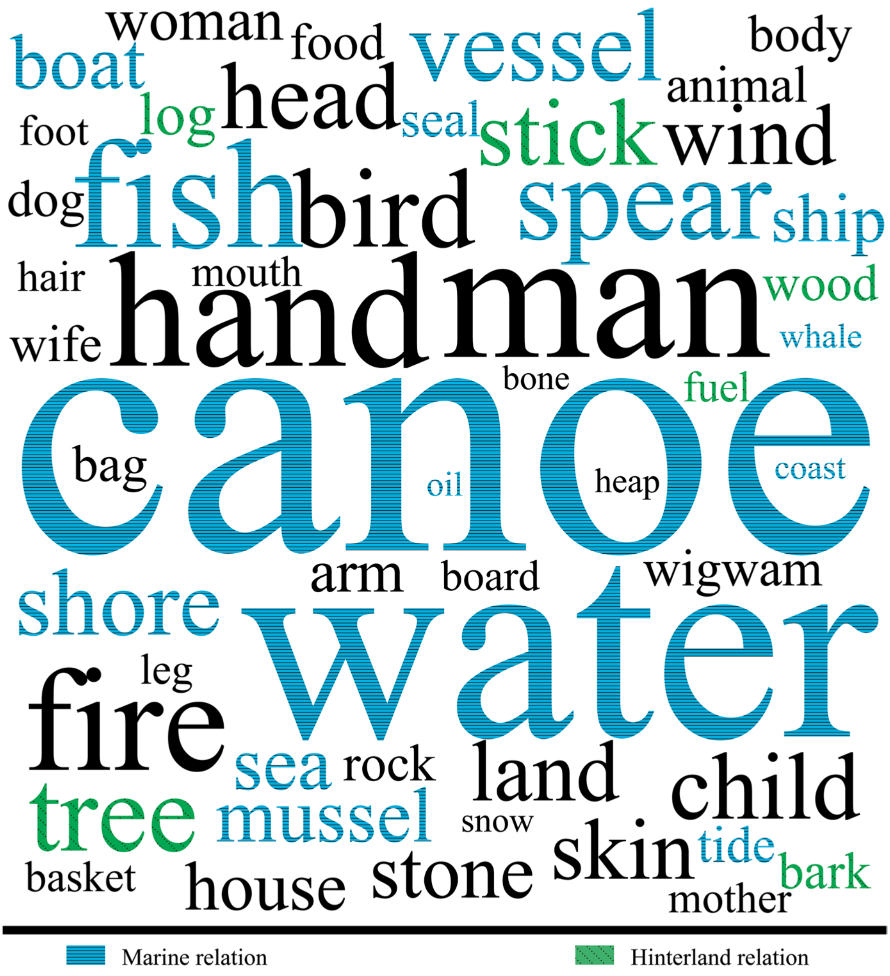


Fig. 6 Word cloud based on word frequencies in Thomas Bridges' Yagan-English dictionary, showing the 50 most frequent, relevant *English nouns in the translations of Yagan words*. The most frequent word, *canoe*, appears on average in almost every 25th translation. Illustration: Jo Sindre P. Eidshaug

Canoes and Animals—Word Frequencies in Bridges' and Aasen's Dictionaries

Figures 6 and 7 show the 50 most frequent relevant English nouns used in translations of Yagan, and Danish nouns used in explanations of Norwegian, respectively. The results are based on frequency analyses of 302,196 English words used in translations of 22,800 unique Yagan words (BD) and 318,717 Danish words used in explanations of 23,560 independent Norwegian words (AAD). Exceptions include *person*, *place* (used mostly as verb), *time*, *thing*, *object*, *state*, *line*, *hole*, *point*, *Stift* (Eng.: *diocese*), *Ved* (Eng.: *firewood* or *by*, used mostly as preposition), *Ord* (Eng.: *word*), *Rum* (Eng.: *room*), etc.

Bridges' dictionary displays a clear marine topic pertaining to the shore and the sea, marine resources, and equipment needed for seafaring and marine hunting. The marine category in Fig. 6 may also have included words like *wind*, *bird*, *skin, bark*

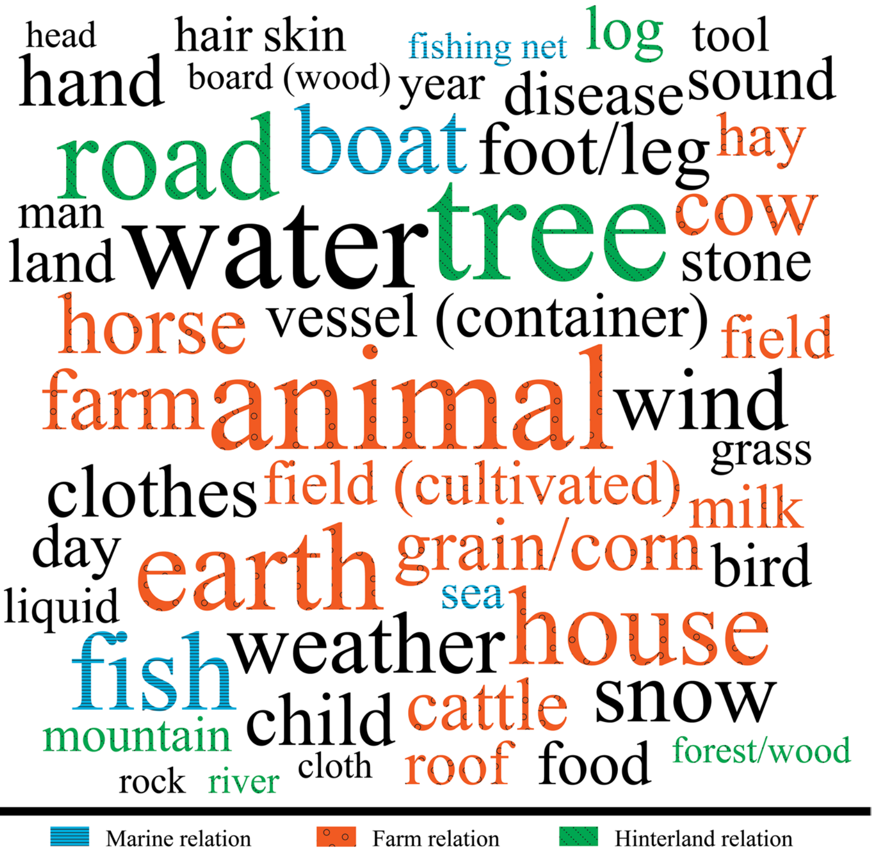


Fig. 7 Word cloud based on word frequencies in Ivar Aasen's Norwegian dictionary, showing the 50 most frequent, relevant *Danish nouns in the explanations of Norwegian words*, translated to English (see Appendix). Words relating to the farm predominate. Illustration: Jo Sindre P. Eidshaug

(canoe), and *wigwam* (archaic term for Yagan huts). The prominent marine topic is contrasted by the sparse representation of words pertaining to the inland beyond the shore. *Trees*, *wood*, *stick*, *bark*, *fuel*, and *logs* are also found close to the shore and—as argued below—they are integral parts of the marine domain.

By comparison, Aasen's dictionary is imbued with words relating to farming (Fig. 7). Animals predominate among the Danish explanations, referring to livestock particularly: *animal*, *cow*, *cattle*, *horse*, *milk*, and *hay*. *Field*—cultivated (Dan.: *Ager*) and cultivated/uncultivated (Dan.: *Mark*)—*earth* and *grain/corn*, *house* and *farm* are other high-frequency words relating to the farming environment—to which *grass, roof*, *vessel (container)* and *road*, and perhaps *water* and *weather*, may have been added. *Water* is more ambiguous in AAD than BD, often relating to non-marine topics such as crops, buildings, running water, etc. The marine topic in AAD is far less salient than in BD (compare Figs. 6 and 7; Fig. 8). While *wind*, *weather*, and *water* also pertain to the marine category in part, only *fish*, *boat*, *sea*, and *fishing net* are represented. Finally, the "outfield" is represented by *tree*—the most frequent word—*forest, mountain*, and partly *rock* and *log*. Although *tree* and *log* are vague, they relate to logging, which was an important trade (Dyrvik et al. 1979). Mobility happened on land and sea, and *road* is frequently entered.

Frequency distributions in BD and AAD differ substantially (see Fig. 8). In BD, a handful of English nouns were used more frequently to describe Yagan words. Here, the five most frequent nouns are *canoe* (n = 1064), *water* (n = 833), *man* (n = 544), *hand* (n = 487), and *fish* (n = 458) while the 50th most frequent noun counts 106 (*bone*, *heap*, and *oil*). In AAD, the five most frequent words are *tree* (n = 318), *animal* (n = 301), *water* (n = 278), *earth* (n = 257), and *road* (n = 239), whereas *river*, the 50th most frequent noun, counts 76. This discrepancy is mostly explained by extensive verb compounding in Yagan, generating repetitions with only minor adjustments of meaning, and by differences in styles of Bridges and Aasen. However, it also means that Yagan appears more specialized and Norwegian more generic—possibly because the latter is a palimpsest of many dialects collected from a larger population inhabiting a broader geographical area.

The marine topic in Bridges' dictionary is even more pronounced among the 2,703 Yagan nouns. Figure 9 shows the 50 most frequent relevant English nouns used in translations of Yagan *nouns* based on a frequency analysis of 24,668 English words. In addition to words labelled "marine" in Fig. 9, *wind*, *bird*, *bark*, *wigwam*, *weather*, and *fat* (from seals and whales) also relate to the marine domain. Words connected with shore and shallow waters are frequent (*shore*, *coast*, *beach*, *kelp*, *shell*, *mussel*, *limpet*, *crab*, *seal*, and *shag*), while *fish* covers both shallow and deeper waters. Compared to the full lexicon (see Fig. 6), more land features are present among the nouns (Fig. 9): *tree*, *bark*, *wood*, *fungus*, *stick*, *plant*, *hill*, and *animal*. Viewed differently, a substantial portion of words relate to mobility on sea—*canoe*, *land*, *water*, *island*, *sea*, *shore*, *coast*, *beach*, *wind*, *weather*, *hill*, and *kelp*—and resources—*fish*, *tree*, *bird*, *seal*, *skin*, *bark*, *shell*, *bone*, *whale*, *wood*, *spear*, *hair*, *mussel*, *fungus*, *crab*, *plant*, *animal*, *fat*, *limpet*, *season*, and *shag*, as well as indirectly through *shore*, *beach*, *canoe*, *kelp*.

Overall, the results from the word frequency analyses align with what we know about the lifestyles of the Yagan (as marine foragers) from ethnographic and

Fig. 8 Diagram showing the degree of overrepresentation of nouns in Aasen's and Bridges' dictionaries, ▸ based on calculations of the coefficient of difference for the high-frequency nouns appearing in Figs. 6 and 7. Words that have values between -1 and 0 are more frequently represented in Aasen's dictionary while those with values between 0 and 1 are more frequently represented in Bridges' dictionary. Extreme values (-1 and 1) indicate that a word is represented in only one of the languages. The figure pinpoints the difference between the Yagan and Norwegian vocabularies as enlisted in the dictionaries: Whereas the marine environment is by far more dominant in Yagan, Norwegian is centered around the farming environment. Words with ambiguous meanings in Danish and English were removed (board, foot, and leg, cf. Appendix). Illustration: Jo Sindre P. Eidshaug

ethnohistorical records (e.g., Orquera and Piana 2015), and the Norwegians (as fisher-farmers) from historical sources (e.g., Dyrvik et al. 1979). A degree of correspondence with other sources is important because it sustains the premise of the study, that specialized knowledge about certain landscape segments is reflected in patterns of language use.

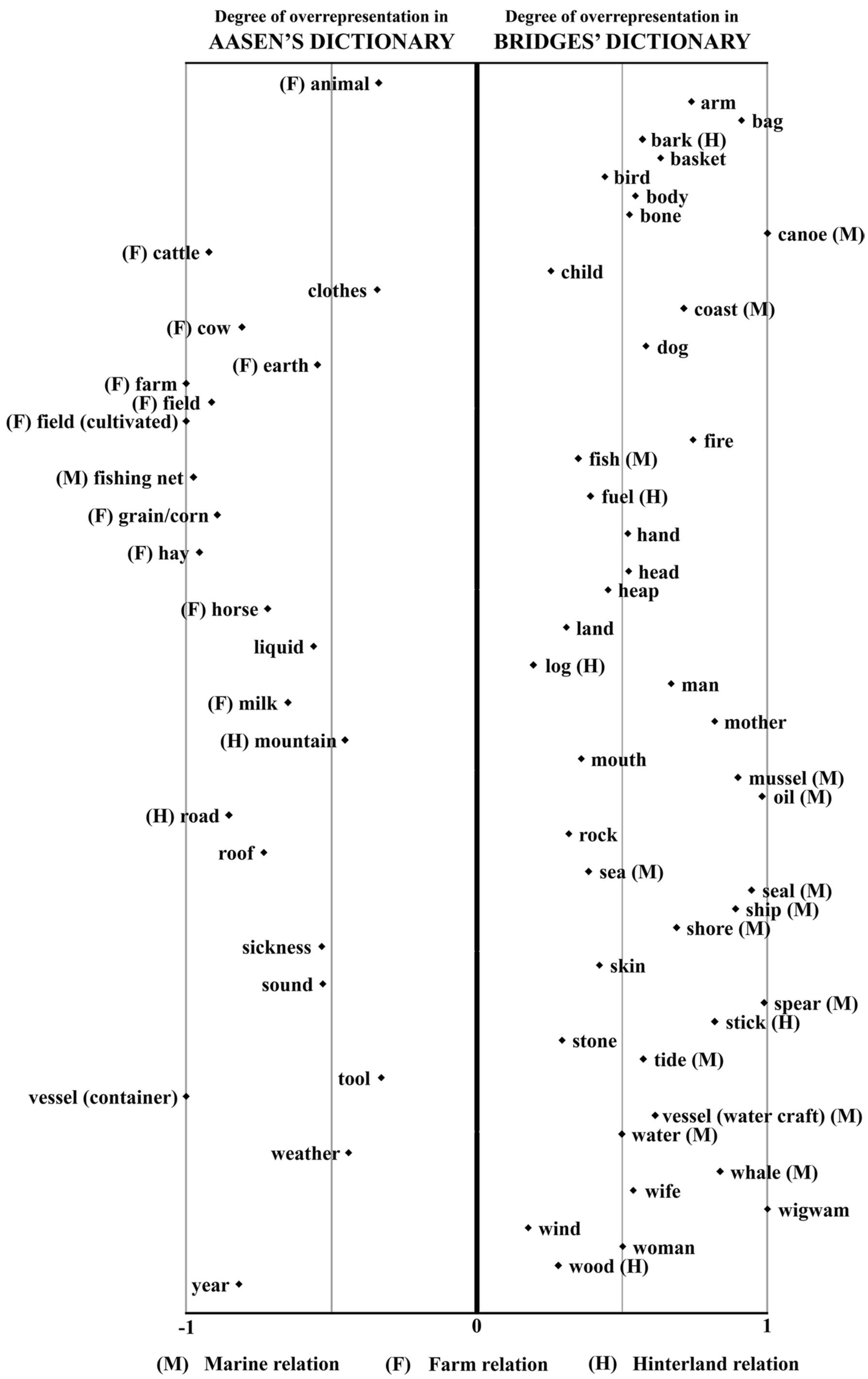
Slicing Seascapes with Bridges' Dictionary

The word frequency analyses demonstrate a clear marine orientation in the Yagan vocabulary, emphasizing resources and seafaring. However, the analyses lack capacity to identify specific environmental niches as the resulting lists are dominated by generic terms that only provide coarse overviews of the dispersion of words across the landscape. Hence, we proceed to examine Yagan nouns more closely.

Directions are pivotal in Yagan language. The Yagan normally used verb prefixes to indicate direction when compounding the verb *to go* (Bridges 1894:70–71). Additionally, they have many adverbs of direction indicating relative positions of things (Bridges 1894:76–77). Words also varied with the position of the speaker (Bridges 2007:34–35). Directions were important at many levels for the Yagan (Gusinde 1937b:1451–1452) but appear particularly structured at the landscape level.

The four adverbs of direction, *ingū*, *īnū*, *īlū*, and *ītū*, translate into the cardinal directions: northwards, westwards, southwards, and eastwards, respectively. The verb prefix *ma-* suggests that northwards (*ingā* or *ingū*) is also associated with movement from water toward land. Conversely, *īla* or *īlū* (southwards) conveys the idea of movement out, away from the shore—as is the verb prefix *kūt-*. Furthermore, *īnū* or *inna* (westwards) can indicate movement upwards, as up a hill or valley, while *ītū* or *īta* (eastwards) can relate to movement downwards, as down a hill or valley. Feeding these pivotal directions into a simplified model, it looks something like Fig. 10.

Apparently, such directional systems are not uncommon among island languages (Nash et al. 2020). For example, similar systems have been described for Kawésqar (Aguilera 2016) and Yaeyaman of the Ryukyuan Archipelago, Japan (Guay 2023)—though analogies can even be found among highland languages, such as Tzeltal in Chiapas, Mexico (Brown 2008). While it is tempting to compare the model with a bird's eye view of the northern coast of the Beagle Channel (compare with Fig. 1), we should rather think about it as a model adapting to the terrain—out from the shore is out from the shore, no matter if it is the "southwards" as the compass indicates (cf. Bridges 1894:71).


Degree of overrepresentation in
AASEN'S DICTIONARY
Degree of overrepresentation in
BRIDGES' DICTIONARY
(F) animal
arm
bag
bark (H)
basket
bird
body
bone
canoe (M)
(F) cattle
child
clothes
coast (M)
(F) cow
dog
(F) earth
(F) farm
(F) field
(F) field (cultivated)
fire
fish (M)
(M) fishing net
fuel (H)
(F) grain/corn
hand
(F) hay
head
heap
(F) horse
land
liquid
log (H)
man
(F) milk
mother
(H) mountain
mouth
mussel (M)
oil (M)
(H) road
rock
roof
sea (M)
seal (M)
ship (M)
shore (M)
sickness
skin
sound
spear (M)
stick (H)
stone
tide (M)
tool
vessel (container)
vessel (water craft) (M)
water (M)
weather
whale (M)
wife
wigwam
wind
woman
wood (H)
year
-1
0
1
(M) Marine relation
(F) Farm relation
(H) Hinterland relation

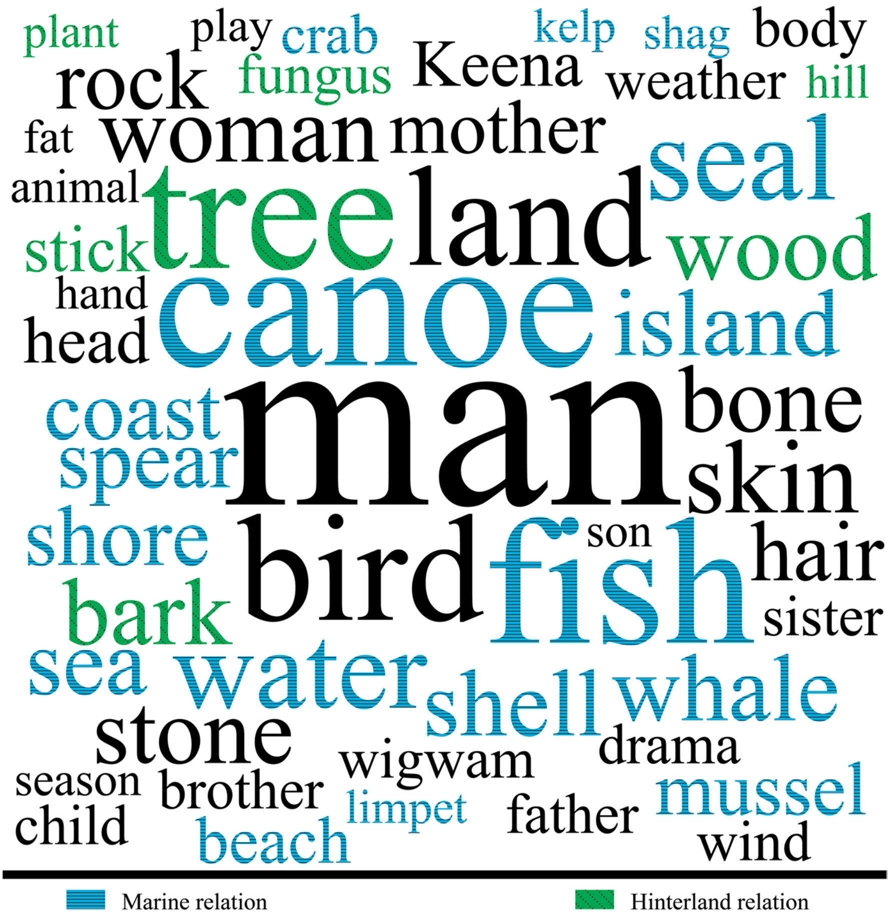


Fig. 9 Word cloud based on word frequencies in Bridges' dictionary, showing the 50 most frequent, relevant *English nouns in the translations of Yagan nouns*. Illustration: Jo Sindre P. Eidshaug

The model supports a coarse division of the Yagan landscape into three segments: *the inland* (up the valleys, into the forest, uphill), *the shore* (including the intertidal zone), and *the sea* (out, away from the shore). Note that the primary divisions of the terrain intersect the same axis, from sea to hill, in Kawésqar (Aguilera 2016:97). Such a segmentation is useful for discussing the objects they contain and for pinpointing smaller environmental niches.

The Zero Point: The Beach at The Bay

> *a[iasi]na(ta)* To go or be gone out so as to leave the wigwam empty as happens when at very low tides all would be away getting fish (Bridges 1987:7).

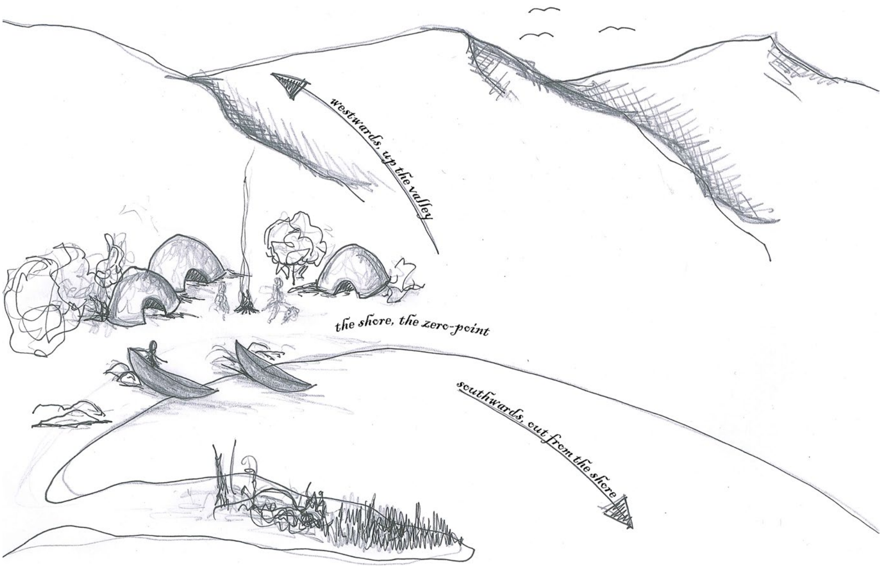


Fig. 10 A simplified model of the macrocosmos based on directions in the dictionary. Movement *on land* up- and westwards (from the shore) are the opposites to down- and eastwards (toward the shore), while movement *on sea* northwards and toward the shore are opposites to southwards and away from the shore. The center (the zero-point) of these two pairs of opposite direction appears to be the shore—*home*—where the Yagan spent most of their time. Illustration: Karen Ø. Oftedal

The shore—where land and sea meet—was the heart of the Yagan homeland. In Yagan, *iūša* means "a coast without any beach" and *iūšatas* "a nice coast" (i.e., an *iūša* "not so steep but what can be landed on)." In turn, *iūšatāsin* translates to "a nice place for landing on an abrupt coast, being less bold than elsewhere." For safe mobility on sea, knowledge about the coastal topography is integral (see below). The Yagan erected dwellings, *ökör$^{\check{z}}$*, on the shore (Orquera and Piana 2015:270–272), and as countless *kūsimöra[dara]*, "heap[s] of shells such as are around wigwams" (Fig. 11, also see Fig. 2), along the coastline testify—the beach was essential for foraging, consumption, and disposal (cf. Orquera and Piana 2009; Zangrando 2018).

The generic term for beach is *paiaka*. However, there are many kinds of beaches—*asölla* is a sandy beach and *lāpix* a muddy beach; *hāšöx* refers to a gravel beach, and *dāri* a boulder beach with large, smooth pebbles; *dūa* is also a stony beach with flat or round stones, though only the upper, black part. It is right above *dönux*, which is additionally spotted white with barnacles and "only uncovered at good ebb tides" (the tidal range in the Beagle Channel is about 2 m). *Īlapaiaka*, from *īla* (south/out) and *paiaka* (beach), is another term for an uncovered beach at low tides (Fig. 12).

Words pertaining to fauna are perhaps the best indicators of Yagan environmental knowledge, as almost a third (806 of 2,703) of the nouns touches the topic. Almost half of the fauna-related nouns denote species of the animal kingdom ($n = 389$) and 318 describe body parts. Yet others relate to habitats, foraging technology, or animal by-products. The beach—the intertidal zone

Fig. 11 A small cluster of shell-middens in front of a steep coastline near Túnel, east of Ushuaia, Tierra del Fuego. Dwelling huts were placed in the center of the middens. The ring-shaped middens owe their distinct shape to the practice of depositing waste immediately outside the huts, that eventually formed into sheltering walls. Due to repeated reoccupations of the same places, these clusters grew ever larger—through reuse as well as additions of new middens. Photo: Jo Sindre P. Eidshaug

Fig. 12 Low tide at a sheltered area with shell midden settlement sites, west of Harberton, on the northern coast of the Beagle Channel. The black, stony part of the beach, *dūa*, is clearly exposed. It is situated above *dönux*, which is spotted white with barnacles and only uncovered at low tides. Photo: Jo Sindre P. Eidshaug

particularly—appears densely packed with words describing its inhabitants (on foraging in the dictionary, see Husøy and Swensen 2016; Swensen 2014). Denizens from deeper waters also seek the coasts in large numbers periodically: the term *aiakāsi* designates "all deep sea or ocean fish and birds … and fur seals" coming to feed on the vast schools of sprats appearing near the coast in the autumn (Bridges 2007:81).

The most numerous animal category, birds ($n = 148$), is dominated by seabirds: albatrosses, cormorants, ducks, geese, grebes, gulls, oystercatchers, penguins, shearwaters, snipes, terns, and waders—but also include predatory birds such as hawks, vultures, and caracaras. Some birds, like penguins, have different terms for the young, or large. *Šušša* labels the "jackass penguin" (Magellanic penguin), *yakauiya* the "young jackass penguins of mature growth yet under one year," and *upöči* the large jackass penguin (though also a variety of penguins and oystercatchers). Moreover, there is *munna*, "a wasted, emaciated penguin," and *waiačömma* or *wēăcömma*, "the state of lean and sick penguins which come ashore and stand all drawn up together."

Fish ($n = 56$) is another rich but ambiguous category. Although it speaks about the sea, the Yagan caught many fish in the littoral zone—in kelp beds (Orquera and Piana 2015:154–159; Zangrando et al. 2016) and even on the shore, as exemplified by the verbs *ūköšiūarāgū*, "to drive ashore by interposing obstacles, and so force ashore, as the natives do fish," and *ūtūgata*, "to drive fish up ashore in creeks by heating the water and hemming them with barriers." The word for beach, *paiaka*, also means all kinds of fish and shellfish used for food that spawn and are found on the shore. Fish species are not normally identified in the dictionary because Bridges (1869:114) lacked knowledge about their English names. Rather, he made brief notes on such things as behavior, appearance, what species they resembled (e.g., smelt, pike, sprat, skate), and/or where they were caught. Thus, *čkīsi* or *kīsi*, *töppun* or *söpun* (presumably same as *töppun*), and *tullux* are terms for small fish which spawn and/or are found under stones on the shores, whereas *gaiyis* and *hāsiūna* are caught in kelp beds close to the shore. *Gaiyis* is also *īn'apömurǯ*—winter fish—and there is *īnāpaiaka*, fish and shellfish found on the shore during winter. While *hāma* is deep-water fish "which feed on sprats," it is "very apt to get stranded on the shores." The smelt-like *yīmūtul* frequent the mouth of streams and *amöš* or *yīmöš* live in streams and pools.

Not surprisingly, there is a richer vocabulary for marine mammals ($n = 55$) than terrestrial mammals ($n = 17$). While many of these mammals' habitats include (or can be spotted from) the beach, most "belong" either to the sea or the hinterland. Hence, they are discussed under their proper headings below.

Thus, it is the rich vocabulary pertaining shellfish that truly demonstrates the Yagans' detailed knowledge about the beach and intertidal environments. Altogether 83 nouns refer to marine invertebrates (shellfish mostly), of which 13 name crabs, including species, quality, and stages of development—two of them even name specific seasons. Fourteen nouns refer to limpets and 21 to mussels—relating particularly to quality and location, and if there is a link between them (e.g., mussels found higher up on the beach are of inferior quality to those found farther down).

The vocabulary regarding exterior and interior body parts is also impressive. While most terms are generic and cannot be related to place, quite many relate to marine mammals (whales particularly) and shellfish (Table 2).

Keena and *drama* are among the high-frequency nouns (see Fig. 9). Bridges used the terms *drama* and *game* for rituals and ceremonies, and *Keena* (English pronunciation of Yagan *kīna*) refers to an initiation ceremony for boys aged 12 to 17 (*ušwa̯ala*) and to the building it was held in: “A wigwam built apart and of logs always for superstitious purposes.” Most translations containing *kīna* pertain to “characters,” “games,” “plays,” and/or “scenes” involved in the ceremony. The Yagan words usually have the affix -*iaka* or -*yaka*, meaning “imitation of, resembling,” referring to animals or other things that are impersonated in the rituals

Table 2 Yagan has many nouns relating to body parts of crabs, limpets, and mussels

Yagan	English
Crabs	
asim	(of crabs specially) Dung, odure, dirt, contents of stomach or bowels
hākasim	A certain part in crabs at certain seasons like the yolk of eggs. The yolk of eggs. Eggs not yet mature as found in birds
hapör$^{\check{z}}$, *hapata*	A certain white, loose, eggy matter which separates from crabs when cooked and sticks about on the shells and meat
hašailöpata	The inner skin of crab, between the skin and shell. The state of a crab before its shell is duly formed and hardened after casting its shell
lāköš	The shells of crabs and other shellfish. The shells of eggs. Empty shells
möšāgāna	The piece which covers to crab’s body underneath of a triangular form
tstwīigulata, tstwīigulū	Empty shells which crabs have cast
uškögin, ušköŋgin	The principal claw, with nipper, of crabs
ušlömin	The contents of *ušlömin*, i.e. the excrementitious parts of crabs. The back shell, or the back of a crab. A crab shell
yöš	The lesser, nipper claws of a crab
Limpets	
auwörasina	The (little) line in limpets which is full of little grit (and always pulled out)
köwöranux	The limpet-like shells which are worn as pendants from necklaces
lön	The firm exterior parts of limpets and *pa̯aš* [shellfish spec.], etc
usči	The soft parts of limpets, especially the white part
ūtöfla	The mass of soft yellow substance in fat limpets
Mussels	
ačinuš, činuš	Pearls found in mussels. Anything like them, grit
asim	The soft dark part found in masses of mussels, limpets, crabs, etc
halöšun	The bristly hair by which mussels are attached to rocks
kūsi	A shell as of mussels, etc
lāpa	The shell of *köčauin*, mussel spec
lāpöš	Shells of mussels and other shellfish generally but not of eggs
tellöš	The shell of a very large mussel called *köčauin* used as an oil dish
ušpālömbi	(lit. black stern) The soft black part of mussels

Table 3 Names of various rituals enlisted in BD, mostly related to the *kīna* ceremony. The table includes animals and other objects identified from the descriptions in BD. Although Martin Gusinde (1937a:33–45, 1937b:1498–1499) attributed Yagan names to many species in *Die Feuerland Indianer*, only three or four of the 13 species listed in the table correspond with Bridges' descriptions. This inconsistency between Bridges' descriptions from the 1860s and 1870s, and Gusinde, who was in Tierra del Fuego 1918–24, is remarkable. Several species were also identified by Yagan names in Hyades and Deniker (1891:285–287), in connection with the French *Mission Scientifique du Cap Horn* in 1882–83, and they are more consistent with Bridges' descriptions

Character/ play	*Kīna*	Imitation of	English translation	Species	Category
čūir$^{\check{z}}$*yāka*	yes	*čūir*$^{\check{z}}$	A certain gull with forked tail, very swift of wing, which dives after its fish	South American tern	seabird
görāpū čis	yes	*görāpū*	The mollemauk	black-browed albatross	seabird
hauwur$^{\check{z}}$*yaka*	yes	*hauwur*$^{\check{z}}$	The broad-winged, black shag which is much given to roosting in trees	neotropic cormorant	seabird
kiūāgwīaka	yes	*kiūāgū, iūāgū*	The common black winged white gull	kelp gull	seabird
tākašaiaka	yes	*tākaša*	A dark plumaged, red legged gull	dolphin gull	seabird
ušwilir$^{\check{z}}$*yaka*	yes	*ušwilir*$^{\check{z}}$	The red legged, red beaked, black and white curlew	Magellanic oystercatcher	seabird
wīnöfköraiaka	yes	*wīnöfköra*	The Johnny rook, a bird very like this vulture	striated caracara	bird
wöseniāka	?	*wösen*	Shags in general, the common and large shag	imperial cormorant	seabird
kūpikīmata	yes	*kukurux*	A light colored owl of fair size	owl (indef.)	bird
kūpikīmata	yes	*yepūtala*	An owl of dark mottled plumage	owl (indef.)	bird
hāšūāpisaiaka	yes	*hāšūāpisa*	A whale with barnacles on it (spec.)	humpback whale or southern right whale (?)	marine mammal
kīnaiagöllum	yes	*aiagöllum*	Whale killers. A porpoise like fish which persecutes and kills whales	orca	marine mammal
lamūkaiaka	?	*lamūka*	Whale (spec.). The black fish	false killer whale	marine mammal
ušōulaiaka	yes	*ušōula, ušaula*	The whale killer. The sword fish	orca	marine mammal
haimušyāka	yes	*haimuš*	Mullet	Patagonian blennie	fish
iūalaiakāsiaka	?	*iūalaiakāsi*	A kind of small sprats	sprat (indef.)	fish
halöŋgaina	?	*haḻlön*	A large spiral shellfish, much valued as food	sea snail (indef.)	marine invertebrate
hīköfkölalaiaka	?	*hīköfkölala*	Jelly fish	jellyfish	marine invertebrate
hāniaka	yes	*hāni*	A, the north wind		wind
löŋgapaiaka	yes	*löŋgapū (?)*	Sun's rays or pathway as seen on the shining waters		celestial body

(Table 3). While matching Yagan words with modern taxonomies falls beyond the scope of this paper (and partly misses the point), we have attempted to identify the beings that were impersonated because of their ritual importance. Table 3 shows that the impersonated animals almost completely belong to the marine realm, sea birds and orcas being most numerous—the latter a companion animal sacred to the Yagan (Chapman 2010:53–57). Notably, it also turns more attention to the sea than the beach.

Venture Southwards: out from the Shore

> *döna* Disturbed, ruffled slightly either by the ripple from a distant wind or by a light local wind as the surface of the sea so that the movements of fish near its surface cannot be discerned and when the canoes return ashore in consequence (Bridges 1987:230).

It is striking how the word *canoe* pervades the dictionary, appearing in almost 4% of the listed translations (954/24,570 = 0.039) (i.e., averagely every 25th translation) (Fig. 13; also see Fig. 6). One reason is the extensive use of the verb affix *köna* (or

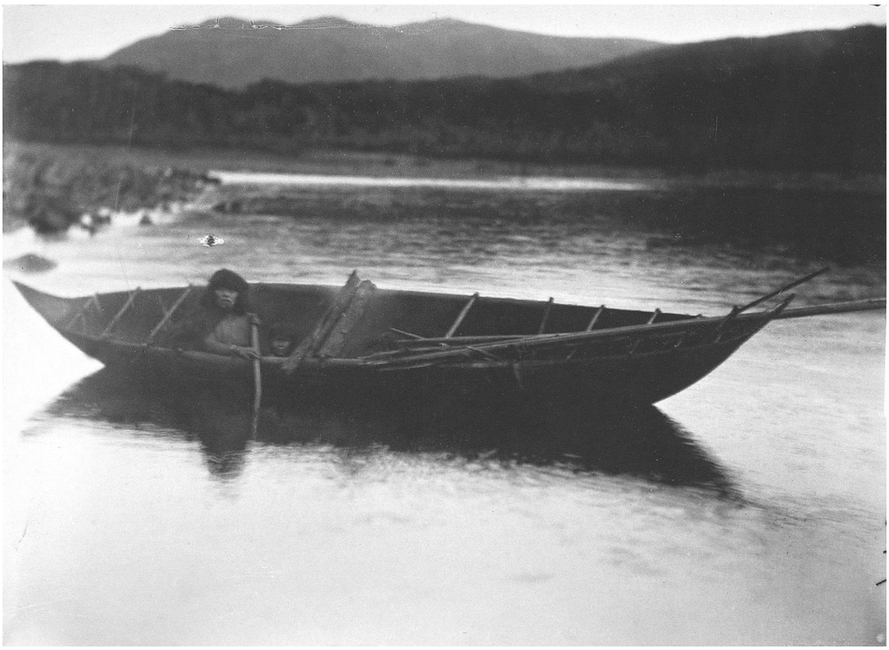


Fig. 13 The word *canoe* is ubiquitous in the Yagan-English dictionary. The canoes were made from the bark of evergreen *šöšči* (*Nothofagus betuloides*). Around 1880, the wood canoe started to replace the traditional bark canoe (Orquera and Piana 2015:260–261). Only the latter kind is mentioned in the dictionary, which was finished in 1879. Photo: Jean-Louis Doze and Edmond-Joseph-Augustin Payen (1882)

göna), which indicates an action taking place when afloat, aboard, or on the water in any sense (Adam 1885:21–22; Bridges 1894:75). Still, it underscores the universal importance of waterborne activity for the Yagan. Wherever the canoe moves, there is knowledge—about weather, wind, and their effects on the sea; life in the sea, mammals, fish, birds, and other people in canoes; the coastal topography and the skyline seen from afar, things to navigate by.

Yagan possesses many adverbs of place that indicate relative positions of things (Bridges 1894:76–77), which was important for navigation. Taking islands (*yöška*) as an example, there is a detailed vocabulary for different parts of islands seen from afar: there are words naming the islands farthest west, east, south, and north, and there are names for the western, eastern, southern, and northern coast, side, point, etc. Navigating closer to land, there are names for each side of a bay, cove, creek, etc. Although very few are listed in the dictionary, the Yagan also had an immense body of place names that described and structured the seascape (see Regúnaga 2022). Bridges noted the following about place names:

> whilst they have names for every locality, every creek or tiny island, which sufficiently serve their purpose, they often have no name for the larger divisions of land and water. … The sixteen mile coast of the Bay of Ushuaia has no less than fifty-six names (Bridges and Lothrop 1950:93)

Many place names have the suffixes -*waia*, meaning bay or harbor, or—*wölakirž*, a point of land, like a promontory. While these features are important for navigation, the coastal environment was packed so densely with place names that any peculiar feature had a name, no matter how trivial it appeared (Gusinde 1937b:1452).

Seafaring also involves risk and requires meticulous observations and knowledge about weather and wind (Fig. 14). While at least 91 of the 2,703 nouns regard *weather*, *wind* is by far the most refined category (Table 4; see also Figs. 6 and 9).

The Yagan had a keen eye for the marine fauna—the canoe being an important means for obtaining food (Bridges 1869:115). Sea birds and fish were important, but so too were marine mammals: *seals* ($n=30$) and *whales* ($n=21$) particularly. Fifteen nouns regard *hair seals* (sea lions, Table 5), seven *fur seals*, six *elephant seals*, and one the *leopard seal*. Finally, *amatas* means "a nice looking seal." Terms pertaining to seals are either generic or referring to species, state of growth, or sex. The orca—the "whale killer" or "swordfish"—is most important among the cetaceans, having five different names in Yagan. Among the names given to body parts, those relating to whales are most numerous ($n=33$), with 13 nouns merely for blubber and flesh (Table 6). Note that the important word *wāpisa*, meaning "whale" or "blubber," is missing from BD. It is enlisted in Bridges' previous manuscript from 1865–66 and appears in compounds such as *aiasiwāpisa* in BD (Table 6).

Venture Westwards: up the Valley

It is easy to think about the canoe—*ānan*—as belonging solely to the sea. BD reminds us otherwise. Bark is cut from the evergreen *šöšči* (*Nothofagus betuloides)*, usually during *čīyāgörana*, the season when it is easier to separate from

Fig. 14 The sun about to burst through the sky on a gray day near the eastern limit of the Yagan homeland. The picture is from a small shell midden site in windy Moat Bay, looking into the more sheltered areas of the Beagle Channel further west. Weather is almost always a matter of concern in Tierra del Fuego (see Table 4). Photo: Jo Sindre P. Eidshaug

the tree. Wood fiber, *uri*, is used for sewing, for which *hūšun*, seed stalks of wild celery (usually), are sewn as pads into the seams to make them waterproof, and *tstāgi*, a soil, is used to cement or wad the seams. The bark is protected by *aikuš* or *tstekila*, small sticks encasing the canoe, normally of *uškutta*, the canelo or winter's bark tree (*Drimys wintery*). Even smaller pieces, *höwöra*, are used in the ends. Pieces of young smooth bark that are fitted over the gunwale to protect the paddlers' arms from blisters, are called *tatega*. Amidships is the fireplace, *āpun*—the hearth turf, *öf*, where a fire is lit, using *ūsāpöna*, "firewood specially for the canoe." This list is obviously not exhaustive, but it suffices to remind us about the canoe's entanglements beyond the marine realm—it intervenes with so many parts of the Yagan world, both on water and land.

Curiously, many words that we associate "instinctively" with the hinterland are also coupled with knowledge about the marine lifestyle. Part of the reason why *tree* is among the most frequent words is its value as a resource—as firewood and building materials for bark canoes and dwellings at the shore. The most frequent symbolic association for *tree* is *bark* (the five most frequent Yagan nouns occurring in translations containing *tree* are: *bark*, *wood*, *log*, *branch*, and with equal figures, *man* and *stick*). While *bark* is used for buckets, cups, and bailers, it was pivotal for making canoes.

Only 14 nouns regard terrestrial mammals (of which four refer to dogs and four to guanacos), whereas 48 concern fungi (see also Fig. 9), rendering *fungus* the most important hinterland category behind *tree* and *bark*. According to the dictionary,

Table 4 Tierra del Fuego is renowned for being a windy place, and many Yagan nouns denominate winds

Yagan	English translation
Light winds (calm–moderate breeze)	
mēteka	Calm weather, a calm
tūtākū	A calm, calm weather
yelaiāgū	Calm weather, a calm
yelaiāgūtas	Beautifully calm weather, a very calm and fine climate
ūsiputurū	The state of the weather when there is no frost, the sky being over-clouded and the air mild and still
hif	Air in motion. A puff or current of air, a little breeze or catspaw. Air, wind, breeze
pux	Any little ripple or play of light airs on the smooth water during a calm. The wake of any bird or fish or boat on or near the water's surface
yekālöma	A slight air or wind on the water, causing a slight ripple on its surface
čgaia̱̣anari	A light breeze, or air, as seen on the water, i.e. catspaws
tauwaa	A drift of snow either at rest or in motion, a blast, a gust, squall, williwaw, whirlwind
Winds (associated with direction)	
makainix	Southerly weather whether fine or otherwise. South wind
hāni	A, the north wind
hānimaiawa	A cloudy, overcast sky, accompanying a north wind. A passing squall scud and wind from the north
hānisēif	Such a sky as companies a north wind
īlan, īlar$^{\check{z}}$	The south wind, also the southeast wind
ītan, ītar$^{\check{z}}$*, ītalum hūša*	An east wind, the east wind
ītan hāni	East-northeast, north-northeast wind, a wind to the east, of north
tāšū	A northeast wind, a northeast gale
Strong winds (fresh breeze–moderate gale)	
hūša	Wind, a strong wind, a breeze
lūkilla	Strong south or southwest winds accompanied with rain and sleet prevalent at the break up of winter
wörūpa	A strong cold blast which beats with violence and noise upon or against any objects exposed to it, such noises caused by strong winds
yākōf	An east wind, specially such as is strong and very chilly
lökha̱̣a	A cloudy, rainy sky with stiff, northerly winds
yesepös	Any cold, strong, steady and biting wind in dull, cloudy weather from any quarter, but specially from the east and southeast
yiftekila	Any strong wind with bad weather from the west, northwest, or southwest
öpauuš	(Strong) West wind. Westerly weather

Table 4 (continued)

Yagan	English translation
Fresh gale or stronger	
asaui	Weather when a fresh gale is blowing from the west or southwest, the sun is shining brightly, and the sky cloudless or nearly so
tauwārū	A gale of wind, storm, stormy weather
tauwönikāgū	A great gale at sea
töšata	Tempestuous, boisterous weather
yamalārihūša	A fearful gale of wind, a mighty blast
yamalenata	The wind during a heavy gale in exposed places or any prodigy in any wonderful qualities of size, force, noise, extent, etc
yamalhūša	An immense gale, such as is common on the open coasts
yerrimātū	The early spring, indicating the stormy, snowy weather prevalent at the break up of winter

Table 5 Yagan nouns pertaining to "hair seal," the archaic name for sea lion

Yagan	English translation
apöšū	(Southern dialect) The young male of hair seal
dwīāta	The grown male of the hair seal
hulla	The name of a certain fabulous hair seal of great daring and cruelty which lived at *Wēakuf* in a certain cave still pointed out and was a source of great dread to all as he had killed many who had passed that way, but was eventually killed by a brave man called *Ūma̯ara*, who also killed the fabled stone man
kilaiama	Hair seals
kīpama	The female hair seal
lokwīama	A kind of small hair seal
lömbia̯ala	Young hair seal pups
mikilina, mökilina	The or a hair seal
tömma	Young hair-seal pups or fur pups
wīya̯ala	The young males of hair seals, seal pups
yākōra kīpa	The female hair seal
yākörūwa	The male hair seal
yamaiākīpa	The full grown female hair seal when of large size
öškīpārum	(Southern dialect) Female fur seal pups

Table 6 Selection of Yagan nouns related to internal body parts of whales

Yagan	English translation
aiasi	A layer of fatty substance lying immediately under the blubber of whales, is redder than the blubber and not so thick, and separating it from the flesh is a thinner layer of skinny matter called *öwönamöga*
aiasiwāpisa	The *aiasi* cut off in slices or slabs from the blubber
api	Skin and blubber adjoining of whales, porpoises and such like
apula	The soft fat (not blubber) from the inner parts of a whale
dögalöx	Old, decayed whale-blubber
döš	The pliant whalebone from the mouth of the whale. Nooses made of it
gai	The fat of seals and such like creatures as porpoises, etc
gūtakun	Loose oil about blubber or adrift on the water and around
gölaša	Meat lined and interspersed with fat. A part of whales of this sort
gössunama	The brisket. That part of the whale between the flippers
hīta	Old and much wasted blubber as found on shores after being long in the sea
höra	Hard kernels found in the blubber of certain whales and not eaten
höšuwa	The entrails of whales
isiska, isöska	The lower jaw bone of whales, much prized as spear bones
iskun	The flesh of whales
kaua	A certain part of a whale, the fat or blubber from the chest (very choice)
kūtakun	(from *gūta* and *kun*) The brains of whales. Any loose, oily substance from a whale
kölāmurž	The skin of whales, porpoises and such like creatures
kössawāpisa	The *kössa* [brisket, chest, breast, especially the fatty part] of whales
lānöšyāgū	The roof of the mouth especially the palate of whale's mouth
lun, luna	The wasted and dirty edges of buried blubber which are cut off and thrown away
löŋki	Whale's tongue
ma̱̣an	Whale blubber toasted and freed from oil by being toasted
pataköni, patakönióndöš	A part of the blubber of whales near the shoulder
tauwöla	Certain choice parts of a whale mottled in appearance
ušta	A hair, a bristle, the fibrous, hair like ends of the whale's mouthbone
uštānim	A porpoise jaw used as a comb. A comb, like a comb
öwönamöga	That substance in a whale which is between the *aiasi* and *iskun*

the Yagan distinguished between twenty types of fungi and had unique names for certain stages of growth, particularly for *auačix* (*Cyttaria darwinii*, Table 7).

Discussion: Relevance of Bridges' Dictionary for Archaeology

Linguistic salience and archaeological visibility do not necessarily correspond (Blench 2006:189–190). Archaeology suffers from the paradox that the archaeological record per se is inherently stratified: no matter their importance,

Table 7 Yagan nouns regarding *auačix* (pronounced owachik), which particularly refers to its stages of growth

Yagan	English translation
auačix	The chief summer fungus produced by *šöšči*, yellow and round
āmasama	The earlier stage of growth of certain funguses, especially *auačix*, *söčipū*, *ösöf*
twīušama	*Auačix* before it is half grown
dāpöl	The small teat-like end of *auačix*. *Auačix* with this part fully developed
čikidönara	Immature *auačix* which falls first, and is not fully grown
pöša	The second stage of *auačix* just before it opens in holes and gets puffy
dönara	The state of the funguses *auačix*, *ösöf*, *mēama*, and others when they burst out in many holes over their surface and being then fully ripe shortly after fall from the trees. The season of the year when *auačix* fall from the trees. *Auačix* in this soft, fluffy, ripe state
čgaiaŋgūta	The season of hatching. The season of ripe *auačix*
dāpalūpaii	*Auačix* of a firm substance fallen but not changed to black. *Auačix* which dries and bleaches up in the tree and falls in a dry, hard, and bleached state
möla	Such *auačix* as has fallen to the earth and there dried and blackened
dāpöš	The teats, breasts of any females, the udder or whole breast, milk, the teat of *auačix*
puiū, fuiū	The inside woolly parts of *auačix*
ammöka	A bundle of rods of threaded *auačix*
galama auačix	A stick or rod of threaded *auačix*

some materials simply preserve better than others—and only a microscopic portion of them are ever excavated. Furthermore, ephemeral and intangible aspects of past beliefs and actions are rarely sensed in archaeological records. This dramatic loss of information with time means that archaeology is prone to "selective amnesia"—since we seldomly discuss what we cannot see (Bjerck 2022). And it can be difficult to establish what is lost and what is biased. For the more recent periods (chiefly), historical archaeology is better equipped, as it uses texts and information from other sources in addition to the archaeological record. Thus, a comprehensive textual source like Bridges' dictionary can bring relevant perspectives and information to archaeology.

With regard to the *ethnographic content* of Bridges' dictionary, which we emphasize in this paper, it is primarily within a methodological tradition that we encounter the relevance of the dictionary for historical archaeology—in dialogues between artifacts and texts, words and archaeological objects, searching for correspondence and contrast (Andrén 1998). Interdisciplinarity is one key strength of historical archaeology. Drawing on and combining multiple sources in new and creative ways is particularly important in studies of Indigenous groups for challenging both written and archaeological records, shedding light on complexity and diversity in Indigenous experiences, and creating more nuanced and inclusive accounts of people that traditionally have been marginalized (Rubertone 2000).

However, the content of dictionary can also contribute to global issues in historical archaeology concerning modern life (see Deagan 1988; Orser 1996)—and the impact of modernity (particularly colonialism) on Indigenous people in Tierra del Fuego.

The compilation of the dictionary involved extensive interactions between European and Yagan people (Regúnaga 2020; see also Bridges 2007; Hazlewood 2000), including voluntary or involuntary displacements of Yagan groups (e.g., to Keppel Island), teaching of the gospel, the establishment of a permanent mission in Ushuaia in 1871, and the development of Bridges' relationship with Okokko and Camilenna—who were instrumental for the compilation of the dictionary. In that respect, it can be argued that the content of the dictionary documents a form of resistance through the survival of traditional marine lifeways and environmental knowledge in the linguistic vocabulary of the Yagan. Despite the huge potential of such studies, the focus of the current paper lies precisely with the ethnographic content of the dictionary—honoring what it can say about marine lifeways, seascapes, and environmental knowledge. The Yagan-English dictionary is remarkable in that it forms a rough estimate of the Yagan vocabulary. And through language it conveys a notion of *diversity*, *complexity*, and *deep knowledge* assembled over a long time span.

Whereas conducting systematic comparisons with ethnographic and archaeological records falls beyond the scope of this paper, previous studies from Tierra del Fuego have identified relevant similarities and differences between distinct sources of information—including Bridges' dictionary. In a study regarding foraging in the Yagan-English dictionary, Elisabeth Swensen (2014; see also Husøy and Swensen 2016) found many parallels with ethnographic and archaeological records from Tierra del Fuego. However, the dictionary did not necessarily correspond in detail with these records (Swensen 2014:53–72). For instance, marine resources, like fish, shellfish (mussels primarily), birds, pinnipeds, and cetaceans, and (in smaller numbers) terrestrial resources, like guanacos, are essential components of the zooarchaeological assemblages collected from shell middens in the Beagle Channel region—though the relative abundance of taxa vary between archaeological sites. These important components are also encountered in ethnographic records, and they are frequently mentioned in the dictionary. On the other hand, perishable materials like crab shells, berries, and fungi are almost never preserved in the archaeological record (crab shells are only very sporadically found in the region, see Orquera and Piana [1999:100, 2001:350]), but we learn about their popularity in the dictionary and in ethnographic accounts. Comparing foraging technology, Swensen (2014) found a similar pattern: lithic and bone artifacts, such as harpoon points, spearheads, and arrowheads, were commonly found on archaeological sites. Although the terminology differs, the hunting technology associated with these artifacts is also accounted for in the dictionary and in ethnographic records (in various degrees). However, the written sources provide more information about the variety of techniques used for fishing and trapping birds. Swensen (2014:73–75) concludes that the dictionary, ethnography, and archaeology pertain to different and partly separate realities, shedding light on different aspects of Yagan lifeways—emphasizing that the dictionary conveys more fundamentally a narrative of *diversity*, both in terms of resource use and foraging technology. As the above examples demonstrate, the ethnographic record aligns better with the dictionary than the archaeological record with respect to diversity in subsistence and foraging technology (Swensen 2014:53–72).

In a similar study concerning material culture related to hunting, fishing, and gathering in Yagan and Selk'nam societies, Danae Fiore, Ana Butto, and María Saletta (2021) found that photographic, written, and sixteenth–nineteenth-century archaeological records from Tierra del Fuego more often are complementary than corroborative. Remarking on the absence of artifacts made of perishable materials in the archaeological record (e.g., slings, clubs, traps, fishing lines and nets, baskets, and bags), Fiore and colleagues also made inquiries into how the records linked various artifacts, tasks, and gender. One important observation regarded the visual culture created through the photographic record, which typically depicts Yagan males with harpoons. Harpoons are also represented in written accounts and archaeological records, but so too are bows and arrows (i.e., lithic points in archaeological records), which are totally absent from the photographic record. The variability in information provided by the sources is partly explained by their diverse formation processes, which included both human and nonhuman agencies, and thus they all contribute to broaden the knowledge about diversity in material culture within and between societies (Fiore et al. 2021, 2014). Moreover, they also shed a light on the agencies involved in the making of such records, as exemplified by the formation of a visual culture that linked maritime hunting (harpoons) with Yagan male identity (Butto et al. 2018).

It is not clear from linguistic sources how far back the Yagan language goes. Nevertheless, it is probable—as Bridges was convinced (cited in Barclay 1987:XVI)—that many words carry seeds of a distant past. According to Willem Adelaar, nine Indigenous languages were spoken in Tierra del Fuego and neighboring parts of southern Patagonia (Yagan is the best documented language among these), but whether they are one linguistic family or if they form a linguistic area has not been resolved (Adelaar and Muysken 2004:550, 578–579). Clairis has claimed that Yagan genetically is the most isolated language of the region (cited in Adelaar and Muysken 2004:556). Even though linguistic studies have indicated a remote relationship between Yagan and Kawéskar, it should be noted that this remains hypothetical (Viegas Barros 1994, 2023). Thus, Yagan may still be considered a language isolate (Regúnaga 2019; Seifart and Hammarström 2018; Viegas Barros 2018).

Curiously, archaeological data indicate that the period that followed the emergence of shell middens in southern Tierra del Fuego, around 7000 BP, witnessed a relative stability that lasted until the nineteenth century (Orquera and Piana 2009). Although we should be careful not to turn the blind eye to variation in ethnographic and archaeological records, the latter which extends several millennia beyond contact with European societies (Borrero and Martin 2023), cultural continuity in Tierra del Fuego renders it meaningful and relevant to compare ethnographic records, and perhaps ethnolinguistic sources in particular, with archaeological records. In our opinion, this does not only concern archaeological records from the period after contact with Europeans in 1624 (see Orquera and Piana 1995) but extends to those from more distant pasts (for an alternative perspective, see Estévez and Vila 2007).

In tandem with the archaeological record, the rich Yagan vocabulary pertaining to seascapes bears witness to work and energy constantly being invested in the marine environment. Despite uncertainties regarding the age of the Yagan language, surely it takes time to develop the required skills and knowledge for sustaining a marine lifestyle. It is not just about adaption, but active engagement in a particular lifestyle, a form of being in the world (Ingold 2011b). Although only one noun specifically denotes heaps of shells (*kūsimöra*)—as landscape features associated with dwellings—and two verbs describe the action of making heaps of shells (*tūkūsimöranata* and *tūlapöšana*), the dictionary corresponds with the geographic distribution of shell middens in establishing the littoral zone as the most important landform. According to several archaeological investigations in the region, most shell middens are located very close to the shore (e.g., Barceló et al. 2002; Bjerck et al. 2016b; Ocampo and Rivas 2000; Orquera and Piana 1999; Piana and Orquera 2010; Risbøl et al. 2023)—and about 80% appear to be located within 100 m from the present shoreline (Barceló et al. 2002). Based on extensive ground surveys in Cambaceres Bay (Harberton, Isla Grande) (Bjerck et al. 2016b), it has been estimated that as much as 10% of the area below the marine ridge (5 m above sea level) was covered by shell middens (Zangrando et al. 2021:33–34).

In a more indirect respect, the dictionary may also be used for assessing the relative importance of the data that are visible in archaeological records from southern Tierra del Fuego—which mostly consist of faunal remains. As mentioned, marine mammals (pinnipeds particularly), guanacos, fish, birds, and shellfish are chief components of the zooarchaeological assemblages. Despite the relative stability noted above, important variations in human-animal relations have been devised from analyses of such assemblages (Tivoli 2010; Zangrando 2009). This includes a shift that occurred around 1500 BP, involving an increase in fish and birds together with a decrease in pinnipeds represented in the zooarchaeological assemblages. In particular, offshore fish and birds became relatively more important. Accordingly, this shift appears consistent with temporal changes in landscape use: external islands became more important after 1500 BP (Tivoli and Zangrando 2011). For instance, the oldest dated archaeological site in the Cape Horn archipelago (Bayli 1) is less than 1500 years old (Legoupil 1993–94; Orquera and Piana 2020).

Based on the present analysis of the dictionary, we are able not only to recognize variety and what taxa or taxonomic categories were most valuable as food resources—we can also say something far more general about the importance of the animal kingdom among marine foragers in Fuegian seascapes. In support of the zooarchaeology in the region, a fundamental aspect is the great *abundance of words* pertaining to the marine fauna in the dictionary. However, changes in the linguistic vocabulary form a premise for the very idea of a correlation between the lexicon and specialized environmental knowledge—and they are expected over time. For instance, it may well be that the rich diversity in words pertaining to shellfish represented in the dictionary partly relate to a quite recent increase in their relative importance as a stable food resource for the Yagan. According to Orquera (2002), shellfish became relatively more important when the Europeans intensified pinniped hunting in Tierra del Fuego during the second half of the nineteenth century and almost depleted the area of the Yagans' most nutritious staple. Despite potential variations, it is notable that almost one third of the Yagan nouns regard the fauna, indicating a peculiar preoccupation with animal life in Fuegian seascapes. Thus, the linguistic vocabulary underpins the relevance of zooarchaeological analyses in the region—indicating that visibility of marine fauna in archaeological records from Tierra del Fuego is not just a matter of the favorable preservation conditions for osteological remains in shell middens (on preservation conditions of shell middens in Tierra del Fuego, see Estéves et al. 2001; Orquera et al. 2011:62).

However, the dictionary also shows that human-animal relations are far more intricate than their nutritional value (cf. Fiore and Zangrando 2006; Haraway 2003; Ingold 2011b; Viveiros de Castro 1998). For instance, it is interesting to note that seabirds with ritual dedications in the *kīna* ceremony (see Table 3)—like cormorants (*hauwurž̌*, *wösen*) and albatrosses (*görāpū*)—belong to bird families that are frequently identified in shell midden assemblages, including records from the last 1500 years (cf. Tivoli 2010; Tivoli and Zangrando 2011). By contrast, the Patagonian blennie (*haimuš*), one of the fish species represented in body paintings during the *kīna,* is absent from zooarchaeological assemblages dating to the seventeenth–twentieth century. Danae Fiore and Francisco Zangrando (2006) interpret the absence as related to a consumption taboo, given that the Patagonian blennie is a common coastal species in the Beagle Channel with a high potential yield, and there is no ecological, economic, taphonomic, or technological explanation for its absence from archaeological records. Much information about human-animal relations is also found in ethnographic records. According to Martin Gusinde (1937b:1145, 1157), who was the first ethnographer to record Yagan cosmology and mythology, the origin myth taught in the *kīna* recounts (among other things) the circumstances surrounding the transformations of the first humans who arrived in the Yagan homeland into various animals or celestial bodies (Gusinde 1937b:1145, 1157). In fact, most Yagan myths that are known through Gusinde concern animals and their nature (see Gusinde 1937b:1186–1277; Fiore and Zangrando 2006:381). Orcas, in turn, were seen as companion animals because they contributed to hunting (for humans) by killing other whales (Chapman 2010:53–57).

Canoe is perhaps the most important word in the dictionary. However, boats are usually not preserved in archaeological contexts, and only one example is known from Tierra del Fuego (Murray Channel, Navarino Island), which recently was rediscovered through studies of Junius Bird's diary notes from 1935 (Aguilera et al. 2019). Nonetheless, boats are always implicit. Practically every shell midden site recorded along the Beagle channel was reachable with canoe (Orquera et al. 2011:63) and sites located on islands are as old as those on the "mainland" of Isla Grande (i.e., around 7000 years old) (Legoupil 1993–94; Orquera and Piana 2009:70; Tivoli et al. 2022). Moreover, possessing knowledge, skills, and raw materials for manufacturing boats (e.g., *Nothofagus* forests) have been listed as primary technological requirements for the successful littoral adaption in Tierra del Fuego (Orquera and Piana 2009:69–71; Orquera et al. 2011:65). Moreover, the striking correlation between the sizes of canoes, dwelling huts, and family-based social groups suggests that boats may have played important roles in structuring settlements and activities on land (Bjerck 2017:292–294). The dictionary leaves no doubt as to the importance of bark canoes for the Yagan, and through the "meshwork" of materials, skills, and knowledge linked with the *canoe*, it sheds unexpected light on complex entanglements between marine and hinterland realms (cf. Ingold 2011a)—which are involved in practically all human-sea relations (Bjerck and Zangrando 2016). As epitomized in the relation between *tree*, *bark*, and *canoe*, words pertaining to hinterland forests can point toward skills and knowledge related to a distinctly marine lifestyle.

In a recent study of biocultural calendars among the Yagan and three additional ethnolinguistic groups in southwestern South America, Ricardo Rozzi and colleagues (2023) refer to biological coinhabitants that are intimately linked with cultural practices as biocultural keystone species. While care for temporal references ought not be confused with environmental determinism (Vallejos Silva 2009), certain correlations between life cycles of keystone species and seasonal mobility patterns are expected. For instance, Dominique Legoupil (1993-94) has suggested that the Cape Horn region was chiefly visited during summer as part of a seasonal subsistence strategy aimed primarily at hunting birds (including collecting egg and hunting otters), given the high total percentage (83%) of avifauna among zooarchaeological remains from excavations of shell middens in the Cape Horn region (see also Lefèvre 1993–94).

This leads to another intriguing aspect of archaeological interest: the way in which the dictionary affords glimpses into how rhythms of life engrave and materialize in important organisms and things. There is (day)light (*mḁala*), darkness/night (*lököx*), and a variety of tides (*čkāgū*—flood-tide, *kaiyārugū*—spring-tide, *löpasāpa*—very low tide when red rocks appear, etc.), of course—and terms referring loosely to spring (*ārina*), summer (*kīsi*), autumn (*hanisluš*), and winter (*īna*) (Bridges and Lothrop 1950:111)—yet *weather*, *birds*, *canoes*, *crabs*, and *fungi* also encapsulate the slower rhythms of a year. (Gusinde 1937b:1447–1450 listed eight seasons based on Bridges' dictionary—see also Vallejos Silva 2009 on the subject of time among the Yagan.) Thus, *čīyimba* is the season for building nests, *tāmana* for laying eggs, *čgaiaŋgūta* for hatching, and *lākösdāra* when nests contain empty shells (January). *Čgaiaŋgūta* is also the season for ripe *auačix* fungus and *dönara* when they fall from the trees (see Table 7). Moreover, *čīyāgörana* is the season when the bark loosens, *hākūa* for making spring canoes, and *tāmata* or *āmatatāmata* when the bark closes tightly upon the trees (March). *Iūan* is the time when older crabs carry the younger, *čīiūaiella* the time after they have separated. These words capture and materialize a rhythm of time and life, and—whether informed by the movement of the sun, the amount of beach uncovered during a tide, bird nesting, the bark of the evergreen Magellan's beech (*Nothofagus betuloides*), or the snowy, overcast, dull weather prevent in the late autumn *(hauwölāmūka*)—through names emphasizing temporal qualities, these beings and things are made more prominent and meaningful in the Fuegian environment. These concepts—in addition to those pertaining to directions discussed above—are integral parts of an environmental knowledge that mostly remains intangible. Unfortunately, they are also part of a conceptual diversity among hunter-gatherers that is about to vanish (cf. Brenzinger 2007; Harrison 2007).

Conclusion: Dictionaries Are Important Archives of Environmental Knowledge

The comparative word frequency analysis of Bridges' and Aasen's dictionaries identified clear topical areas related to where people lived and worked: the coastal environment in Tierra del Fuego (BD) and the farming environment in Norway (AAD). They concern homesteads and loci of the most important resources—particularly those related to sustenance. These were places invested with time, work, and energy, to secure what was needed and desired in lifestyles unfolding in the respective regions—and these are places that often are visible in archaeological records—as shell middens in Tierra del Fuego (see Fig. 2; e.g., Piana and Orquera, 2010; Zangrando 2018), and as cultural deposits ("farm mounds") or other traces of rural settlements and farming in Norway (e.g., Bertelsen 1979; Iversen and Petersson 2017). For AAD, we also identify seasonal economies that complemented farming and were important in case of crop failures: fishing and logging.

Within a language, we can—to certain extents—identify important landforms and environmental niches through the distribution of words in the vocabulary: it tends to be overflooded with terms referring to peculiar things and beings, actions, and habits belonging to places that were particularly important for the speakers' lifestyle (see also Lars-Gunnar Larsson's [2018:181–209] analysis of the content of an eighteenth-century Saami dictionary). However, the deeper analysis of BD displays the Fuegian seascape as a messy web of paths crossing sea, shore, and land, rather than a set of confined and well-defined spaces with only endemic things and beings (cf. Ingold 2011a, 2016). Indeed, most beings, things, and actions imply motion and movement. Regardless, the marine lifestyle evolved mostly on the shore and in the canoe. The adjacent areas—beach, intertidal zone, and shallow waters close to shore—are particularly rich in words that illuminate the intimate knowledge the Yagan possessed about seascapes, supported by a rich vocabulary attending to the marine fauna that also points outwards, toward life in and on the sea. Not surprisingly, many words pertain to skills required in seafaring (navigation, weather)—*canoe* being used very frequently in the translations. Yet, the "canoe environment" is not confined to the sea—it has many entanglements on land.

This study has looked at the landscape level, seeking to balance the account between the linguistic information provided by the dictionary and issues pertaining to archaeological studies of marine lifestyles. Given the resemblance between words and archaeological objects, we positively confirm that the dictionary can complement archaeology, including historical archaeology and landscape archaeology.

Digitizing the dictionary has made it possible to carry out various studies addressing different topics relevant to archaeology, linguistics, and other disciplines. Looking forward, we hope to see more systematic studies of the ethnographic content in the dictionary. For instance, it would be interesting to "dig" into material culture in the dictionary, applying the methodology Fiore and colleagues (2014) developed for studying ethnographic photographs. Swensen's (2014) study of foraging technology is a notable example of studies of material culture in the dictionary, and such studies will be facilitated in the future with a digital version of the dictionary.

Far from being repositories for dead or near-dead languages pinned down under the rule of occidental, masculine missionaries, ethnolinguistic dictionaries are valuable sources for knowledge, joy, and contemplation. If we think about them only as fossil records that never belonged to living speech communities, we risk doing more harm than justice. Moreover, we tend to become forgetful that we should not judge the content by its cover: it is the words and the wisdom within them that matters. And these sleeping giants can say much about the intricate and many-sided relationship between humans and their other-than-human surroundings.

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Data Availability The data that support the findings of this study are available from the corresponding author upon reasonable request. The digital version of Thomas Bridges' Yagan-English dictionary will be made available online after the final information has been added.

Declarations

Ethical Approval This article does not contain any studies with human participants or animals performed by any of the authors.

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