The Collecting and Sharing of Knowledge of Water-Related Place Names in Tokyo

by

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Abstract

March 11, 2011, 14:46 Japan Standard Time. This was the moment that marked the beginning of what is now known as the "2011 Tōhoku earthquake and tsunami," a catastrophe that brought about devastation throughout many regions in Japan, most notably in the north eastern region of the main island of Honshuu, and resulted in the loss of thousands of lives and the displacement of even more. While the earthquake and the subsequent tsunami were unavoidable, they were not entirely unforeseeable: similar disasters in the region have occurred in the past. People in Japan from past generations carefully recorded episodes of these catastrophes. This recorded information was meant to be passed onto future generations so that the knowledge and memory of past disasters will be preserved and be applied to the many aspects of Japanese society, so that the loss of lives and damage to towns and cities can be kept at a minimum in times of earthquakes and tsunamis. Not only was this knowledge archived in ancient texts and chronicles, but also embedded into infrastructure and, at a more subtle level, place names.

However, this knowledge became "invisible" with the passage of time. This memory of past catastrophes became forgotten not as a result of the loss of the knowledge itself—much of the infrastructure and place names embedded with memories from past generations still exist—but the loss of awareness of this vast library of information, information that is literally peppered across the landscape of Japan, information that is in plain sight yet invisible.

In this thesis, I will explore how this lost memory can be resurrected, preserved, and shared. I will begin with a close examination on where and how knowledge from generations past was weaved into Japanese society, into its culture, literature, mythology, infrastructure, and how this knowledge can be interpreted through collaboration and interdisciplinary research. I will then explore how this knowledge can be (re)captured, archived and shared by using digital tools to reinterpret and visualise ancient knowledge, and to present this knowledge in a format that is comprehensible to modern-day people.

Ancient knowledge on earthquakes and tsunamis in Japan's past is as relevant and important then as it is now. It is imperative that this knowledge be made known and not to be forgotten again.

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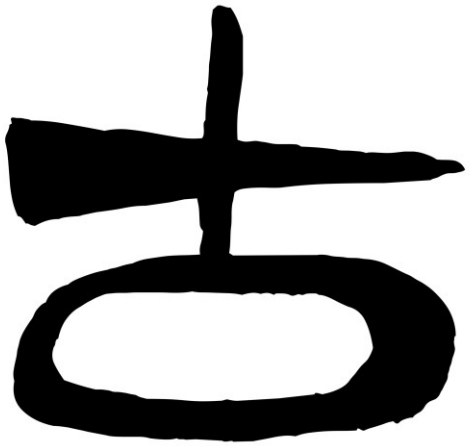

古
pronounced “inishie”
meaning “ancient times”, “antiquity”
the time where concepts in this paper originated from

Where the plates converge

According to Japanese mythology, earthquakes are caused by a giant catfish or “Ōnamazu” that lives in the mud under the Japanese islands. When it thrashes about earthquakes would occur (Namazu (Japanese mythology) 2016).

Figure 1.1 “Namazu-e” or catfish motif earthquake art

A catfish is portrayed in figure 1.1 as the culprit of the Ansei Edo Earthquake of 1855.

The Japanese archipelago is situated above the Philippines Sea Plate, the Amurian Plate, the Okinawa Plate, and the Pacific Plate. The interactions between these plates is the main cause of many natural disasters in Japan, including earthquakes, tsunamis, and volcanic eruptions (Geology of Japan 2016). The Great Kantō earthquake (関東大震災 Kantōdaishinsai) of 1923, the Great Hanshin earthquake (阪神・淡路大震災 Hanshin Awajidaishinsai) of 1995, the Chuuetsu earthquake (中越地震 Chuuetsujishin) of 2004, the Tōhoku earthquake and tsunami (東日本大震災 Higashinihondaishinsai) of 2011, Mount Ontake eruption (御嶽山噴火 Ontakesanfunka) of 2014, the Kumamoto earthquakes of 2016

(熊本地震 Kumamotojishin) are but a few of the natural disasters that occurred in the last 100 years in Japan.

People in ancient Japan experienced earthquakes and tsunamis just as present-day Japanese do. They went to great lengths to record information about the disasters, as well as damage and casualties. While there are records that did not survive through natural disasters, social upheavals, or were simply forgotten through generations, there are records and archives researchers can still benefit from (Hirakawa 2011).

In addition to written records—governmental documents, chorographical records, chronicles—the ancient Japanese preserved this knowledge in various media for future generations to interpret and understand. Japanese mythology, literature, infrastructure, and name places are embedded with ancient knowledge that have sadly become "invisible" with the passage of time—gone unnoticed even when viewed in plain sight—in the name of economic and social development (Hirakawa 2011).

The recent 2011 Tōhoku earthquake and tsunami—a disaster that resulted in over 11,000 aftershocks and brought about over 18,000 casualties—became the catalyst that revived the awareness of this lost knowledge of the past back to the present (2011 Tōhoku earthquake and tsunami 2016). Mass media made possible for news of this catastrophe to be shared in real-time across the globe. Social media platforms, most notably Twitter and YouTube, gave the public the power to transmit information in real time to anyone watching and listening. Ground-level images of buildings shaking within and without, of structures collapsing, of fires breaking, of people running amok in confusion in metropolitan centres, of people desperately running toward inland or for higher grounds in cities along the coastline of north-eastern Japan, as well as aerial

images—taken from the vantage point of cameras in helicopters—of sediment-darkened tidal waves hitting the coastline and sweeping relentlessly inland, taking with them objects animate and inanimate, of billowing pillars of smoke emanating from burning structures from areas immediately below to those along the horizon were viewed in real time.

There is great significance to the transmission to these images. As Professor Tanikawa Akihide (谷川 彰英) of Tsukuba University (筑波 大学) noted: While the Tōhoku region has faced large earthquakes and tsunamis of similar scale and devastation in the Meiji and Showa eras, this is the very first time in Japanese history where the people of Japan actually witnessed and were shocked by the disaster via television in real time (2012, p.3). The transmission, of course, was not limited to within Japan only. It was broadcast worldwide. The physical devastation of the tsunami rippled through screens and monitors, leaving in its wake equally deep social and psychological devastation.

In addition to regular news programs following the disaster, earthquakes and tsunami became one of the popular themes on Japanese television shows, ranging from documentaries to "variety shows." Given the long history and frequency of disasters in Japan, the topic of earthquakes and tsunamis is no stranger to Japanese television programming. However, with the help of popular TV shows, the notion of the occurrence of the 2011 Tōhoku earthquake and tsunami and other disasters in recent history as phenomena that have been forewarned by historical records and knowledge—literally "hints" left by previous generations—was brought to the attention of the general public.

To say that it had to take a disaster with the scale as large as the 2011 Tōhoku earthquake and tsunami in order to bring such warnings and records to the public's

attention is really an understatement. For years, many people from enthusiasts to experts have conducted studies in earthquake associated history, sociology, and folklore.

The proper understanding, interpretation, and sharing of this information are vital today as they were when the ancients made use of this information and knowledge. On an individual scale, it could make the difference between surviving a tsunami and perishing; on a societal scale, it could mean the difference between building safe infrastructure and living environments, and creating vulnerable conditions susceptible to natural disasters. This information, when properly understood, provides narratives about the earthquakes and tsunamis of the past, as well as vital knowledge for survival in the present and the future.

I will begin this thesis by examining the "forgotten knowledge" that resurfaced in the wake of the 2011 Tōhoku earthquake and tsunami, and its connections with and significance to modern day Tokyo. I will explore where this forgotten language is hidden: in street names, in district names, clearly visible in plain sight yet invisible to most residence of Tokyo, including myself. I have lived in Tokyo for 3½ years, and other parts of Japan for another 4 years. During that time, I saw place names simply as identifiers of the respective locations, never considering how they came to be, not realising the information they encapsulated.

I will then explore how this knowledge can be captured/collected, organised, shared, and generate interest and discussion to ensure that this knowledge can be preserved for future generations.

In addition, I will discuss how digital humanities can be the cohesive element that can further interdisciplinary research in this study. I constructed a prototype digital map,

a map that leverages on geographic information system (GIS) based technology and mobile device usage, to demonstrate this.

Finally, I will conclude with proposals that could be potential "next steps" beyond this thesis, steps that can take the thesis onto a PhD or collaborative projects.

Including this opening chapter, I have created twelve short chapters that hold together the concepts of this thesis. Each theme is encapsulated in a "Kanji," a Chinese character used in Japanese, which appears in the beginning of each chapter. I will also provide a brief explanation of each Kanji.

Where disciplines converge

This thesis speaks to the importance of interdisciplinary scholarship and demonstrates that Science and Humanities are not separate disciplines: they are part of a disciplinary continuum. This is done so by examining the theory of data derived through scientific research and data from historical archives are different languages that convey the same information in terms of Japanese earthquakes and tsunamis. The thesis also speaks to the importance of crowd-sourced based research and projects. I have deliberately used Wikipedia as one of the sources of information to exemplify the value of such research and information-sharing.

Using this thesis, I call for the attention of educators of Japan. The "forgotten knowledge" which I will discuss must be made known and dispersed at an earlier stage of education. Education is a key factor that can contribute toward the survival of this knowledge.

礎

pronounced “ishizue”
meaning “foundation”
this chapter provides the foundation necessary for understanding this thesis

Japan – A Geographic Overview

Japan consists of 6,852 islands (Japan 2016). The four main islands are (from northeast to southwest) Hokkaidō (北海道), Honshuu (本州), Shikoku (四国), and Kyuushuu (九州). The area that saw the most devastation from the 2011 Tōhoku earthquake and tsunami are the three northeastern prefectures in Honshuu facing the

Pacific Ocean: Iwate (岩手), Miyagi (宮城), and Fukushima (福島).The three prefectures are part of the region known as the Tōhoku region (東北地方). This is the area I will focus on in the initial part of this thesis. Tokyo, the capital of Japan, is situated in the Kantō region (関東地方), on the southeastern part of Honshuu. This is the area whose place names I will discuss in detail.

Figure 2.1: Map of Japan

Figure 2.2: Map of Kantō

To give context to where these areas are situated in relation to each other, the Fukushima Daiichi Nuclear Power Plant (福島第一原子力発電所, Fukushima Daiichi genshiryoku hatsudensho), where the "Fukushima Daiichi nuclear disaster" occurred as a result of the 2011 Tōhoku earthquake and tsunami, is situated about 220 km north-northeast of Tokyo. For comparison, the distance between Edmonton and Calgary is approximately 280 km.

Note on names of Japanese persons

In this thesis, all Japanese names will be given in the traditional Japanese order: Family Name, Given Name. For example, the name of the first Shogun of the Tokugawa Shogunate will be written as Tokugawa Ieyasu in Romanised Japanese (known as "Rōmaji"), and Tokugawa Ieyasu 徳川家康 in Japanese. (English names will be given in the order of Give Name, Family Name.) In addition, phonetic guides will be given above Japanese names in Rōmaji as seen in this example. It is common practice to provide phonetic guides in Japanese Kana (phonetic script) for names written in Japanese, or more specifically, for Chinese Characters or "Kanji" (kanji 漢字). For example, "Tokugawa Ieyasu" would be written as とくがわいえやす 徳川家康.

Basic understanding

The information in this chapter provides the basis needed to understand the concepts and ideas in this thesis.

For example, a basic understanding of the geography of Japan is necessary to grasp the significance of the location of the Tōhoku region in relation to the epicentre of the 2011 Tōhoku earthquake and tsunami; a basic understanding of Tokyo and its proximity to Tokyo Bay is necessary to appreciate how the place names in the city provides clues to its past and present relations with water.

Establishing and clarifying the order in which names of Japanese people will be presented are also crucial. I have chosen to present Japanese names in the traditional "Family Name, Given Name" order so that names will not appear awkward when written in Kanji. Writing "Tokugawa Ieyasu" in Kanji in the western order of "Given Name, Family Name" would be as inappropriate as writing *Shakespeare William* in English. Furthermore, this will eliminate any confusion when referring to the different parts of a name presented in both Rōmaji and Kanji.

道
pronounced "michi"
meaning "road", "way"
ancient roads that lead to safety
renewed ways of understand old knowledge

Encoded in the infrastructure

In the wake of the 2011 Tōhoku earthquake and tsunami, a number of peculiarities along the Pacific coast of the Tōhoku region came to the attention of researchers and the general public that cannot be simply dismissed as coincidental: the dividing line between the flood zones and safety zones that coincide with certain

roads/highways and landmarks; shrines that remained undamaged in areas of complete devastation. These phenomena became the affirmation—or more accurately, the *reaffirmation*—of long held theories that infrastructure built by the ancients were more than mere physical structures. This infrastructure *is* the information about the tsunami in this region, information accumulated from previous episodes of devastation. An accurate understanding of this information is crucial, because it leads to greater awareness of the potential degree of damage the tsunami could cause in the region.

The ancient highways and post stations that remained dry

Just as the ancient Romans constructed roads that formed a network that connected many regions of their vast empire, so did the Japanese (Roads Helped Romans Rule 2016) (The roads of Roman Italy 1999). The "Edo Five Routes" (五街道 Gokaidō)—Tōkaidō (東海道 Tōkaidō), Nakasendō (中山道 Nakasendō), Kōshuu Kaidō (甲州街道 KōshuuKaidō), Ōshuu Kaidō (奥州街道 Ōshuu Kaidō), and Nikkō Kaidō (日光街道 NikkōKaidō)—are the best known "ancient highways" in Japan. Edo is one of the many Japanese dynastic periods. The Edo period was founded by Tokugawa Ieyasu (徳川家康 Tokugawaleyasu), and lasted from 1603 to 1868 (Edo period 2016).

Figure 3.1: Map of the Edo Five Routes

The Edo Five Routes, along with other official and unofficial routes, the earliest of which date back to the 7th century, form a network of roads throughout Honshuu (Honshuu 本州). The oldest official route in Japanese history, as recorded in "Nihon Shoki" (NihonShoki 日本書記) or "The Chronicles of Japan" in English, is "Takeuchi Kaidō" (TakeuchiKaidō 竹内街道), which connects present-day Osaka Prefecture (Ōsakafu 大阪府) and Nara Prefecture (Naraken 奈良県). Takeuchi Kaidō

dates back to the year 613, approximately one century before Tokugawa Ieyasu's grand project on connecting and making the Five Routes official (竹内街道 2016). As outlined on "Edo Five Routes" page on Wikipedia:

> The various roads that make up the Five Routes existed in some form before becoming an official set of routes. Tokugawa Ieyasu began work on the roads shortly after becoming Shogun in 1600. The initial step of the official creation of the Five Routes was the Shogunate taking government control of the Post Stations along the existing routes. The post stations, before any official attempt to create a transportation network, worked together to create a courier system, as well as provide places for travelers to rest. The Shogunate began to require that these stations give preferential treatment to those on official business, or be forced to cease activity. In the 1640s, Shogun Tokugawa Iemitsu closed down all but the necessary stations. From that point until the end of the Edo Period, the system of Post Stations would see very little change (Edo Five Routes 2016).

This network of highways gave the Shogunate efficient access to regions beyond the capital, Edo, which is present-day Tokyo. In addition, there were also specific purposes behind the construction and design of these routes. Kōshuu Kaidō (甲州街道), for example, functioned also as the escape route for Tokugawa Ieyasu. While the route and its associated post stations existed prior to the Edo period, it was given proper maintenance after becoming one of the five official routes under Tokugawa Ieyasu. The route was carefully outfitted and maintained so that Tokugawa Ieyasu could escape with loyal clans and troops fitted with firearms should Edo Castle fall. Plants/vegetation along the route were grown specifically to serve as a food source in case such is needed during the escape. In addition, the route also functioned as an "attack route" for Tokugawa Ieyasu and his troops to retake Edo Castle should it fall (甲州街道 2016).

One important point that should be brought to attention is that Tokugawa Ieyasu was not the person who initially built these ancient highways, per se, but rather built upon,

improved, and systemised these routes. To cite from an example from Japan's closest neighbour, China, I would like to bring to attention one of the most ambitious projects in history: the construction of the Great Wall of China. The first emperor of China, Qin Shi Huang, who was the very first person to unite all the states in China, did not initiate the construction of the Great Wall ground up, but rather, connected and built upon existing wall sections, creating a unified wall (Great Wall of China 2016). The significance here is that both the ancient highways that criss-cross Japan and the Great Wall that protects the northern boarders of China were built upon infrastructure and knowledge created by previous generations, knowledge that was remembered, understood, and used.

During the rescue and restoration efforts after the 2011 Tōhoku earthquake and tsunami along the northeastern coast of Honshuu, the area most devastated by tsunami, some long forgotten facts surfaced about Ōshuu Kaidō (Ōshuu Kaidō 奥州街道), one of the Edo Five Routes, as well as Hama Kaidō (Hama Kaidō 浜街道). Hama Kaidō, an official route that was not one of the Edo Five Routes, and Ōshuu Kaidō were both segments of a route that ran from Edo all the way up to present day Aomori Prefecture (Aomoriken 青森県), the northern most prefecture in Hōnshuu.

Both Ōshuu Kaidō and Hama Kaidō run a few kilometres inland along the northeastern coast. While the majority of Honshuu's northeastern coast area was buried under the tsunami that followed the earthquake, the ensuing waves curiously stopped short of both routes. It is clear that these ancient routes were strategically designed and placed not only simply as roads for ancient travellers. The routes are part of the

infrastructure encoded with ancient knowledge that clearly indicate the limit of the waves (Hirakawa 2011).

In an urgent presentation made on April 13, 2011, one month after the 2011 Tōhoku earthquake and tsunami, visiting professor at the Center for Northeast Asian Studies (Tōhoku a j i a kenkyuu s e n t a a 東北アジア研究センター) of Tohoku University (Tōhokudaigaku 東北大学) and president of Miyagi Gakuin Women's University (Miyagigakuinjoshidaigaku 宮城学院女子大学), professor Hirakawa Arata (HirakawaArata 平川新), who is a specialist in the history of the Edo Period and longtime advocate for the search and preservation of lost historical documents, revisited two major disasters in the same area and presented their corresponding statistics. The tsunami associated with the "869 Sanriku earthquake"—known as "Jōgan Jishin" (Jōganjishin 貞観地震) in Japanese—caused the deaths of over 1,000 people in "Tagajō" (Tagajō 多賀城), a fort that was originally built in 724, located in present-day Takajō City (多賀城 2016) (Hirakawa 2011). The tsunami associated with the "1611 Sanriku earthquake"—known as "Keichō Sanriku Jishin" (KeichōSanrikuJishin 慶長三陸地震) in Japanese—caused a total of 1783 deaths in the Sendai area, as well as numerous deaths in Morioka Domain (Moriokahan 盛岡藩), an area that stretches from the central region of present-day Iwate Prefecture to the eastern part of present-day Aomori Prefecture, and Tsugaru Domain (Tsugaruhan 津軽藩), in present-day Aomori Prefecture (盛岡藩 2016) (弘前藩 2016). A domain, or *han* (han 藩) in Japanese is the "historical term for the

estate of a warrior after the 12th century or of a [powerful feudal lord] in the Edo period and early Meiji period" (Han system 2015).

Hirakawa pointed out the facts that (a) in both earthquakes, the respective flood zones were almost identical to the 2011 flood zones, and (b) both Ōshuu Kaidō and Hama Kaidō underwent maintenance in the 1600s, suggest that the routes and post stations restored and maintained in early Edo Period were done so to avoid the flood zones. In other words, the experience gained from the two major disasters was applied to the construction of roads and towns. The routes and post stations functioned as the demarcation that separated the "flood zone," the area east of the route, from the "safety zone," the area west of the route. However, since the Meiji Period, urban and residential developments progressed along the northeastern coast; memories of the disasters were forgotten (Hirakawa 2011).

Ancient roadways and infrastructure embody ancient memory and knowledge that became less interpretable to, and eventually forgotten by modern-day people. Just as earthquakes and tsunamis are not limited to the Tōhoku region, neither are memory/knowledge embodied roadways and infrastructure. As we shall see, this ancient knowledge was embodied in many aspects of Japan, from tangible physical structures including shrines, to intangible cultural and sociological elements including place names and mythology.

社

pronounced "yashiro"
meaning "shrine"
a place of protection, a manifestation of ancient knowledge

"Shrines are built at places that evade tsunamis."

Professor Imamura Fumihiko, Tohoku University

Different languages, same narrative

In the following chapters, I will explore evidence that support the theory of ancient knowledge and scientific data are, in fact, different languages that convey the same information about past and present earthquakes and tsunamis in Japan.

Markers of safe places – deities on guard; shrines parting waves

In Fukushima Prefecture (福島県 Fukushimaken)—where the ill-fated Fukushima Daiichi Nuclear Power Plant (福島第一原子力発電所 FukushimaDaiichigenshiryokuhatsudensho) is located—an assessment was conducted from March to May of 2011 along the coastal area of the prefecture where 82 shrines are situated. The majority of these shrines miraculously remained undamaged after the 2011 Tōhoku earthquake and tsunami.

It has long been believed that shrines, 神社 jinja in Japanese, are some of the safest places during earthquakes and tsunamis. In spite of the devastation along the northeastern coast of Honshuu during the 2011 tsunami, the majority of shrines in that area remained beyond the reach of the tsunami, a fact that promptly caught the attention of the Japanese mass media. Researchers who conducted post-tsunami investigations and damage assessments along the Tōhoku coast were able to connect their historical research on tsunamis in the area with folklore known to the local residents who survived by taking refuge at the safest place in area: shrines.

When investigators entered the area soon after the tsunami subsided, they witnessed a surreal landscape: in an area where all was left of houses were their foundations, where ships were washed ashore, where trains were derailed and bent like twigs, the shrines stood. Hauntingly. Untouched. Even in cases where the tsunami progressed as far into the precincts of some of the shrine sites, the main shrine buildings (社殿 shaden in Japanese) remained untouched by the waves. Even more disturbing was the fact that when investigators compared the "tsunami line" that divided the flood zone and the safe area, the majority of the shrines formed a line that correlated with the "tsunami line." This suggests that, similar to ancient highways discussed in the previous section, the very locations of the shrines were also chosen by the ancients with the intention of demarcating the "danger zone" from the "safe zone" (いにしえからの警告 2012).

While a small number of the 82 shrines were damaged by the tsunami, according to city and town records, these damaged shrines were likely built in fairly recent times. In comparison, records of actual construction dates and related information of the remaining majority of shrines do not even seem to exist. Furthermore, according the records in the region's book of history and geography, "Ōsōshi" (奥相志 Ōsōshi, 1857), which dates back to the Edo period, the origins of these shrines were unknown even back at the time when "Ōsōshi" was written. This strongly suggests that the shrines were built in the far distant past. Of the very few surviving shrines *with* an existing documented history, some of them seem to have been constructed as early as the year 807, over 1,000 years ago (Takase 2011).

Tohoku University Professor Imamura Fumihiko (今村文彦) explains that the ancients must have observed the maximum reach of the waves inland, and determined "safe locations" within the area. Upon these safe locations, the ancients built shrines (いにしえからの警告 2012). Imamura is a civil engineer whose "field of interest include tsunami engineering, coastal and river engineering and disaster science. He was among those [the Japan Broadcasting Corporation] designated as experts on disaster response during the 2011 Tōhoku earthquake and tsunami" (Imamura 2016).

Another researcher, Professor Tanikawa Akihide (谷川彰英), non-fiction writer and retired Vice President of Tsukuba University (筑波大学), shares a similar view. According Tanikawa, for over 1,000 years, shrines that were originally built in the distant past but destroyed by tsunamis were reconstructed further inland on higher ground, out of the subsequent tsunamis' reach. Historical records show that people who took refuge at these shrines were saved (Tanikawa 2013). The same stood true for the 2011 tsunami. Many survivors shared very similar stories: that they grew up learning the local folklore of shrines being the safest place when a tsunami approaches; that they are grateful for the wisdom and knowledge passed down from their ancestors (いにしえからの警告 2012).

Just as there were people who knew of this knowledge, sadly, there were many who did not.

In order to further illustrate the significance of information embedded within shrine legends, I will take a more in-depth look into 2 particular shrines, Hanabushi Shrine and Namiwake Shrine, both of which are located in coastal area of Miyagi Prefecture, one of the worst hit regions.

"The shrine, sunk; the deity, relocated"

Hanabushi Shrine (Hanabushijinja 鼻節神社) is situated in Shichi-ga-Hama Cho (Shichi ga HamaCho 七ヶ浜町), Miyagi Prefecture (Miyagiken 宮城県). The shrine is built on a hill, facing Sendai Bay (Sendaiwan 仙台湾). (The geographic significance of the name "Hanabushi" itself will be examined later in the chapter.) The god of Hanabushi Shrine is worshiped as the protector of the sea. Within the shrine precinct stands a "hokora" (hokora 祠) or "miniature shrine," for the diety "Ōne Myōjin" (Ōne Myōjin 大根明神) (Hokora 2009) (波分神社 2014). The land on which Hanabushi Shrine now stands was originally connected to a headland that stretched out to the Pacific, where a different shrine called Ōne Myōjin Shrine once stood, and where the "go-shintai" (goshintai 御神体) of the deity Ōne Myōjin was worshiped. In Shinto, "go-shintai" is a sacred body within which a deity lives. The Ōne Myōjin go-shintai was believed to be a stone (神体 2016) (いにしえからの警告 2012).

When the 869 Sanriku earthquake struck, the headland sank and with it, Ōne Myōjin Shrine, too, sank into the ocean after the subsequent tsunami. This "Legend of the Jōgan Tsunami" has it that the location of the shrine was changed to its current location—a location deemed safe from tsunami—and named Hanabushi Shrine after the destruction of Ōne Myōjin Shrine. Iinuma Yuugi (IinumaYuugi 飯沼勇義), author and historian whose research includes large-scale tsunami centred on the Sendai Plain (situated in the Tōhoku region)

in the past 2000 years, offers, “Legends about tsunamis are highly credible. The big question here is what these legends are warning us about” (いにしえからの警告 2012).

Researchers put the Legend of the Jōgan Tsunami to the test, and investigated the undersea area in question. What the investigation turned up was nothing short of a legend itself: About 8 km off the coast of Shichi-ga-Hama Cho, investigators discovered a rock on the ocean floor that is believed to be the original “go-shintai” of Ōne Myōjin (いにしえからの警告 2012) (波分神社 2014).

“The shrine that parted waves”

Similar to Hanabushi Shrine, “Namiwake Shrine” (浪分神社[Namiwakejinja]) became widely known after receiving much attention from researchers and mass media as the shrine that remained untouched by the 2011 tsunami. The name of the shrine translates literally as the “wave-dividing shrine” (“nami” = wave, “wake” = divide). The shrine is situated in Sendai City (仙台市[Sendaishi]), Miyagi Prefecture. Sendai was of the major cities along the Tōhoku coast severely hit by the 2011 earthquake and subsequent tsunami.

Built in 1703, Namiwake Shrine was originally known as “Inari Shrine” (稲荷[Inari]神社[jinja]). While its original location and the actual year when the name change occurred vary according to different sources, the shrine is generally believed to have been relocated to its current location in 1835. The reason behind the choice of its current location can be traced back to the 1611 Sanriku earthquake: the tsunami that followed the

1611 Sanriku earthquake parted into two and ebbed at the current location of Namiwake Shrine (いにしえからの警告 2012) (Takemura 2011).

The deity worshiped at this shrine is the red-faced guardian deity “Fudōmyōō” (不動明王 Fudōmyōō), also known as “Fudōson” (不動尊 Fudōson). It is believed that Fudōmyōō captured the demon known as “tsunami” with his rope, slayed it with his sword, and disposed of it—an act that put an end to the life of the demon—at the location where Namiwake Shrine now stands (不動明王 2016) (Takemura 2011).

Figure 4.1: Namiwake Shrine and its associated Torii (gate) in the foreground

A “torii” (鳥居 torii) stands at the entrance of Namiwake Shrine. A torii is “a traditional Japanese gate, [red in colour], most commonly found at the entrance of or

within a Shinto shrine…" (Torii 2016). The torii at Namiwake Shrine was a new addition to the shrine prescient, made of concrete, and relatively large in comparison to the shrine itself. Takemura, Assistant Director of Kobori Research Complex Inc., commented that perhaps the red torii, embodying that red face of Fudōmyōō, facing east, scowled at the oncoming waves, and forbade them from ploughing any further (2011: p. 22).

Legends similar to Fudōmyōō slaying the tsunami demon carry great significance: they are narratives that carry forth to future generations knowledge from generations past, knowledge that can now be reinterpreted and correlated with research.

Similar to the discovery of the "go-shintai" of Ōne Myōjin off the coast of Hanabushi Shrine, Imamura's research on the 869 Sanriku earthquake provides another example of modern day research reaffirming ancient knowledge. While studying sediments brought on shore by its subsequent tsunami—the flood zone of both the 869 and 2011 tsunamis were strikingly similar—Imamura explained that there were clearly deposits brought inland by the tsunami approximately 200 m – 300 m on the ocean-facing side (east) of Namiwake Shrine, and no evidence of such beyond that point (いにしえからの警告 2012). The tsunami did not progress beyond the shrine, the shrine that parted waves.

Examples like Hanabushi Shrine with Ōne Myōjin miniature shrine within the Hanabushi precinct as well as Namiwake Shrine provide strong support towards the theory of shrines being safe places during disasters. They were built in locations known to be safe based on knowledge gained from previous generations, the same knowledge that was embedded into the design and construction of ancient highways and post stations.

If shrines and ancient highways were built based on ancient knowledge that preserved their safety, then what of other infrastructures that were built without the incorporation of ancient knowledge? In the next chapter, I will take a close look at two examples, both of which are modern-day constructions located within the earthquake and tsunami prone area in the Tōhoku region. One of the constructions was designed based on the awareness and understanding of ancient knowledge; the other without. The differences in design led to the safety of the former, and the demise of the latter.

証

pronounced "akashi"
meaning "proof", "evidence"
proof of the validity of ancient knowledge, evidence from the past and present

"...it would be difficult to conclude that the

2011 tsunami was unexpected."

Shishikura Masanobu, Active Fault &

Earthquake Research Centre

The plant that fell

In stark contrast with the shrines that remained untouched by the Tōhoku tsunami, the Fukushima Daiichi Nuclear Power Plant was so critically damaged that it was eventually shut down, a seemingly unbelievable fact. After all, the Fukushima Daiichi Nuclear Power Plant complex—a grand structure that overlooks the Pacific—dwarfs the shrines, which are quite literally shacks in comparison. Why, then, did the Fukushima Daiichi Nuclear Power Plant (commonly known as "Fukushima Daiichi") fall?

The demise of Fukushima Daiichi was due to factors not considered during the design and construction of the plant: past earthquakes and tsunamis that devastated the Tōhoku region.

The "Dawn" of Fukushima Daiichi Nuclear Plant

Tokyo Electric Power Company (Tōkyōdenryoku 東京電力), commonly known as "TEPCO," began construction of Reactor No. 1 in 1967. In that same year, "Nichiei Kagaku Eiga" (NichieiKagakuEigaSeisakujo 日映科学映画製作所), a film production company, produced the documentary entitled "Reimei Fukushimagenshiryokuhatsudenshokensetsukiroku chōsahen 黎明 福島原子力発電所建設記録 調査篇," which translates to "Dawn – A Record of the Construction of Fukushima Daiichi Nuclear Power Plant: Findings." The first two Kanjis of the title (黎明) translate as "dawn." This 25-mintue documentary captured

Fukushima Daiichi literally at its dawn, and is still available for viewing on the "Science Film Museum Incorporated NPO" web site as well as YouTube (科学映像館 n.d.).

In what was meant to record the "unfathomable wisdom of human kind connecting to the next civilization of magnificence, and the process of reaching the achievement of a grand construction," in historical irony, the documentary captured fatal flaws in the design of the plant. According to the documentary, the location of the power plant was surrounded by a tranquil countryside primarily used for farming, and that the region has experienced no major damage caused by earthquakes, typhoons, or tsunami over the past hundreds of years (黎明 1967).

I discussed about earthquakes in the Tōhoku region, including the 1611 Sanriku earthquake, a major earthquake with subsequent tsunamis that devastated that region, which from the perspective of 1967 when the documentary was made, had been a mere 356 years ago. Even if no major earthquake or tsunami related damage occurred in the region surrounding the Fukushima plant site, it would be difficult not to see the potential danger in the area, given the past catastrophes in the region.

Furthermore, the Fukushima plant site was originally a coastal plateau 30 metres above sea level that overlooked the Pacific. However, the top 20 metres of the plateau was scraped off. This was done so in order to reach the bedrock necessary for a solid foundation for the plant. This effectively placed the Fukushima plant site 10 metres above sea level (黎明 1967).

TEPCO estimated the maximum height of the tsunami that could potentially hit Fukushima Daiichi at 5.7 metres, and constructed a sea wall matching that height. The tsunami that sealed the fate of the plant was 13 metres in height, over twice the estimated

maximum (いにしえからの警告 2012). If the foundation at the site of the plant did remain at 30 metres above sea level, perhaps that tranquil countryside would not have been devastated by the 2011 tsunami.

Fukushima Daiichi was one of the many achievements during what is called the "Japanese post-war economic miracle" (高度成長期 Kōdoseichōki), "Japan's record period of economic growth between post-World War II era to the end of Cold War" [sic] (Japanese economic miracle 2016). This was a forward-moving period in Japan. Demands in resources, including power, skyrocketed. Tokyo hosted the 1964 Summer Games, no more than two decades after Japan was defeated in World War II. It was during this national upswing from which Fukushima Daiichi materialised. Japan was looking forward, onwards to the future, away from the past. However, this forward-only gaze effectively placed past knowledge and ancient wisdom out of sight.

The plant that stood

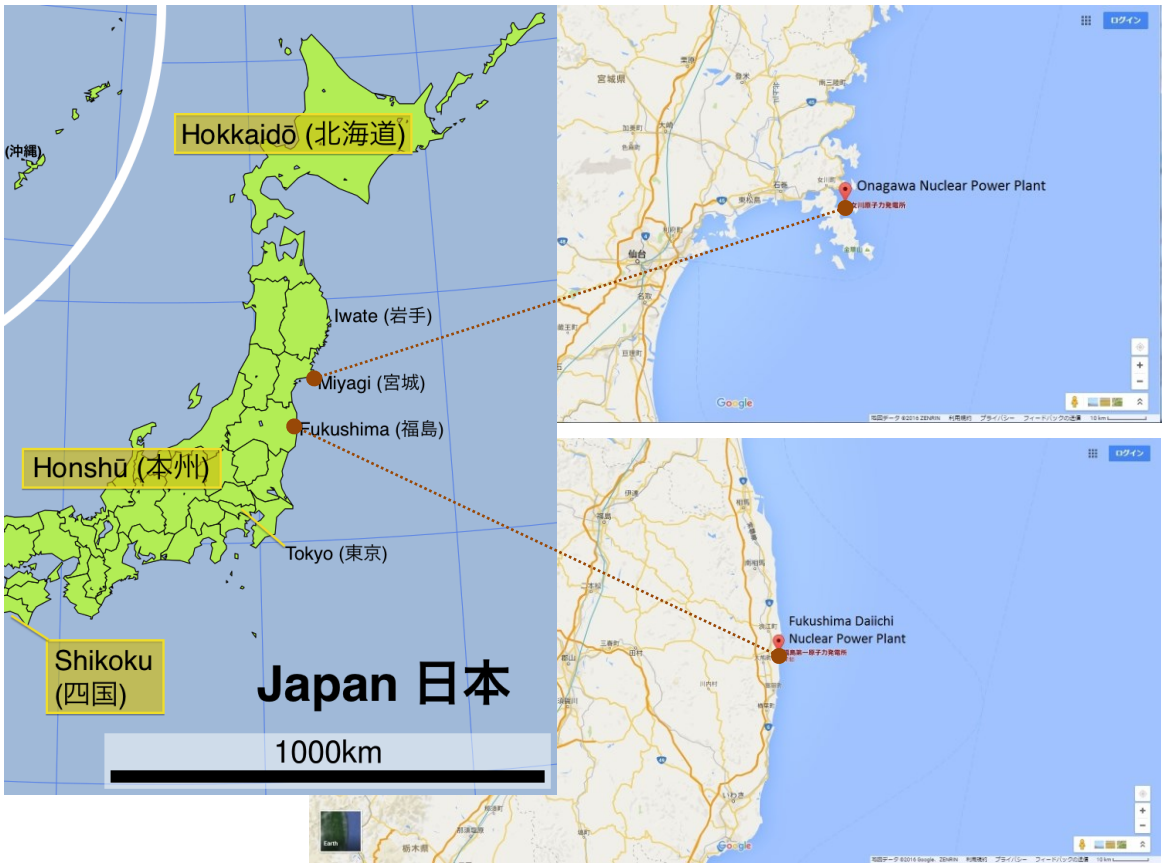

Figure 5.1: The relative locations of Onagawa Nuclear Power Plant (Miyagi) and Fukushima Daiichi Nuclear Power Plant along the northeastern Pacific-facing coast of Hōnshuu

Similar to Fukushima Daiichi, Onagawa Nuclear Power Plant (女川原子力発電所 Onnagawagenshiryokuhatsudensho), a plant operated by Tōhoku Electric Power Co., Inc. (東北電力 Tōhokudenryoku), stands on the Pacific coast in Miyagi Prefecture in northeastern Honshuu. Onagawa Nuclear Power Plant was, in fact, the nuclear plant closest to the epicentre of the 2011 Tōhoku earthquake, and was also hit by the subsequent tsunami, as did Fukushima Daiichi (Onagawa 2016) (Negishi, Nishikawa, Maeda, Watson 2011). In spite of its proximity to the epicentre, the damage at Onagawa Nuclear Power Plant was far less severe compared

to Fukushima Daiichi, located approximately 120 kilometres to the south-southwest in the neighbouring Fukushima Prefecture. In fact, local residents found refuge at the Onagawa plant, where "its gym served for three months as a shelter for those made homeless" (Maeda, Janowski, Popeski 2011). Unlike Fukushima Daiichi, Onagawa Nuclear Power Plant continues to operate today. So why did Onagawa Nuclear Power Plant stand while the more distant Fukushima Daiichi fall?

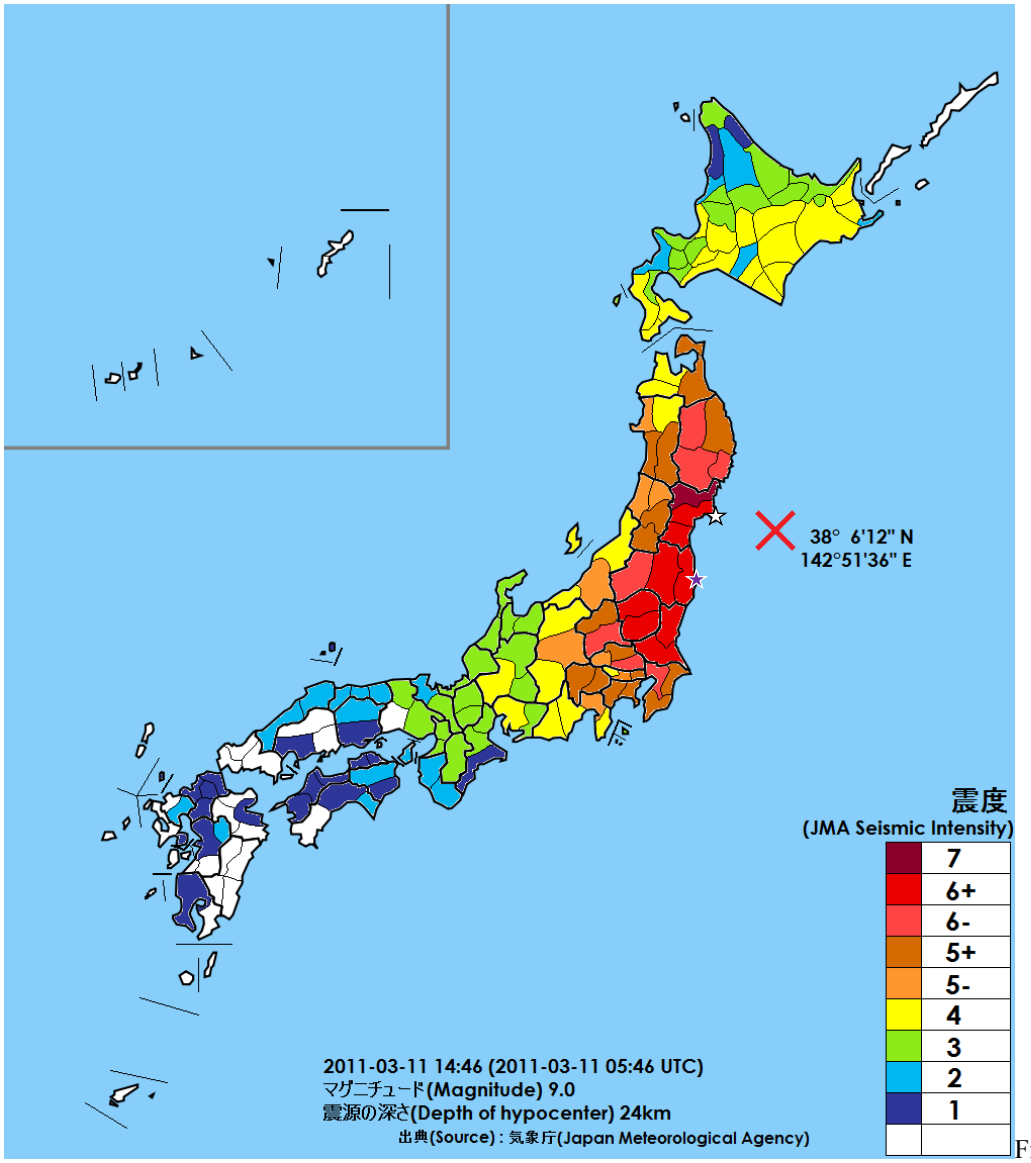

Figure 5.2: The white star marks the location of Onagawa Nuclear Power Plant; the purple star marks the location of Fukushima Daiichi Nuclear Plant; the red "X" marks the epicentre of the earthquake.

Operations at Onagawa Nuclear Power Plant began in 1984. Compared to Fukushima Daiichi, which began operations in 1971, one can argue that the overall newer design and technology of Onagawa Nuclear Power Plant are contributing factors to the better integrity of the plant. However, the decisive difference lies not only in the technology available to the respective plants at the time of construction, but also in the very principles behind the original design of the plant, a design that incorporated knowledge from ancient texts.

According to Sasagawa Toshirō (笹川稔郎), current Executive Vice President of Tōhoku Electric Power, records from ancient texts were debated upon when the initial plans for the construction of the plant were made (いにしえからの警告 2012). Although there were internal disagreements amongst the original participants of the construction project regarding the necessary "safe height" for the plant's foundation, it was decided in the end that, despite the extra cost, the foundation would be set at 14.8 metres above sea level instead of 12 metres (Woody 2012).

In an interview in 2011, Sasagawa, then manager of the civil engineering and construction unit, offered, "Considering the disasters from past tsunamis in the Sanriku region, it would be nonsense to set the foundation of the plant below 10 metres above sea level" (いにしえからの警告 2012).

When Tōhoku Electric Power began preparing for the construction of its second reactor at Onagawa, the company turned to ancient texts once again for information, and carefully examined the records of the Sanriku earthquake of 869, where they learned that the tsunami pushed 3 kilometres inland from the coastline. Tōhoku Electric Power

estimated that a potential tsunami to hit the plant would have a maximum height of 9.1 metres.

The tsunami that reached Onagawa Nuclear Power Plant was 13 metres. The plant sustained damage from the tsunami, but unlike Fukushima Daiichi, remains operational today.

In the same interview in 2011, Sasagawa explained, "At the planning stage, the company did not foresee the possibility of the tsunami actually exceeding the estimated maximum height of 9.1 metres. When dealing with nuclear power, such unexpected circumstances must, in particular, be taken in consideration. This is the point upon which the company must reflect [in view of the 2011 tsunami]" (いにしえからの警告 2012).

Although Tōhoku Electric Power underestimated the magnitude of the 2011 tsunami, the company understood the value and relevance ancient knowledge has upon the present. Aichi Institute of Technology (愛知工業大学 Aichikōgyōdaigaku) Adjunct Professor and Kyoto University (京都大学 Kyōtodaigaku) Professor Emeritus Irikura Kōjirō (入倉孝次郎 IrikuraKōjirō), who is also a member of the Earthquake & Tsunami Related Guidelines Examination Subcommittee under the Nuclear Safety Commission (原子力安全委員会 Genshiryokuanzeniinkai), explains: "The very important task we should take away [from the 2011 Tōhoku disaster] is to learn from past tsunamis, in particular, the Sanriku earthquake in the 9th century. In fact, we should really push even a little further back in time. The biggest challenge we will face from now on is how to rediscover such [ancient] knowledge" (入倉 n.d.) (いにしえからの警告 2012). It should be noted that Irikura is the 2011 recipient of the Bruce A. Bolt Medal, which "recognizes individuals who use strong-motion earthquake data and transfer scientific

and engineering knowledge into practice or policy for improved seismic safety" (Broadbent 2011).

In 2007, four years before the 2011 Tōhoku earthquake and tsunami, Imamura co-wrote and published a journal entitled "Tsunami Assessment for Risk Management at Nuclear Power Facilities in Japan," in which the authors argue that "the calculation system [for simulation of water level along the coast] should be verified by comparison of historical and calculated tsunami heights…" and that "historical earthquake-induced tsunamis" is one of the factors that should be considered as part of the tsunami assessment process (Yanagisawa, Imamura, Sakakiyama, et al. 2007).

It is clear that researchers from different backgrounds recognise how crucial knowledge from historical records can be when incorporated and applied to the design of nuclear power plants in Japan.

Warning ignored

After the 2011 Tōhoku disaster, TEPCO commented that the "giant tsunami was unexpected" (いにしえからの警告 2012).

However, in 2009, when the Ministry of Economy, Trade and Industry (経済産業省 Keizai sangyōshō) conducted an evaluation on the earthquake resistance of Fukushima Daiichi, one of the evaluation committee members referred to ancient records pertaining to the 869 Sanriku earthquake, and warned of the potential dangers from tsunamis.

Okamura Yukinobu (岡村行信), Director of the Active Fault & Earthquake Research Centre (活断層・地震研究センター), National Institute of Advanced Industrial Science and Technology (AIST) (産業技術総合研究所), questioned why the record of the 869 Sanriku tsunami—a tsunami of substantial magnitude that caused severe damage—was not taken into consideration.

In a phone interview, TEPCO revealed that also in 2009, the company conducted an investigation on Jōgan tsunami along the coast of Fukushima Prefecture, but "did not obtain any positive evidence on the occurrence of any giant tsunami" (いにしえからの警告 2012).

Contrary to TEPCO's statement, Shishikura Masanobu (宍倉正展), a researcher at the Active Fault & Earthquake Research Centre, AIST, explains that intervals in the sedimentary deposits from the Tōhoku region can reveal the cycles of tsunami. Based on the deposits, it is understood that large-scale tsunamis occur in 500 – 1000 year cycles in the Tōhoku region. Shishikura further argues that the urgency of the conditions can be seen from the sedimentary data, and it would be difficult to conclude that the 2011 tsunami was unexpected: it was, in fact, a predictable part of the tsunami cycle (いにしえからの警告 2012).

Past knowledge, present day relevance

In the cases examined in this thesis so far, we can see the relevance of ancient knowledge in the context of present day Japan, as Hirakawa, Iinuma and other researchers advocate. We have seen how the incorporation of this knowledge made it possible for infrastructure to endure and survive large-scale catastrophes. The contrasting fates of Onagawa Nuclear Power Plant and Fukushima Daiichi speak to the importance of both the understanding and application of this knowledge. We have also examined examples of how people of past eras incorporated their knowledge in both the tangible—highways, post stations, shrines—and in the intangible—legends, folklore, place names—as a means to transmit this knowledge to future generations. Research conducted by Shishikura and Imamura provide strong support towards the theory of historical records—knowledge from the past—and geological data—knowledge from the present—providing the same information only in different languages, the former as humanistic, and latter as scientific. In the following chapter, I will take a deeper look into place names, and how the intrinsic nature of the Japanese language itself carries this knowledge in place names.

名

pronounced “na”
meaning “name”
name, a key to the past, a keeper of stories, a repository of information

“Of all available data on the Japanese language, place names are the oldest.”

(Kagami Akikatsu, Place Names and Kanjis)

Unlocking secrets hidden in words

The examples of "embedded" ancient knowledge discussed so far are of knowledge incorporated or encoded into the design of infrastructures. The same can also be found in place names. The key to extracting this knowledge from names requires an understanding of two intrinsic features of the Japanese language: "Kanji" (漢字[kanji]) and Japanese homonyms (同音異義語[dōonigigo]).

Logograms from China

A Kanji is a Chinese character. "Chinese characters are logograms used in the writing of Chinese and some other Asian languages," including Japanese, Korean, and Vietnamese (Chinese characters 2016). Each character has "shape," "sound," and "meaning" (Logogram 2016).

For example, the Kanjis for the word "Kanji" are "漢字." "漢," pronounced "han" in Chinese, is the name of the "second imperial dynasty of China" (Han dynasty 2016). "字" means "word." The two Kanjis together mean "words of Han."

Encapsulated in a name

How and why do we name places? Just for the moment, without making any reference to any historical documents, let us consider the name "Tokyo." In Japanese, Tokyo is written as "東京." What can we extrapolate from just the two Kanjis that make up the name Tokyo?

"東" (pronounced "higashi/tō") means "east"; 京 (pronounced "miyako/kyō") means "capital." Based on the meaning of the individual Kanjis, the name could be interpreted as "eastern capital." Does this imply that at some time in the past the capital was somewhere west of Tokyo? If so, why was the capital moved eastward? Was the capital relocated for economic or political reasons or because of natural disasters? Or does "eastern capital" imply that a "western capital" also exists?

Such is the power of Kanji, a logogram. By extension, combinations of Kanjis—as in the case of Tokyo—can convey substantial information. If we look at a Japanese place name not simply as an identifier of that location, but as a window, through which, the history, geography, tradition, and folklore can be seen, we can potentially gain considerable knowledge of that place simply by starting with the question, "What is the meaning of this place name?"

Known as the father of Japanese folklore, Yanagita Kunio (Yanagita Kunio 柳田國男) explains that a place name in essence is a "sign" or "mark" (fugō 符号) used between two or more people to identify that place. Tanikawa states that place name is a kind of language indispensible to human communication. He further argues that a name place that comes

into existence in a natural manner must have become so as a result of an unspoken decision made by that society. Therefore, there can be no doubt that a place name must be one that distinguishes a specific location from other locations, and encapsulates the characteristics of that specific location in the most appropriate manner possible (柳田國男 2016) (Tanikawa 2012).

We, in fact, have encountered two such examples in the previous section: Hanabushi Shrine and Namiwake Shrine. The origin of the name "Hanabushi" (variant of "hanappashi," "はなっぱし" in Japanese) is believed to be a description of the geography of the area: a landmass protruding towards the ocean. Similarly, "Namiwake," as discussed previously, literally translates to "wave-dividing."

It is this awareness of how logograms and Japanese homonyms work that allows us to understand both the literal meanings place names convey, and the knowledge they carry at a more subtle level, knowledge that becomes "visible" once we know where and what to look for.

One language, three scripts

For the purpose of understanding concepts in this thesis, I will discuss only the three commonly used scripts in modern Japanese: Kanji (漢字), Hiragana (ひらがな), and Katakana (カタカナ).

Structure of Kanji

Kanjis are logograms that were introduced into Japan from China. Currently, over 100,000 Chinese characters exist (漢字 2016). "[A] logogram, or logograph, is a written character that represents a word or phrase" (Logogram 2016). Each character is made up of either a single "radical" (部首 bushu) or the combination of a "radical" and a "primitive" (偏旁 henbō) (部首 2015) (偏旁 2016). (There is no Kanji that has no radical.)

A radical, also known as a classifier, "is a graphical component of a Chinese character under which the character is traditionally listed in a Chinese dictionary. This component is often a semantic indicator…In other cases, the radical may be a phonetic component or even an artificially extracted portion of the character." The Kanjis for radical, "部首," literally translate to "section header" (部 = part, section; 首 = head, header) (Radical (Chinese characters) 2016). As I will demonstrate, the radical can provide vital clues that could "guide us to the waters," as well as other geographical and historical information hidden in place names. For example, if a Kanji has water (水) as its radical, we can interpret this Kanji as one related to water.

A primitive, as its Kanjis "偏旁 henbō" imply, forms the remaining part of a Kanji: "偏" refers to "the left portion" and "旁" refers to "the right portion" of a Kanji. In fact, "primitive" is also called "偏旁冠脚 henbōkankyaku" in Japanese, with 冠 (meaning "crown") referring to "the top portion," and 脚 (meaning "foot") referring to "the bottom portion" of a Kanji, respectively. Similar to a radical, a primitive also can also function as a semantic or

phonetic component of a Kanji (偏旁 2016).

A Kanji can simply be a radical itself, or a combination of a radical and its associating primitive. (A radical can also function as a primitive when it is part of a Kanji that has a different radical.) While some radicals are by themselves Kanjis, e.g. “水” (water), “木” (tree), some radicals are not, e.g. “厂” (reads as “gandare,” meaning “cliff”), “勹” (reads as “tsutsumigamae,” meaning “wrap”).

A Kanji that is also a radical would have the meaning of the radical itself. The Kanji for water “水” by itself would simply mean water. Combine the water radical “氵” (variant of “水”) with another radical “目” or “eye,” and the Kanji “泪” (“namida/rui”) is formed, meaning “tears,” literally “eye water.” Although 目 is by itself a radical, it functions as the primitive in the Kanji 泪. Combine the radical “亻,” a variant of the radical “人” or “person,” with another radical “木” or “tree,” and the Kanji “休” (“yasu[mu]/kyuu”) is formed. “休” is an ideogrammic compound, which “portrays” a man leaning against the tree to “rest” (休 2016). Similar to 目, 木 is also a radical, but functions as the primitive in the Kanji 休.

Kana

In comparison, Hiragana and Katakana, known collectively as “Kana,” are “syllabic Japanese scripts, a part of the Japanese writing system contrasted with…kanji” (Kana 2016).

Hiragana is “a Japanese syllabary…a phonetic lettering system…used to write native words for which there are no kanji, including grammatical particles…” (Hiragana 2016).

Katakana is also a Japanese syllabary and a phonetic lettering system. In contrast with Hiragana, Katakana “is used for transcription of foreign language words into Japanese and the writing of loan words…; for emphasis; to represent onomatopoeia; for technical and scientific terms; and for names of plants, animals, minerals, and often Japanese companies” (Katakana 2016).

Identifying Water Radicals

There are 3 radicals, including the “water radical” itself, that are associated with water.

冫(Hyōbu): “冫部”, commonly known as “nisui” (にすい in Hiragana) – This radical derives from the Kanji “冰” (also written as “氷”, pronounced “kōri /hyō”), which means ice (冫部 2016). The radical itself is a representation of frozen water. Examples of Kanjis with this radical include 冷 (pronounced “tsume[tai]/rei,” meaning cold), 凝 (pronounced “ko[ru]/kyō,” meaning stiff).

巛(Senbu): “巛部”, commonly known as “magarigawa” (まがりがわ in Higarana) – This is a variant of “川” (pronounced “kawa/sen”), meaning river (巛部 2013). “川” by itself is also a Kanji. Examples of Kanjis with this radical include 州 (pronounced “shuu,” meaning continent, province, state, etc), 巡 (pronounced “meru[ru]/jun,” meaning cycles,

rounds, etc.)

水: “水部”, commonly known as “mizu” (みず in Hiragana) is also a stand-alone Kanji that means water. It has two variants: 1. 氵: “Sanzui” (さんずい in Hiragana), 2. 氷: “Shitamizu” (したみず in Hiragana) (水部 2015). Examples of Kanjis with this radical include 沼 (pronounced “numa/shō,” meaning marsh), 浜 (pronounced “hama/hin,” meaning beach or shore), 泉 (pronounced “izumi/sen,” meaning fountain or spring). The first Kanji in the name of Namiwake Shrine, “波分神社,” includes the Sanzui (氵).

Here are a number of examples of place names in Tokyo that include the water radical. (The Kanjis with the water radical are highlighted.)

- 平河町 - “Hirakawachō” in Chiyoda Ward
- 八重洲 - “Yaesu” in Chuuo Ward
- 海岸 - “Kaigan” in Minato Ward
- 渋谷 - “Shibuya” in Shibuya Ward
- 池袋 - “Ikebukuro” in Toshima Ward
- 氷川町 - “Hikawachou” in Itabashi Ward
- 羽沢 - “Hazawa” in Nerima Ward

The key to decoding place names relevant to water—rivers, ponds, lakes, swamps, marshes, waterfalls, inlets, bays, islands, waves, tsunamis—is to understand where to look for water-related elements in radicals—the semantic indicator—and Kanjis. As we

examine homonyms in further details, I will demonstrate how the phonetic components in radicals and Kanjis also hold the key to identifying waters hidden in place names.

音
pronounced “oto”
meaning “sound”
sound of words, of homonyms

More than word play

By understanding the meaning of Kanjis used in place names, we can gain an understanding of the history, geography, and other aspects of that place. The name “Tokyo” (東京) is a good example of how the combination of the two Kanjis “東” and “京” can convey the meaning, “eastern capital.”

There is, however, another vital aspect of the Japanese language that we also need to understand in order to gain a more comprehensive understanding of place names: Japanese homonyms.

Homonyms

The richness of Japanese homonyms can be best appreciated by simply looking at some examples first.

Take the homonym “kōshō,” “こうしょう” in Hiragana for example. This homonym can mean any of the following, depending how it is written in Kanji.

Kanji	Definition
交渉	negotiation
高尚	high, elegant
公証	Notarization
考証	historical study
口承	oral tradition
鉱床	ore deposit
厚相	Minister of Welfare
哄笑	guffaw
工廠	arsenal

In fact, a search of the homonym “kōshō” in the Japanese version of Wiktionary yielded 49 words. Another common homonym, “kikan” (きかん) yielded 26, and “seika” (せいか) yielded 33 (こうしょう 2012) (きかん 2015) (せいか 2014).

The homonyms above belong to “Sino-Japanese vocabulary” or “Kango” (漢語 Kango), one of three broad categories in the Japanese vocabulary. The other two categories are “Yamato Kotoba” (大和言葉 Yamatokotoba) or “Japanese words,” which “are native Japanese words, meaning those words in Japanese that have been inherited from Old Japanese, rather than being borrowed at some stage,” and “Gairaigo” (外来語 Gairaigo) or “loan words,” which are words of foreign origin “that was not borrowed in ancient times from Old or Middle Chinese, but in modern times, primarily from English or from other European languages” (Yamato kotoba 2016) (Gairaigo 2016).

Sino-Japanese vocabulary – An influx into Japanese language

As the term implies, Sino-Japanese vocabulary, also called “Kango,” “refers to that portion of the Japanese vocabulary that originated in Chinese or has been created from elements borrowed from Chinese…It is estimated that approximately 60% of the words contained in a modern Japanese dictionary are Kango” (Sino-Japanese vocabulary 2016). The Japanese language originally had no written form. “…Chinese characters were introduced [into Japan], and texts were written and read only in Chinese…Chinese characters also came to be used to write Japanese words, resulting in the modern kana syllabaries” (Kanji 2016) (Okimori 2010).

Kanjis did not simply provide the Japanese language with a script, but also with “new concepts along with Chinese words to express them. Chinese became the language of science, learning and religion” (Sino-Japanese vocabulary 2016).

"Nihon Kokugo Daijiten" (日本国語大辞典), a 14-volume and the largest Japanese language dictionary published, contains 500,000 words (Nihon Kokugo Daijiten 2016). In comparison, "Hanyu Da Cidian," a 13-volume Chinese dictionary contains approximately 370,000 words (Hanyu Da Cidian 2016); "[the] Second Edition of the 20-volume *Oxford English Dictionary* contains full entries for 171,476 words in current use, and 47,156 obsolete words" (How many words are there in the English Language? 2016).

In contrast to its rich vocabulary, however, Japanese is a syllable-poor language. It is generally accepted that Japanese has 114 – 116 syllables (Inoue 2011). In comparison, there are 413 syllables in Mandarin Chinese (Zein 2008). This different number of syllables between the two languages can be traced back to their earlier forms. "Middle Chinese had a much more complex syllable structure than Old Japanese, as well as many more vowel and consonant differences. Many sounds and sound combinations had to be approximated in the borrowing process, sometimes with significant differences…" (Sino-Japanese vocabulary 2016) (Takamatsu 1987)

"While much Sino-Japanese vocabulary was borrowed from Chinese, a considerable amount was created by the Japanese themselves as they coined new words using Sino-Japanese forms." Kanjis were used to create new vocabulary that referred to "uniquely Japanese concepts." These include words like daimyō (大名), Shintō (神道), seppuku (切腹), matcha (抹茶), etc (Sino-Japanese vocabulary 2016). The growth of Sino-Japanese vocabulary was gradual up until the Edo period, but saw rapid increase since the Meiji period (1868 – 1912), when "prolific numbers of kango [were] coined…[based] on the model of Classical Chinese to translate modern concepts

imported from the West…These words include 科学 kagaku (‘science’),社会 shakai (‘society’), 哲学 tetsugaku (‘philosophy’), 電話 denwa (‘telephone’) and a host of other basic words” (Sino-Japanese vocabulary 2016) (Okimori 2010).

Homonym-rich vocabulary

Although the Sino-Japanese vocabulary has grown substantially, the Japanese syllables have seen little change. The influx of Kanji, and of Sino-Japanese words into the Japanese vocabulary, resulted in many of the new words sharing the same pronunciation, or in other words, a significant increase in homonyms in Japanese.

Although the focus in this thesis is primarily on Sino-Japanese vocabulary, it should be noted that Yamato Kotoba is also rich in homonyms. Turning again to the Japanese version of Wiktionary for examples, we find that the verb “toru” (とる) has 12 homonyms, “kaku” (かく) has 6, “kiku” (きく) has 5, “kakeru” (かける) has 14 (とる 2014) (かく 2016) (きく 2015) (かける 2016).

We will not be considering Gairaigo (“loan words”) here since the place names I am examining in this thesis are mainly of Japanese origin.

Returning to the argument presented at the beginning of this chapter: how is the understanding of Japanese homonyms significant to the understanding of Japanese place names?

語

pronounced "kata[ri]"
meaning "story" or "the act of telling stories"
stories in Kanjis, stories in names, stories to share

Separating "shape" from "sound"

The syllable-poor nature of Japanese means that a single syllable can be associated with multiple Kanjis. Throughout the long history of Japan, place names that retain their original pronunciation but are assigned different Kanjis of the same pronunciation would effectively mask the origin of the names themselves.

For example, “Matsuchiyama” is a district located in Taitō Ward (台東区 Taitōku) in Tokyo. Matsuchiyama is written as 待乳山 Matsuchiyama in Kanji. The respective Kanjis translate as “wait” (待), “breast” (乳), and “mountain” (山). However, “matsuchi” was most likely originally written as 真土 matsuchi, meaning “real soil,” and generally interpreted as an indicator of the area being suitable for farming. In fact, there are other examples of place names within Tokyo as well as in other prefectures including Aomori Prefecture (青森県 Aomoriken), Wakayama Prefecture (和歌山県 Wakayamaken), and Ehime Prefecture (愛媛県 Ehimeken) that are named “matsuchi” and written as 真土 (Tsutsui 2014). Not only did the current Kanjis used in “Matsuchiyama” (待乳山) in Taitō Ward mask the original meaning of the place, they suggest an erotic albeit erroneous origin to the place as the “Mountain of the Awaiting Breast.”

In this chapter, I will explore examples of places with identical or similar/variant names, and how this can be mutually beneficial for the understanding of how intricately the names and places are related to each other, and how this relation can help decode and rediscover the history and origins of these places that might otherwise be lost.

“Ya” or “Ya”?

I will begin with examining Hibiya (日比谷 Hibiya), a district in Chiyoda Ward (

Chiyodaku
千代田区), Tokyo. I have chosen to examine Hibiya as because (1) “ya” is common in place names in Tokyo, (2) when written in different Kanjis, “ya” can convey varying and diverse meanings, and demonstrate how homonyms can provide comparisons and contrasts between place names, (3) “Hibi” is also found in other place names that can provide vital information about the origin of the name Hibiya.

The three Kanjis in the name 日比谷 can be broken down to “日比” (hibi) and “谷” (ya). The Kanji 谷, which means valley, is common in many names in Tokyo, including Shibuya (Shibuya
渋谷), Yotsuya (Yotsuya
四谷), Asagaya (A s a g a y a
阿佐ヶ谷), Sendagaya (S e n d a g a y a
千駄ヶ谷), etc. The presence of many names with the word valley coincides with the fact that Tokyo has many valleys. However, such is not the case for Hibiya.

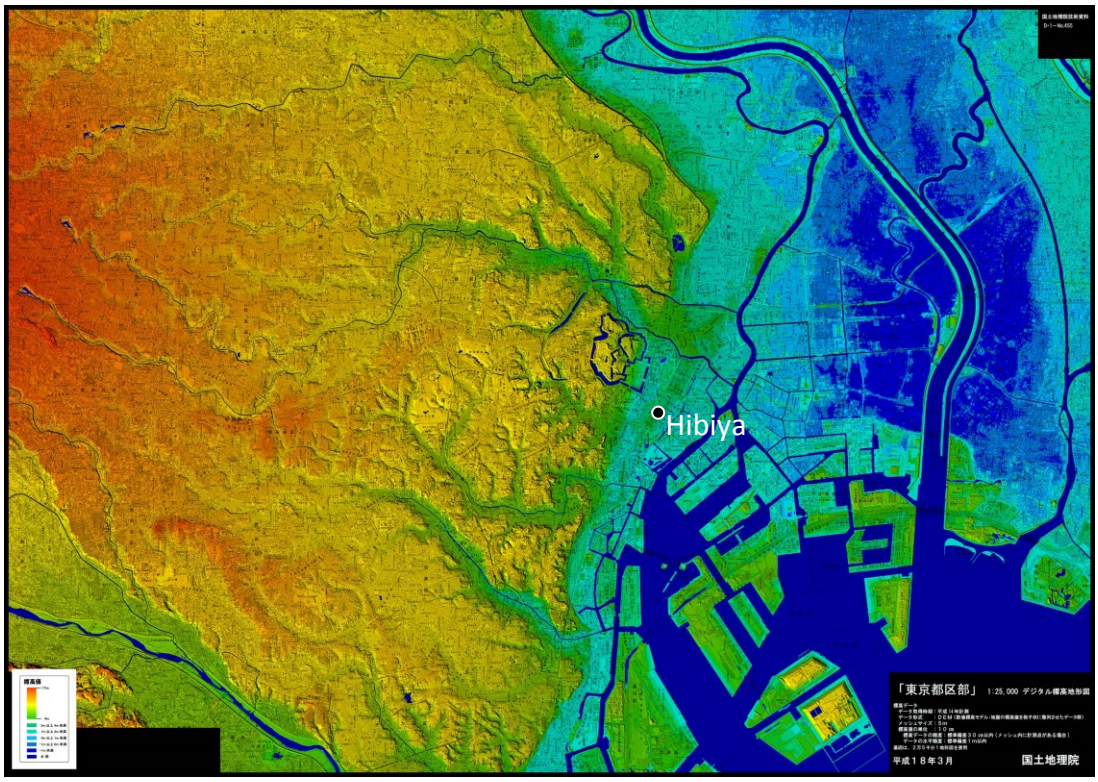

Figure 8.1: Elevation and Topography Digital Map of Tokyo (scale 1:25,000)

In this map, the prominent valleys can be seen as the branch-like structures in light green,

in contrast with the higher landmass that stretches towards the west, in yellow, orange, and red (4 m – 77 m above sea level). Hibiya is situated at the eastern edge of this higher landmass. The areas in light blue and blue are either at sea level (0 m) or below sea level. The area in dark blue in the bottom right corner is Tokyo Bay.

In "Bukō Nenpyō" (武江年表 Bukō Nenpyō), a chorographic record from the Edo period, it is recorded that Hibiya was a coastal area where fishermen used brushwood to set up rows of traps in shallow waters (武江年表 2015). Fish would swim into these "corridors" of traps during high tide and get caught when the tide ebbed. This brushwood was also used for seaweed farming. Tsutsui points out that "谷" can also be interpreted as "wetland along the coastline" (2014, p. 43).

In a previous chapter, I discussed Yanagita's explanation of a place name as a "sign" or "mark" used to identify that place. If this theory of a place name functioning as a descriptive identifier holds true, one would realise a flaw in this naming method: Would locations with similar geographic characteristics not end up with identical names? Would this not be counterintuitive if the purpose of naming a place is to give that place a unique identifier? The following examples will shed light onto these questions and demonstrate what role homonyms play in Japanese place names.

Fish traps across Japan

If "ya" (谷) in "Hibiya" is not meant to mean "valley," what is it meant to be? And what is "Hibi" meant to represent? Places that bear the same or variations of the

name can provide vital clues.

The district "Hibi" (日比) in Tamano City (玉野市 Tamanoshi) in Okayama Prefecture (岡山県 Okayama ken) in western Honshuu boasts a horse-shaped harbour that is ideal for fishery. When the famous Japanese poet Saigyō (西行 Saigyō) visited Hibi in the 12th century, he wrote of hibi—the brushwood fish traps—in one of his poems, the same "hibi" in "Hibiya" of Tokyo.

> Sheath of spreading
> moonlight one would
> almost take for ice,
> flocks of teal circling
> the poles of the fishermen's frames
> (Saigyō 1991)

Here is the poem in Japanese:

> 敷き渡す月の氷を疑ひて
> 篠(ひび)の手まはる味鴨(あじ)の群鳥(むらとり)
>
> (Tsutsui 2014)

In fact, "hibi," when written as "篠" instead of "日比" means brushwood, the very material that can be used for either seaweed or oyster farming, or for constructing traps to catch fish by fishermen during low tide (Tsutsui 2014).

Also located in western Japan, a village by the name of Hibiya (日比屋 Hibiya) once existed on the shores of Tottori Prefecture (鳥取県 Tottoriken), facing the Sea of Japan. Note that "ya" here is written as "屋," meaning house or dwelling, and not "谷," meaning valley.

Hibiya Village went into decline after the Sengoku Period (戦国時代 Sengokujidai) at the end of the 16th century. Across the original site of Hibiya Village, on the northern shore of

Gamō River (蒲生川) is an area called “Ajiro” (網代). The word “ajiro” means wickerwork net for fishing. In ancient times, it was highly probable to find both wickerwork fishing and trap fishing in close proximity of each other (Tsutsui 2014).

We find the same elements in the district of “Himi” (日見), a variation of “Hibi,” in Tsukumi City (津久見市), Ōita Prefecture (大分県) in Kyuushuu (九州): a geography suitable for fishery, place names—Himi and Ajiro—that are associated with fishery (Tsutsui 2014).

Hibiya in Tokyo was originally an area of coastal wetland, where fishermen either worked or lived in a fishing community, possibly both. The area was reclaimed in the Edo period, physically masking the coastal origin of the area since. The name “日比谷” itself was written as “日比屋” and “ひゞ屋”—both pronounced as “Hibiya”—in the past. The Kanji “谷” in the current name was then written as “屋,” meaning dwelling or house, similar to places in western Japan that bear the same name or a variant of such (Tsutsui 2014).

By comparing places with identical or similar names, we can begin to search for correlations between these places based on the respective place names, as well as geographical and sociological features. This would enable us to trace the geographic origins encoded in place names even if the physical or visual evidence no longer exists, as is the case for Hibiya in Tokyo.

Figure 8.2: Present-day Hibiya (February 2016, photo taken by author)

Figure 8.3

Figure 8.4

Figures 8.3 & 8.4: Hibiya Park, located in present-day Hibiya (February 2016, photos taken by author) The current topography shows no hints of this being a coastal area in the past.

While there are historical records about Hibiya (in Tokyo) being a fishing community in the past, the same might not be true for other areas with the same name. In the absence of historical records, the comparison of places with similar or identical names is where the proving of correlations between such places can begin. In fact, this is also where the disproving of correlations between places can begin.

Using Hibiya in Tokyo again as the example, we understand that the name can be broken down into the components of "hibi" and "ya." We also understand that Hibiya is situated inland even though it was once a coastal area. Would this also mean that other inland areas that bear the same or a variant of the name "Hibiya" may have similar geographical and sociological origins and characteristics?

Figure 8.5

Consider Hibino (日比野 Hibino) in Gifu Prefecture (岐阜県 Gifuken), Hibihara (日比原 Hibihara) and Hibiu (日比宇 Hibiu), both in Tokushima Prefecture (徳島県 Tokushimaken).

All these areas share the “hibi” portion of the name as Hibiya of Tokyo, and are all situated inland. However, the “hibi” of Hibiya in Tokyo is no more than a homonym and has a different origin compared with the other examples of “hibi” here. In the case of Hibino, Hibihara, and Hibiu, the “hibi” refers to Japanese Plum Yew (Cephalotaxus harringtonii), a native tree to Japan that grows widely areas south of Iwate Prefecture (岩手県 Iwateken). According Tsutsui, since the ancient times, oil extracted from the seeds of this tree has been used as fuel for lanterns as well as hair oil. Also because of the sturdiness of

its wood, Japanese Plum Yew has also been used to make bows (for archery) since the Jōmon Period. Tsutsui further argues that it is highly probable for places that have "useful trees" (有用樹[yuuyōju]) to bear names that include the name of those particular trees (2014: p. 45 – 46).

Based on the above examples related to "Hibiya," we can reason that:

1. Place names that include "hibi" could be either (i) a fishing community where fishermen lived and/or fished by means of "trap fishing" using fish traps (簗[hibi]) in the past, or (ii) an area where Japanese Plum Yew can be found.
2. Place names that include "ya" could be either (i) an area that is situated in a valley, or (ii) a community associated with dwellings or housing in the past or present.

Examples of homonyms associated with "Hibiya" are by no means limited to only the abovementioned. For example, "ya" within place names can include the Kanjis "谷," "屋," "矢," "野," "家," "弥," etc. This is but one example that demonstrates the importance of examining homonyms amongst names. It is where the questions can be asked and answered. When we come across "ya" written as "谷," the question to ask is: Is this a reference to a "valley" or "coastal wetland" if this "谷" is not a "ya" originally written as another Kanji? And if this "ya" was written as another Kanji, what Kanji was it written as? What other place names have this same "ya"?

Landlocked island

Similar to Hibiya, Ikebukuro (池袋 Ikebukuro) is an area with a topography that does not seem to match its namesake. “Ikebukuro is a commercial and entertainment district in Toshima [Ward] (Ikebukuro 2016)”. The Kanji 池 means “pond” and 袋 means “bag” or “sack.” Similar to Hibiya, the natural geography is effectively hidden by the infrastructure of the area. There are multiple places in Japan that bear the name Ikebukuro, including:

- Ikebukuro in Tome City (登米市 Tomeshi), Miyagi Prefecture (宮城県 Miyagiken)
- Ikebukuro in Yokohama City (横浜市 Yokohamashi), Kanagawa Prefecture (神奈川県 Kanagawaken)
- Ikebukuro in Kirishima City (霧島市 Kirishimashi), Kagoshima Prefecture (鹿児島県 Kagoshimaken)

Figure 8.6

Tsutsui uses the topography of Ikebukuro in Miyagi Prefecture to illustrate how the name is, in fact, a description of the landscape of the area.

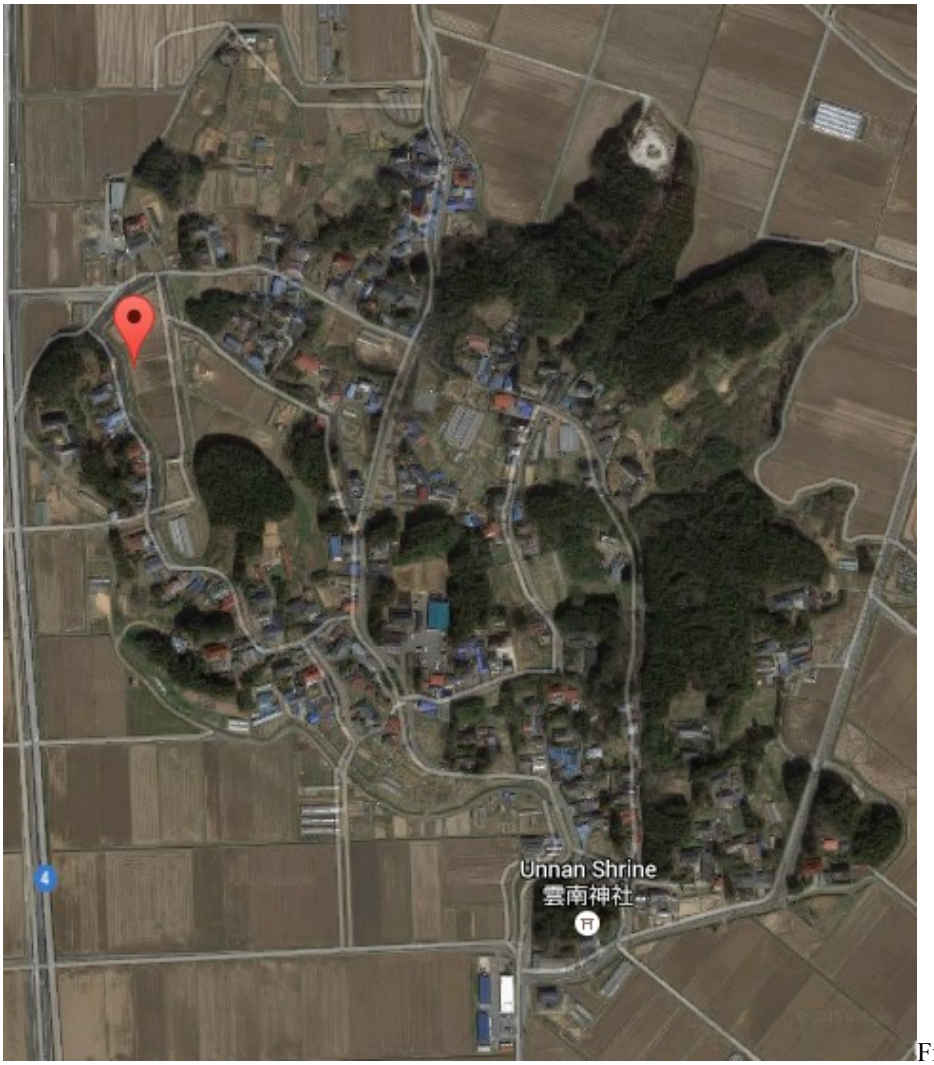

Figure 8.7

The red marker on the map indicates the location of Ikebukuro, or more specifically, "Asamizu Ikebukuro" (浅水池袋 Asamizuikebukuro). "Asamizu" translates as "shallow water."

Interestingly, the hill area situated to the east of Ikebukuro is called "Kojima" (小島 Kojima), which translates to "little island."

The low-lying area to the west of the hill consists of primarily rice fields today. Tsutsui explains that this area was once a wetland, and that Ikebukuro itself was once a flood plain. The shallow lake that once existed flowed westward from Kojima towards Ikebukuro. The name Ikebukuro itself defines an area where the water of a pond flows

towards an area of land in the shape of a bag. In contrast to the flooded land, the hill area Kojima would appear as a "little island" that floats in the flood plain (2014: p. 14).

The name Kojima provides a vital clue that explains why names of a number of landlocked locations in Japan contain the word "island" (島). One of the reasons behind the name origin of these peculiar "inland islands" is the combination of and relation between landmasses and water bodies. In the case of Kojima, the elevated land mass was once surrounded by a temporary flood plan, giving Kojima the appearance of literally a little island.

Modern day Ikebukuro in Tokyo is a highly metropolitan area. Its original topography has long since been blanketed by infrastructure—major roadways, train and subway lines, and skyscrapers. While it is possible to look at Ikebukuro in Miyagi Prefecture on Google Map to gain an understanding of its topography, the same cannot be done for Ikebukuro in Tokyo. In the absence of visible physical evidence that could prove or disprove Tsutsui's theory, he draws upon other names that are, in essence, variants of the name, including:

- Numabukuro, "沼 袋 (Numabukuro)" in Kanji ("沼" = marsh or swamp, "袋" = bag or sack), located in Nakano Ward (中野区 (Nakanoku)), Tokyo
- Kawabukuro, "川 袋 (Kawabukuro)" in kanji ("川" = river, "袋" = bag or sack), located in Iwata City (磐田市 (Iwatashi)), Shizuoka Prefecture (静岡県 (Shizuokaken))

Other names in Tokyo that contain the Kanji "袋" include:

- Ayase Yagorō Shinden Aza Kobukuro, “綾瀬弥五郎新田字小袋” – located in present day Adachi Ward (足立区)

- Shimura Azusawa Aza Kobukuro, “志村小豆沢字小袋” – located in Itabashi Ward (板橋区)

- Shimura Motohasunuma Aza Kobukuro, “志村本蓮沼字小袋” – located in Itabashi Ward (板橋区)

(Tsutsui 2014)

Based on Tsutsui’s argument, “袋” (pronounced as “fukuro” as a stand-alone Kanji) is a key Kanji that we can use as a geographic signifier that would suggest a location as a water-related locale. In addition, two points of interest emerge from the above.

The first point being that there are Kanjis within the three names listed (highlighted in yellow) that include “氵,” a variant of the water radical. The meanings of the respective Kanjis are as follows:

- 瀬 = shallows/rapids

- 沢 = swamp/marsh

- 沼 = swamp/marsh

The second point is what the Kanjis "袋[fukuro]" (present in all 3 names) and "蓮[hasu]" (present in the last name, highlighted in light green) signify. Even though "袋[fukuro]" has no inherent water element, as Tsutsui suggests, it is a signifier of the presence (past or present) of water. "蓮[hasu]" is the Japanese word for lotus. Although the Kanji 蓮[hasu] contains no water element either, it is also a signifier of the presence of water, since lotus is a plant that grows in shallow waters.

Connecting the dots

The homonym-rich nature of Japanese, and geographic and sociologic elements embedded within Japanese place names allow us to group place names based on common roots. Even if such places are physically located in different regions of Japan, their respective elements—geographic, sociologic, historic, economic—however local or isolated, can provide clues to the origin of places with the same name or variant thereof. From the "Hibiya" examples, we differentiated the locations associated with brushwood and "fish trip" (簀) from locations associated with the plant Japanese Plum Yew (Tsutsui 2014).

Examining an identical name shared by different locations, as well as the Kanjis within the name, as we did in the case of Ikebukuro (池袋), allowed us to see a topography that have since been hidden and changed. In addition, we see in this example that the water element in the Kanji is not the only clue that would lead us to the water.

There are also other key words/Kanjis without any water elements, but are closely associated with water, as are the Kanjis for “fukuro” (袋) and “hasu” (蓮).

In fact, if we zoom out of individual names and look at all names across the map of Japan on a broader perspective, we can see that the Japanese landscape is literally peppered with names that include geographical-related Kanjis—山 (yama) (mountain), 川 (kawa) (river), 島 (shima) (island), 池 (ike) (pond), 森 (mori) (forest), 林 (hayashi) (woods), 石 (ishi) (stone)—as well as socio-geographical-related kanjis—村 (mura) (village), 田 (ta) (field), 橋 (hashi) (bridge), 船 (fune) (ship) (Tanikawa 2012).

Because of the voluminous number of and the vast information encoded into place names, cataloguing and categorising these names in an accurate and systematic manner would necessitate collaboration from researches from different disciplines—researchers of the Japanese language, Japanese history, geography, literature, just to name a few.

Where water is hidden in names

Take finding water hidden in place names as an example. This would not be simply a process of going through all of Kanjis with the water radical: that is only the first step. “Finding water” would also necessitate identifying place names that do not have Kanjis with the water radical but suggest possible associations with water bodies, as well as place names used at multiple locations that could point to a common root associated with water.

With both a broad and detailed perspective and understanding on names, we can now turn our attention to place names in Tokyo.

水
pronounced "mizu"
meaning "water"
waters… once flowed through Edo, now written in(to) names, forgotten in Tokyo

City of water

Why look for water related place names in Tokyo? What is the significance in these names? What is at stake?

Water has always been closely associated with the "culture of Edo" (水のある風景を取り戻す 2009) (水の都 2016). Tanikawa speaks of the culture of Edo as one that

has been greatly influenced by water (2012: p.42). This association with water has been recorded in various forms and media, most notably, in the ukiyo-e prints by the famous Japanese artist Utagawa Hiroshige (UtagawaHiroshige 歌川広重) in the series "One Hundred Famous Views of Edo", MeishoEdoHyakkei 名所江戸百景 in Japanese (広重 2016) (Famous Views of Edo 2016).

Figure 9.1: Minami Shinagawa and Samezu Coast (MinamishinagawasamezukaiganMinamishinagawasamezukaigan 南品川鮫洲海岸)

The print entitled "Minami Shinagawa and Samezu Coast" (fig. 9.1) was produced in February 1857. It depicts fishermen gathering seaweed in what would be present-day Shinagawa, a view that we would also witness if we could time travel back to the Hibiya in the Edo period.

The changing face of Tokyo

Present-day Tokyo is bordered by Tokyo Bay to the southeast.

Figure 9.2: Geographical Map of Tokyo and its surrounding areas

Throughout recent history, the coastline of Tokyo has seen drastic change, most significantly, since the Edo period. In fact, Edo quite literally expanded into Tokyo Bay as more land was reclaimed. This reclamation was accompanied by the development of inland canals that functioned as traffic routes that crisscrossed areas in eastern Tokyo, effectively connecting the landmass of Tokyo with the waters of Tokyo Bay. Albeit an obvious consequence, in addition to the natural rivers that run through Tokyo into Tokyo Bay, the addition of these canals made Tokyo that much more vulnerable to the effects from changes in the sea level in Tokyo Bay.

Figure 9.3: This photo was taken at the location where Kitajikkengawa (北十間川), a canal originally built in 1663, flows into Kyuunakagawa River (旧中川). Kitajikkengawa flows from right to left (west to east) in the foreground. The altitude of the shoreline in this photo (near centre) is approximately -1 m. This view faces north-northeast. (February 2016, photo by author)

Figure 9.4: This photo was taken approximately 30m west of where the photo fig.9.3 was taken. Kitajikkengawa is on the left. Kyuunakagawa River (on the right) flows from northeast to southwest towards the right in the photo. The area east of Kyuunakagawa River seen here is Edogawa Ward; the area to the west of the river includes Sumida Ward and Kōtō Ward. The Tokyo Skytree is visible in the background (left of centre). (February 2016, photo by author)

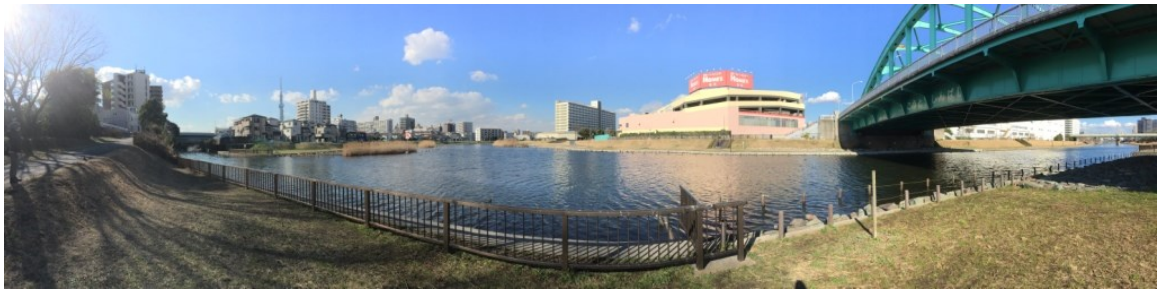

Figure 9.5: This is a panoramic view of the photo above. (February 2016, photo by author)

Figure 9.6: The red marker indicates the approximate location where the photos fig. 9.3, 9.4, and 9.5 were taken.

Figure 9.7: "The Mouth of the Nakagawa River" (中川口 Nakagawaguchi), ukiyo-e print by Utagawa Hiroshige (February 1857). This location is approximately 2.5 km downstream along Nakagawa River from the location where the photo fig. 9.3 was taken.

The altitudes of the coastal region of Tokyo range from a few metres below sea level to a few above sea level. While low-lying areas are not uncommon amongst coastal cities, Tokyo is at a higher risk to floods because of its vulnerability to tsunamis.

In Tanikawa's 2012 book "'Tokyo Tsunami' Hidden in Place Names" (original title in Japanese: 地名にかくされた「東京津波」 (Chimeinikakusareta「Tōkyōtsunami」)), he speaks of his coincidental encounter with a rather remarkable map in the Tokyo Metropolitan Library (東京都立図書館 (Tōkyōtoritsu toshokan)). The map he chanced upon can literally be translated as the "Map of Highs and Lows of the City of Tokyo"—title in Japanese: 東京市高低図 (Tōkyōshikōteizu) (scale 1:20,000). It is estimated that this map was published in March, 1925, by the Reconstruction Bureau (復興局 (Fukkōkyoku)) under the Home Ministry (内務省 (Naimushō)), and currently accessible for online viewing at https://www.timr.or.jp/library/docs/mrl1003-01-38.pdf (2012: p. 27 – 28).

What makes this map remarkable in the current context, in the 21st century, is that all of place names on the map are recorded as they were a century ago, allowing places to be identified by names that are no longer in use today. More significant still, is the estimated date on which the map was published: March, 1925, eighteen months after the 1923 Great Kantō earthquake.

The Great Kantō earthquake is but one of many happenings—tragic and auspicious, natural and man-made—that has changed the face of Tokyo in recent history: the Great Fire of Meireki (明暦の大火 (Meirekinotaika)) in 1657, the Great Fire of Meiwa (明和の大火 (Meiwanotaika)) in 1772, the Earthquake Fire (地震火事 (Jishinkaji)) in 1855, the Bombing of Tokyo (東京空爆 (Tōkyōkuubaku)) in

1942, 1944 – 1945 during World War II, the Japanese postwar economic miracle (高度成長期 Kōdo seijōki) from 1954 to 1973, the Tokyo Summer Olympic Games in 1964, FIFA World Cup in 2002, and the upcoming 2020 Tokyo Olympic Games.

The ground is moving/being moved

According to the World Risk Report of 2013, "[due] to its location in the Pacific Ring of Fire, Japan is substantially prone to earthquakes and tsunami, having the highest natural disaster risk in the developed world (Japan 2016)".

Japan is the only country to have been devastated by natural disasters—volcanoes, earthquakes, tsunamis—and large-scale destruction by air raids and nuclear bombs, yet recovered and continues to stand as a nation. Even though the country's landscape has been altered and resurfaced repeatedly, Japan has recovered, quite literally, from the ashes. Just as the Reconstruction Bureau rebuilt Tokyo and the Kantō region after the 1923 Great Kantō earthquake, the current government continues to rebuild areas affected by the 2011 Tōhoku earthquake and tsunami as well as the 2016 Kumamoto earthquakes. Restoration and development have always followed disasters. What this also means, however, is that the original topography can often get erased. With the original topography—the identity and the characteristic—gone, we are left with the one element that could function as the "identifier" of places: place names.

Even if we do not take into account the possibility of future man-made disasters (warfare, nuclear plant melt downs), we cannot ignore the inevitable natural disasters to

come. This has been the case in the Tōhoku region as previously discussed. The earthquakes and tsunami that devastated the region in 869, 1611, and 2011 respectively were identical in scale as well as in the areas affected. Residents who survived were the ones armed with the knowledge of the local geography, history, and folklore. They understood how to read the signs of eminent danger: the sudden drop in water level in the local rivers, the sudden ebb along the coastline. They understood where to seek safety: at the shrines, at higher grounds (いにしえからの警告 2012).

The same is not necessarily true for residents and commuters of Tokyo.

The face and the mask

First time visitors to Tokyo would notice the city's buildings and skyscrapers, the intricate network of trains and subway tracks, the seemingly endless traffic flow of both vehicles and pedestrians, and after night fall, the array of signs and illuminations that light up the buildings and the urban sky. Look in any direction, and one will find infrastructure. With the narrower streets compared to North American standards, a foreigner may experience a sense of entrapment or cluster while bemused by the urban environment.

One can argue that this infrastructure is the face of Tokyo. This is what people would expect to see in one of the largest metropolitan centres in the world. The same argument, however, can be made in saying that this infrastructure is also the mask of Tokyo, a mask that hides the original face of Tokyo.

The lost sense of "highs" and "lows"

Shibuya (渋谷)—"渋," a Kanji with the water element as its radical, "谷" the same Kanji from Hibiya (日比谷), meaning valley—is one of the most popular areas in Tokyo amongst both local residents and visitors from abroad. It is also home to the famous "scramble intersection."

Figure 9.8

Figure 9.9

Figure 9.10 “Scramble intersection” of Shibuya (February 2016, photos by author)

With a constant flow of traffic throughout the area, it is easy to walk through the main street of Dōgenzaka (道玄坂 Dōgenzaka) without noticing the changes in altitude.

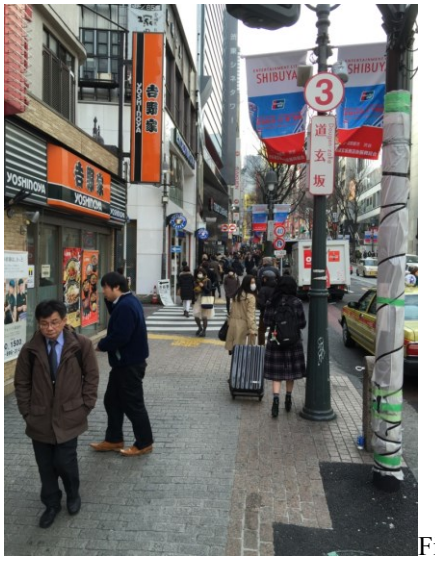

Figure 9.11: Dōgenzaka (February 2016, photo by author)

Dōgenzaka is a small district west of JR Shibuya Station. Within this small area, there is a comparatively large number of slopes. The name of the area itself actually hints at this fact: the Kanji 坂 (pronounced as “saka” as a stand-alone Kanji) means “slope.” Slopes are, in fact, common place in many districts in Tokyo.

Tanikawa astutely points out that Tokyo is a city with many slopes, a fact that curiously goes unnoticed (2012: p. 39 – 40). I have lived in Tokyo for 3½ years, and have

had my fair share of "slope climbing," both on foot and by bicycle. My attention was always drawn to the busy traffic. "Noticing the local topography" was not a priority when trying to steer clear of other pedestrians and vehicles. That was simply a fact of life living in urban Tokyo.

Tanikawa attributes this lost sense of altitude to the continuous constructions of skyscrapers and the dependence on the train and subway systems.

Buildings are constructed, seemingly with a desperate sense to reach the sky, without thorough consideration on the soundness of the land upon which they are built. Tanikawa argues, for example, while safety measures are likely in place when the recently opened "Tokyo Skytree" was designed and constructed, taking into consideration the forces that would be exerted upon this 634 m structure during earthquakes, the ground upon which the tower stands does not necessarily provide a strong foundation. He also argues that Tokyo residents tend to look up, skyward towards the skyscrapers, without paying attention to what is under their feet (2012: p. 40 – 41).

The train and subway systems form a network of arteries that intricately connects areas within as well as beyond metropolitan Tokyo. The population of the city depends heavily on this network. People in Tokyo were given a wakeup call to this dependence after the 2011 Tōhoku earthquake struck, when the stranded commuters, or "refugees of the commute" (通勤難民 tsuukinnanmin) as referred to in the Japanese media, were stranded in Tokyo and the surrounding areas.

The majority of trains run on overhead tracks above the busy streets. (Ground-level train tracks are more common outside the central area of Tokyo.) Passengers on these trains are unlikely to be aware of the undulation of the landscape because train

tracks generally run horizontally without abrupt change in altitude. The majority of subways run underground, evading all traffic on the street level. This is both necessary and effective since neither trains nor subways would likely be affected by street-level traffic and vice versa. As for subway, the fact that they are primarily underground, passengers looking out the window would basically see alternating views of platforms and tunnel walls as the train travels from station to station. The dependence on trains and subways isolated the people from the geography of Tokyo. This particular point can be best appreciated by taking a ride on the Tokyo Metro Ginza Line (東京メトロ銀座線 Tōkyō Metoro Ginzasen), commonly known simply as the Ginza Line.

Subway train on the 3rd floor

The Ginza line has 19 stations, and run underground in a roughly southwest-northeast direction, with Shibuya Station (渋谷駅 Shibuyaeki) at the southwest end of the line and Asakusa Station (浅草駅 Asakusaeki) at the northeast end.

渋谷	表参道	外苑前	青山一丁目	赤坂見附	溜池山王	虎ノ門	新橋	銀座	京橋	日本橋	三越前	神田	末広町	上野広小路	上野	稲荷町	田原町	浅草
Shibuya	Omotesandō	Gaienmae	Aoyamaicchōme	Akasakamitsuke	Tameikesannō	Toranomon	Shimbashi	Ginza	Kyōbashi	Nihonbashi	Mitsukoshimae	Kanda	Suehirochō	Uenohirokōji	Ueno	Inarichō	Tawaramachi	Asakusa

Table 9.1: Stations of Ginza Line

The length of this line (excluding the maintenance line portions) is 14.3 km, of which, 0.3

km is above ground (Ginza Line 2016).

It is not uncommon for Tokyo subway lines to have portions of above ground tracks. For example, the Tokyo Metro Tōzai Line (東京メトロ東西線 Tōkyō Metoro Tōzaisen), is 30.8 km long, of which, 13.8 km run above ground (Tōzai Line 2016).

What is peculiar about the Ginza Line is that, while the majority of the line *runs underground* from Asakusa Station to Omotesandō Station, the last station on the south-western end of the line, Shibuya Station, is three storeys above ground. If a passenger travelling towards Shibuya Station keeps his/her eyes to the view outside the window, he/she would find him/herself looking at the tunnel walls moments after the train leaves Omotesandō Station, and suddenly "emerging" in midair as the train nears Shibuya Station. I have often used the Ginza Line, and always looked forward to seeing this sudden change of scenery. However, I never once bothered looking for an explanation to this oddity. I, too, as a resident of Tokyo fell victim to this lost sense of altitude that Tanikawa speaks of.

Does this mean the 1.3 km tracks make a sharp upward incline between Omotesandō Station and Shibuya Station?

No. While this subway line gives the impression of running *underground*, "underground" does not necessarily equate "below sea level."

Figure 9.12: This photo is taken at the south-western end of the Ginza Line, at the bus terminal just outside of Shibuya Station. The overpass at the top of the image is where the "underground" subway trains run, emerging from a tunnel about three storeys above ground. The Kanjis on the side of the over pass read: Ginza Line (銀座線) Shibuya Station (渋谷駅). (February 2016, photo by author)

Figure 9.13: This is another view at the south-western end of the Ginza Line. A subway train can be seen here approaching Shibuya Station, situated outside of this photo to the right. (February 2016, photo by author)

The figures in table 9.2 are the respective altitudes of the areas where each of the Ginza Line stations are located. The data are based on Mapion, http://www.mapion.co.jp/. Note that these are *street-level* figures of the areas where the stations are situated. With the exception of Shibuya, the stations themselves are situated "generally no more than one and a half stories underground" (Ginza Line 2016). Based on the above, we can estimate that the altitude of Omotesandō station to be approximately 25 metres, which explains why the 0.3 km portion of Ginza Line leading up to Shibuya Station is "in mid-air."

Station	Altitude (metres above sea level)
Shibuya 渋谷	19m
Omotesandō 表参道	31m
Gaienmae 外苑前	31m
Aoyamaicchōme 青山一丁目	30m
Akasakamitsuke 赤坂見附	18m
Tameikesannō 溜池山王	10m
Toranomon 虎ノ門	7m
Shinbashi 新橋	3m
Ginza 銀座	4m
Kyōbashi 京橋	4m
Nihonbashi 日本橋	4m
Mitsukoshimae 三越前	4m
Kanda 神田	4m
Suehirochō 末広町	5m
Uenohirokōji 上野広小路	5m
Ueno 上野	7m
Inarichō 稲荷町	2m
Tawaramachi 田原町	2m
Asakusa 浅草	2m

Table 9.2

The difference in height between the highest areas (Omotesandō and Gaienmae) and the lowest (Asakusa) is 29 metres, or about 10 storeys high.

This seemingly odd abrupt emergence of subway lines from underground to

"above ground" can also be observed in other subway lines. The Marunouchi Line (丸ノ内線), also operated by Tokyo Metro, illustrates this point. Portions of the line near Myōgadani Station (茗荷谷駅) and Yotsuya Station (四谷駅) run above ground. While the station names do not necessarily provide irrefutable proof, one cannot ignore the fact that both station names provide a common, tantalising clue of the geography. Both station names contain the Kanji "谷," meaning "valley." Using this Kanji as a clue, we can reason that this line runs under a landscape with a higher elevation, and emerges "above ground" at locations where the elevation is lower: at the valleys.

The (forgotten) significance of the geography of Tokyo

As mentioned in the opening of this chapter, Tokyo has long been a city associated with water. This is obvious since Tokyo is a coastal city. Curiously, however, the notion of disaster in Tokyo has always been associated with fire rather than water. Tokyo has seen a fair share of serious fires. Even at the time of the 1923 Great Kantō earthquake, in spite of serious devastation caused by the subsequent tsunami—the Sagami Bay (相模湾) area in Kanagawa Prefecture (神奈川県), adjacent to and west of Tokyo, was swept by a 6 – 7 m high tsunami—the sheer severity of destruction caused by the fires in Tokyo overshadowed the tsunami (Tanikawa 2012). This was similar during the 2011 Tōhoku earthquake. Attention was drawn to northeastern Honshuu as the waves surreally engulfed the coastline. Little attention was paid to the tsunami that affected the

Tokyo area. And when cameras did point to the Kantō region, the human stories, including the numerous "refugees of the commute," were given the spotlight.

Like many coastal cities in Japan, Tokyo is vulnerable to earthquakes *and* tsunamis. There are factors, however, that place Tokyo, as well as people who live and work there, in greater danger compared to other cities.

Daily tsunami of people

One of the key factors that puts Tokyo in great danger is that Tokyo is one of the busiest hubs in Japan. It is a city that people reside in, a city that people commute to and from for both work and school. The number of people who live and/or work, as well as the daily flux of people inbound and outbound is substantial.

The population of greater Tokyo makes up over 10% of the national population. Some of the areas in Tokyo have the highest population density in the country. In 2010, the population of Tokyo was 13,159,388; the population of Japan was 128,057,352 (都道府県の人口 2016). The population of the 23 Wards of Tokyo is 8,950,000; the population density is 14,389 persons/km^2 (人口密度 2016).

According to Statistics Japan (統計局 tōkeikyoku), under the Ministry of Internal Affairs and Communications (総務省 sōmushō), in 2005, the number of people who commuted to the 23 Wards of Tokyo for the purpose of work or school is 3,330,000 (流入人口 1996).

The figures above are annual numbers. In order to get a more tangible perspective of the magnitude of people moving through and within Tokyo on a daily basis, we turn to reports prepared by East Japan Railway Company, commonly known as "JR East" (ＪＲ HigashiＮihon 東日本), and Tokyo Metro Co. Ltd (TōkyōＭetoro 東京メトロ) (乗車人員 n.d.) (乗降人員ランキング n.d.).

Daily average number of passengers who *boarded* trains at JR East stations in fiscal year 2014	
Name of Station	Number of Daily Passengers
Shinjuku 新宿	748,157
Ikebukuro 池袋	549,503
Tōkyō 東京	418,184
Yokohama 横浜	403,905
Shibuya 渋谷	371,789
Shinagawa 品川	342,475
Shinbashi 新橋	253,874
Ōmiya 大宮	244,556
Akihabara 秋葉原	241,063
Kawasaki 川崎	204,153
Note: The full report includes 976 stations. The above extract only includes the top 10.	

Table 9.3

Daily average number of passengers who *boarded/alighted* subway trains at Tokyo Metro subway stations in fiscal year 2014	
Name of Station	Number of Daily Passengers
Ikebukuro 池袋	529,698
Ōtmachi 大手町	301,519
Kitasenju 北千住	285,742
Ginza 銀座	241,330
Shinbashi 新橋	230,720
Shinjuku 新宿	226,734
Shibuya 渋谷	212,534
Ueno 上野	210,379
Takadanobaba 高田馬場	189,558
Tōkyō 東京	186,459
Note: The full report includes 130 stations. The above extract only includes the top 10. The above does not include Tokyo Metro stations that (i) are directly connected to stations of other train lines, (ii) share the same station with other train lines.	

Table 9.4

Daily average number of passengers who *boarded/alighted* subway trains at Tokyo Metro subway stations that are directly connected to stations of other train lines or share the same station with other train lines in fiscal year 2014	
Name of Station	Number of Daily Passengers
Shibuya 渋谷	753,571
Ayase 綾瀬	436,961
Kitasenju 北千住	288,610
Nishifunabashi 西船橋	280,011
Yoyogiuehara 代々木上原	250,439
Nakakurome 中黒目	215,568
Wakōshi 和光市	170,122
Kotakemukaihara 小竹向原	159,115
Oshiage (Skytree) 押上（スカイツリー前）	153,857
Nakano 中野	147,773
Note: The full report includes 14 stations. The above extract only includes the top 10.	

Table 9.5

Based on the data on the Tokyo Metro subway as a point of reference, on average, Shibuya Station alone sees a total of 966,105 passengers on a daily basis. For comparison, based on the 2014 census, the population of Edmonton is 877,926 (Edmonton 2016). It should be noted that not one but four train and subway companies have lines running

through Shibuya Station. If we took all of the passengers from all lines into consideration, we will be looking at a number of passengers that far exceeds the population of Edmonton that go through this one station in Tokyo on a daily basis.

While the "culture of trains and subways" is deeply integrated into the daily lives of Tokyo commuters, it is questionable whether they have an awareness of the geography and topography of Tokyo (Tanikawa 2012). How aware are Tokyo commuters of their surroundings when they traverse the city an *underground* train line that runs metres above sea level, or a *ground level* train line built in an area that was once part of a water body?

Walking on water

Land reclamation from Tokyo Bay began in 1590, the year when Tokugawa Ieyasu (Tokugawa Ieyasu 徳川家康), the eventual founder of the Tokugawa shogunate, entered Edo and occupied Edo Castle (Edo jō 江戸城). Edo Castle was located where the Imperial Palace stands today, and originally stood at the northern shore of Hibiya Inlet (Hibiyairie 日比谷入江) at the northern end of Tokyo Bay before the reclamation.

Not unlike present day Tokyo, land was in high demand in Edo. With the establishment of the Tokugawa shogunate came the influx of government officials, daimyos, tradesmen and businessmen, and a sharp increase in the demand for infrastructure. Since 1590, a total of 250 km^2 of land was reclaimed primarily in the Tokyo Bay area, covering areas in, from west to east, Kanagawa Prefecture, Tokyo, and

Chiba Prefecture (Higashide 2016). For comparison, the area of the City of Edmonton is 684.37 km^2 (Edmonton 2016).

Present-day usage in this area of reclaimed land includes steel plants and factories, chemical plants, petroleum storage facilities, storage and logistics facilities, aeronautic facilities, commercial and business buildings and facilities, residential complexes, and leisure facilities, the most famous of all, the Tokyo Disney Resort, including Tokyo Disneyland and Tokyo DisneySea (Koarai & Nakano 2013).

The more we look into the land usage in these areas, the more parallels emerge between the coastal region of Tokyo and the coastal region of the Tōhoku region devastated by the 2011 tsunami. Both regions went through periods of rapid development, with Tokyo's beginning just before the dawn of the Edo period, and the Tōhoku region's in the Meiji period. Both regions have similar land usage and infrastructure. Both regions are vulnerable to and have histories with major earthquakes and tsunamis. There are, however, also dissimilarities that would place these two regions worlds apart.

Unlike many of the residents of the Tōhoku region who were born and raised in the area and were taught of stories and folklore that contain knowledge of the land that saved many of their lives as they took refuge during the initial earthquake and subsequent tsunamis in 2011, a substantial percentage of people in Tokyo are not residents but daily commuters. According to Statistics Japan, in 2005 the number of commuters (including both commuters for work and school) who travelled from (1) areas in Tokyo beyond the 23 Wards and (2) surrounding prefectures including but not limited to Saitama, Kanagawa, Ibaraki, and Chiba was 3.33 million (Ⅱ ３大都市への流入人口（通勤・通学者）2005).

Even amongst residents of Tokyo, it would not be uncommon to be unfamiliar with the history and geography of the land. As we have seen so far, much of this history and geography have either been erased or masked, then eventually forgotten (Tanikawa 2012).

Unlike the Tōhoku coastal region, a considerable area in Tokyo is developed on reclaimed land. If the earthquake and tsunami of 2011 were capable of unleashing power sufficient to wipe out coastal cities and fishing communities, and causing a nuclear meltdown in the Fukushima Daiichi Nuclear Power Plant, a plant that was built on solid foundation (albeit at a miscalculated height above sea level), a similar earthquake and tsunami can bring about serious casualties and cause severe damage in petroleum facilities and industrial areas built upon reclaimed land around Tokyo Bay, land that could liquefy during an earthquake.

Now, more than ever, do we need to reconnect residents and commuters of Tokyo with information on the history and geography of Tokyo, information that has been present all along but simply forgotten: information preserved in place names. The next challenge now would be to find ways to repopulate this information back into the people's lives.

図

pronounced "zu"
meaning "picture"
pictures painted into names…names craved into places…
places pasted together forming pictures and stories

"The greatest value of a picture is when it

forces us to notice what we never expected

to see."

John W. Tukey, Exploratory Data Analysis

"…the possibility of expanding

participation and of the value of knowledge

in the service of the public good…"

Todd Presner, HyperCities Think Mapping

in the Digital Humanities

Putting data points into perspective

We have seen in previous chapters the vast knowledge and information about earthquakes and tsunamis created by Japanese peoples of generations past. We have discussed how many of the place names in Tokyo and across Japan are embedded with information about the geography of the past. We have discussed the significance of the understanding and preservation of this knowledge, and the necessity to both make this information available to the general public, and facilitate collaboration and discussion so that we can better understand this knowledge. In this chapter, I will use a sample digital map to discuss the significance in visualising and contextualising this information, and how visualisation can help contextualise names with their respective locations (space), geography, and history.

A picture is worth a thousand words

Knowledge accumulated over generations can either be the greatest treasure of information or the greatest chaos if this information is not properly organised and studied. A digital map could function as a medium, a dynamic picture to put information into perspective. In quoting Tukey's argument, "for the value of data visualization: "The greatest value of a picture is when it forces us to notice what we never expected to see[,]" Kirk argues, "Through visualization, we are seeking to portray data in ways that allow us to see it in a new light, to visually observe patterns, exceptions, and the possible stories that sit behind its raw state. This is about considering visualization as a tool for discovery." (2012: p. 10)

Tokyo Water Map – Version 1.0

As a test platform that allows access to multiple users for gathering, storing, and displaying place names and associated data, as well as analysing possible correlations between place names in Tokyo, I have created a prototype digital map using ArcGIS. The map is currently saved as "Tokyo Water Map Version 1.0" at http://www.arcgis.com/home/webmap/viewer.html?webmap=dbcecab73f784738ad527a3f28b3d537. (I will refer to this map as "Tokyo Water Map" in this thesis.)

Figure 10.1

Roles and levels of access

There will be varying levels of accessibility to this map depending on the user's "role." Roles will be divided into "owner," "curators," "collaborators," and "general users." Definitions of the roles are as follows:

- Owner – the person who created the initial map. This person will have complete access to, and is responsible for the overall management of the project—collecting, posting and updating data. The owner can also function as a "curator" as well as a "collaborator."
- Curators – persons responsible for the overall management of the map. They will upload new content and updates from "collaborators" to the map, and can also function as "collaborators."

- Collaborators – persons who contribute content to the map. This can range from members of academia to independent researchers. Collaborators would not be involved in the mechanics of the digital map itself; their role is to provide information to the "owner" or "curators" who, in turn, would update the map as necessary.
- General Users – persons who make use of the digital map. They will have "view only" access, and cannot alter the contents of the map.

Structure and contents of the map

The two main components of the map are (1) the area map of the 23 Wards of Tokyo, with points of interest indicated by pins, flags, etc., and (2) the ledger that allows users to choose specific layers and/or information to be viewed over the base map. For the purpose of building this prototype map, I used data available from Japan Post Co., Ltd. (national provider of postal services in Japan) to create these points of interest. However, the actual search for points of interests is far more complicated process that requires interdisciplinary collaboration, a process which I will discuss in depth in the next chapter.

Figure 10.2: Map of the 23 Wards of Tokyo with points of interest

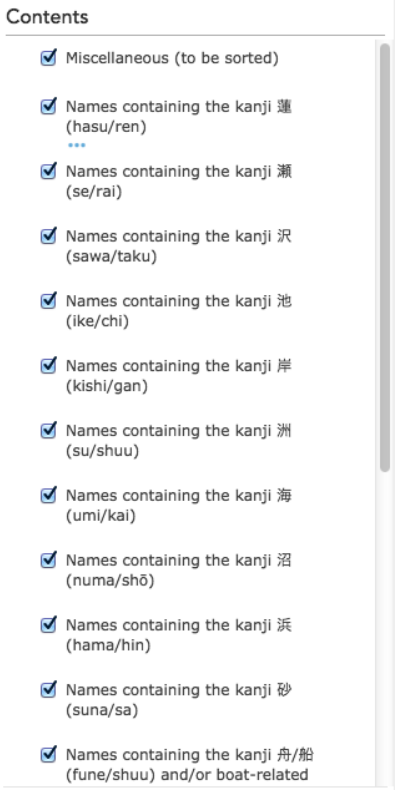

Figure 10.3: Ledger

Each point of interest would include information relevant to that particular point.

Figure 10.4

In the example above, the point of interest is “四谷 (Yotsuya).” The associated Kanji is “ya” written as 谷 (tani/ya).

Groups can be created based on identical or related Kanjis. In ArcGIS, these groups would be created and displayed as “Map Notes.” For example, 四谷 (Yotsuya) belongs to the Map Notes “Names containing the Kanji ya.”

Figure 10.5

Subsequent groups can be created, edited, and viewed similarly as Map Notes. We can choose to display a single group of place names, as we did in the example above, or to display multiple groups to search for correlations between place names or groups.

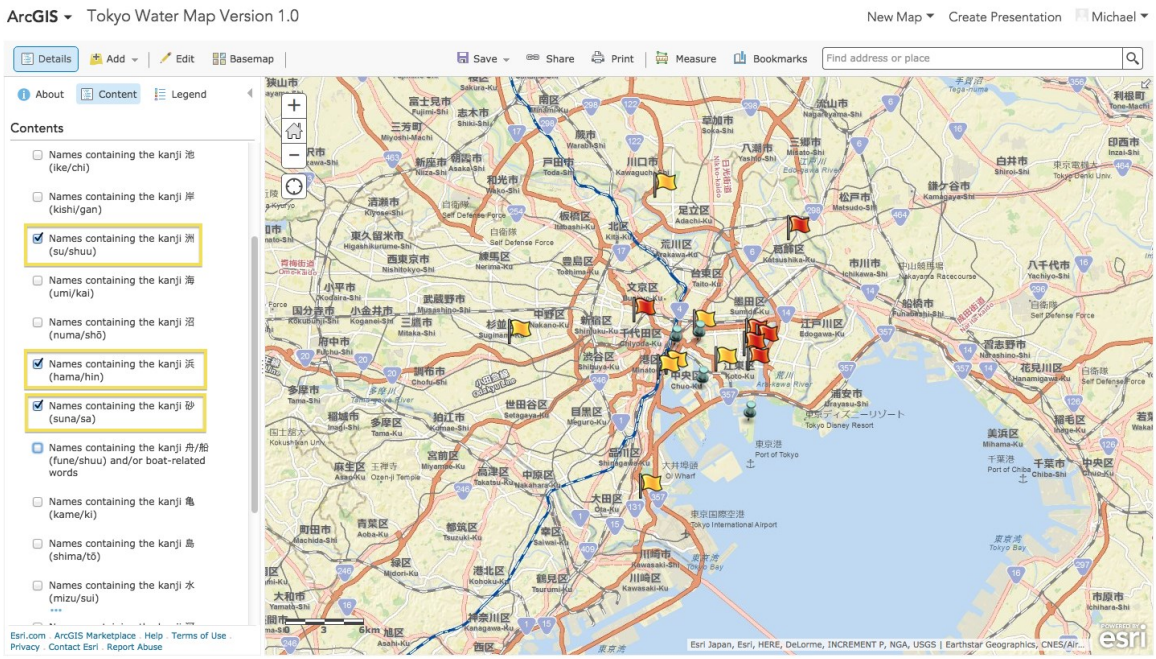

Figure 10.6

The example above shows the 3 sets of Map Notes: “Names containing the Kanji 洲 (su/shuu),” “Names containing the Kanji 浜 (hama/hin),” and “Names containing the Kanji 砂 (suna/sa).” 洲, 浜, and 砂 all have the common element of being associated with “coast” or “coastline”—洲 meaning sandbank, 浜 meaning coast, and 砂 meaning sand.

Making sense out of chaos

Even within the very limited area of the 23 Wards of Tokyo, there are numerous points of interest, each with its respective set of data that could include history, background information, and possible narratives and folklore. Plotting the points of

interest on a map can help us systematically organise the data, and visualise patterns and/or correlations that exist in the contexts of geography and folklore. It could also relate place names with the respective locations, geography, and history.

This can be best demonstrated through examples on this map. At the initial stages of creating the map, through the very exercise of plotting points of interest, patterns emerged from place names that are in close proximity with possible relations.

Figure 10.7

The first map (figure 10.7), which covers an area of about 20 km^2 in Setagaya Ward (世田谷区 Setagayaku), we find a cluster of names all with the Kanji "沢" (pronounced as sawa or zawa depending on the preceding Kanji), which means swamp or marsh. The current topography of this area is covered with modern infrastructure. However, the proximity of these "沢" points to the possibility of the original geography of the area being a swamp. As a point of interest, "駒沢公園" (Komazawakōen) was the site of the 1964 Tokyo Olympic Games. A new Olympic Park, named "Komazawa Olympic Park General Sports Ground," is being constructed for the 2020 Tokyo Summer Games—another example of ongoing change in the topography of Tokyo.

Figure 10.8

The second map (figure 10.8) covers an area of about 1.2 km^2 in Sumida Ward (Sumidaku 墨田区). The water-associated place names within this area are "曳舟 (Hikifune)," "向島 (Mukōjima)," "京島 (Kyōjima)," and "押上 (Oshiage)." Tokyo Bay is approximately 8 km to the south of Oshiage. Although this is an inland area, the two names with the Kanji for island (島), Mukōjima 向島 and Kyōjima 京島, respectively, suggest this area could either be a part of a water body in the past, or an area with rivers that separate areas into "islands," or once a flood plain, with hills appearing as "islands," as was the case with Ikebukuro (Ikebukuro 池袋) in Miyagi Prefecture (chapter 8). What makes this area interesting is that the other two names lend support to these possibilities.

The individual Kanjis of 曳舟 (Hikifune) translate to pull (曳 from the verb pull or tow "hiku," "曳く" in Japanese) and boat (舟). 曳舟 can be interpreted as "tow boat" or "boat towing." In the past, goods were transported through this area by boats, which were pulled upstream with ropes. This practice itself eventually became the name of this area (Tanikawa 2012).

This scene of boat towing during the Edo Period might very well resemble the scenery in one of Utagawa Hiroshige's ukiyo-e prints, "Towboats Along the Yotsugi-dōri Canal" (figure 10.9). The scene portrayed in Hiroshige's print is located in Katsushika Ward (Katsushikaku 葛飾区), at a location under 3 km away to the northeast of present-day Hikifune.

Yotsugidōriyōsuihikifune
Figure 10.9: Towboats Along the Yotsugi-dōri Canal (四ツ木通用水引ふね)

The individual Kanjis of 押上 (Oshiage) translate to push (押 from the verb push "osu," "押す" in Japanese) and up (上). One interpretation of this name originates from the formation of the area: sediments being pushed up, making land out of a body of water, suggesting that this area was once underwater (Tanikawa 2012). Another interpretation of the name originates from the fact that this area was prone to flooding by rivers nearby in the past, where water "pushed up" over land (Tsutsui 2014). As a point of reference, the "Tokyo Skytree" I first mentioned in chapter 9 is situated in Oshiage.

Figure 10.10: This is one of the entrances of Oshiage station (Tokyo Metro). The station is situated by Tokyo SkyTree. (February 2016, photo by author)

Figure 10.11: The altitude of this location, 0.9 m above sea level, is show on the sign by the entrance. (February 2016, photo by author)

Figure 10.12: This photo is taken on a foot bridge, named “Oshinarihashi” (written in Japanese, “おしなりはし,” as seen here), situated by Tokyo SkyTree. The bridge crosses Kitajikkengawa (北十間川), the same canal discussed in chapter 9. (February 2016, photo by author)

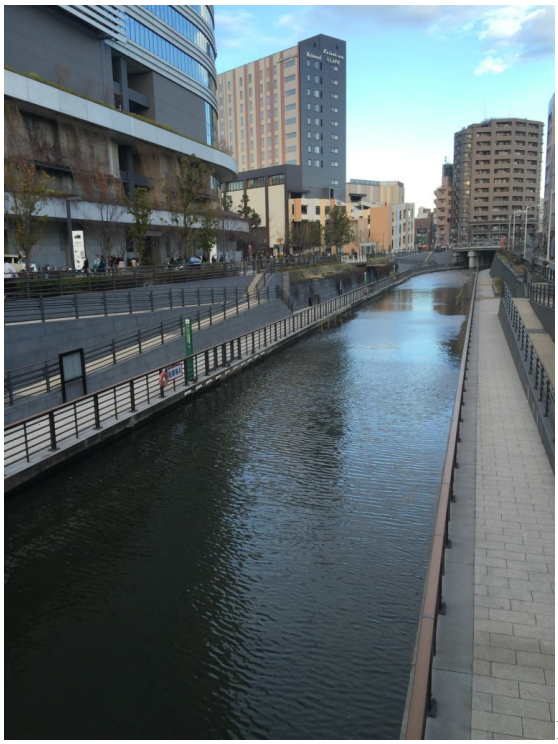
Figure 10.13: Kitajikkengawa flows westward and connects to Kyuunakagawa River (旧中川). (February 2016, photo by author)


Figure 10.14: Tokyo SkyTree (February 2016, photo by author)

While the individual name gives information about the original geography of the respective areas, there is great significance of their proximity. “向島 (Mukōjima)” and “京島 (Kyōjima)” both suggest the topography of a “raised” piece of land that is higher than its surrounding, appearing as “islands.” “押上 (Oshiage)” suggests an area formed by the “piling up” of sediments, creating an “island.” “曳舟 (Hikifune)” suggests the presence of rivers which could have “separated” the islands. The proximity of these four names is the telltale of the geographic past of this area.

Figure 10.15

The third map (figure 10.15) covers approximately 19 km^2 in Kōtō Ward (江東区). About 700 years ago, this entire area was part of a shallow sea and formed part of Tokyo Bay. Earth and sand was transported via natural rivers including Sumidagawa (隅田川) and Nakagawa (中川) for reclamation. This reclamation progressed from north to south towards Tokyo Bay (Nakagawa Museum n.d.).

Demand for land and infrastructure increased sharply in the Edo period. Kōtō Ward not only had its share of land reclamation, but also the development of a network of canals. As part of the development and enrichment plan for Kōto Ward, canals were built in order to import resources including rice and wood from parts of Kantō region and Tōhoku region, as well as to export products produced in Edo to these regions. In addition, the Great Fire of Meireki of 1657, which destroyed much of Edo, became the catalyst that led to the redesigning of Edo as a city. Much of the infrastructure, including temples and the estates of daimyōs, were spread out from the centre to the surrounding areas of Edo. As a result, the demand for more land grew. For coastal areas like Kōtō Ward, land was reclaimed from Tokyo Bay (Nakagawa Museum n.d.) (明暦の大火 2016).

By plotting these specific points on the map in Kōtō Ward, we can see how the place names function as historical sign posts that point to evidence of reclamation in the area. The two names with the Kanji for island "島" near the top of the area, "大島" (Ōjima) and "石島" (Ishijima), were located near coastline before the reclamation. The name "海辺" (Umibe, near centre) literally means "seaside," echoing the original geography of the area. The same can also be said for "塩浜" (Shiohama), a name which contains the Kanji "浜" which also means seaside.

More intriguing still, are the four names with the Kanji for sand, "砂." (suna) 北砂 (Kitasuna), 東砂 (Higashisuna) (Kitasuna), 南砂 (Minamisuna) (Higashisuna), 新砂 (Shinsuna) (Minamisuna) were all part of 砂町 (Sunamachi) (Shinsuna)—"砂" means sand, and "町" means town—which was previously (Sunamachi)

named 砂村 (Sunamura) or "Sand Village" before becoming a town. While there are opposing arguments behind the origin of the name of this area, it cannot be disputed that the name 砂村 (Sunamura) originated from the geography, the sandy soil (砂地) of the area (Tanikawa 2012). But what makes the four names intriguing is that the names themselves suggest the sequence in which the reclamation may have progressed.

Consider the literal meaning of the first Kanji in each name: 北 means north, 東 means east, 南 means south, and 新 means new. Using these definitions, we can argue that 北 (north), 東 (east), 南 (south) are prefixes to their respective 砂 (Suna) that indicate the position relative to the other "Suna." South of 南砂, "South Sand," we find 新砂 (Shinsuna), "New Sand." Could the naming of Shinsuna suggest that this area is named after Minamisuna and thus newer, or perhaps even *newest* amongst the four areas?

The historical sequence of reclamation in the area supports this idea, since reclamation progressed from north to south, making Shinsuna quite literally the "newest sand." The use of dynamic maps can show a visual sequence of the progression of reclamation that correlates with the meaning of the place names.

All three examples demonstrate how the map, or in Tukey's words, the *picture*—a tangible visual manifestation of data—forces us "to notice what we never expected to see" (2012: p. 10). Of course, not only can the Tokyo Water Map function as a visualising tool, but also as a medium that facilitates collaboration, as well as the gathering and sharing of information on the waters of Tokyo.

Different maps, different roles

There are existing web sites and online maps dedicated to transmitting information on the latest updates on earthquakes in Japan, including the earthquake page managed by Yahoo Corporation Japan, and the Japan Seismic Hazard Information Station Map (commonly known as the J-SHIS Map) managed by the National Research Institute for Earth Science and Disaster Resilience (Yahoo Japan 2016) (J-SHIS 2012). These function as transmitters of information at times of earthquakes and tsunamis.

In comparison, the Tokyo Water Map functions as an active repository and transmitter of information about places susceptible to such disasters, a tool to encourage us to rethink the meaning of place names and how we can create safe environments based on past knowledge. It is a map that functions as a complimenting counterpart to maps like the J-SHIS Map.

拡

pronounced “hiro[geru]”
meaning “spread,” “expand”
of memories to be spread, of knowledge to be expanded

"Too much information, and so much of it lost. An unindexed Internet site is in the same limbo as a misshelved library book. This is why the successful and powerful business enterprises of the information economy are built on filtering and searching."

James Gleick, The Information

Collecting data points

The place names on the Tokyo Water Map are primarily based on the dataset of names associated with the individual postal codes within the 23 Wards of Tokyo listed by Japan Post (日本郵便 n.d.). The place names associated with water are extracted from the dataset, and plotted as points of interest on the map. However, since the Tokyo Water Map was constructed only as a prototype, the water-related place names included form only a small fraction of all potential water-related place names. The process of gathering all applicable names is a far more involved and intricate process that would involve the following steps.

Identifying names that are in current use and include Kanjis with water-related Radicals

This is the first and most elementary step. Using individual postal codes within the 23 Wards of Tokyo listed by Japan Post as my dataset, I searched for all place names with Kanjis that included water-related Radicals, including the Kanji for "water" (水) itself. This can be a mechanical process by simply defining and searching for the target Kanjis.

Identifying names that are in current use and include Kanjis without water-related Radicals but are associated with water

There are Kanjis that are associated with water but do not embody water elements. These include Kanjis like "suna 砂" (sand), "shio 塩" (salt, also a homonym of "shio 潮," meaning tide) "hasu 蓮" (lotus), "fune 船" (boat/ship), "shima 島" (island), "kame 亀" (turtle, a Kanji used in names of places with island-like topography). Names that include these and other Kanjis in this category can also be mechanically searched by defining the target Kanjis in a dataset. This is the same process used when compiling names for the Tokyo Water Map.

Identifying names that are in current use whose water-related originals have become hidden

These include names that have no identifiable water elements, i.e. names with Kanjis that do not have water radicals and/or do not have apparent association with water. Hibiya (日比谷) is one such example of names in this category. Identifying these names cannot be done simply as a mechanical process of identifying names on a dataset like

names associated with postal codes within the 23 Wards of Tokyo listed by Japan Post. This process involves searching for places names in archives, chronicles, historical maps, literary works, and ancient texts. Names on the Tokyo Water Map only captured a fraction of these names.

Identifying water-related place names is the process of collaboration that involves researchers in academia who can provide perspectives from the both humanities and sciences, researchers and enthusiasts who conduct independent and grassroots level research, and the very people who grew up learning about legends and folklore who can contribute and create a larger narrative to place names. (In the context of the Tokyo Water Map, these people can take on the roles of "Curator" and "Collaborator.") This is especially true when we take place names that are no longer in use into consideration.

Since postal codes are assigned to all areas in Japan, using the postal codes associated names for the Tokyo Water Map will ensure that all current names are included. However, places names from the past—names that are no longer in use because of social and political changes in villages, towns, and other areas—will remain unaccounted for. Unless we include past and present names, we cannot create a map that can accurately reflect the relation between places and their respective names.

Interdisciplinary collaboration

In an interview, Hirakawa spoke of the importance in breaking barriers between disciplines, and advocated interdisciplinary research on natural disasters of the past. He explained that it is primarily researchers in the Sciences in Tohoku University who

conduct research in earthquakes, tsunamis, and flood damages. There is great significance in these researchers benefiting from the achievements as a result of historical research. In addition, there are researchers of Tohoku University in the Humanities—Law, Economics, Psychology, Sociology—who also conduct research in disaster. Collaboration and interdisciplinary research can provide vital contribution to both local communities and society as a whole (Hirakawa 2011).

In hindsight, the timing of this interview proved most haunting: the interview took place on January 19, 2011, mere weeks before the 2011 Tōhoku earthquake and tsunami.

The power of such collaboration was most evident during the post 2011 Tōhoku earthquake and tsunami investigations in the affected regions. Scholars of history, literature and ancient Japanese texts, independent researchers of folklore and shrine legends, geologists and paleogeologists, governmental staff, engineers of power companies, and residents who grew up learning about shrines in tsunami prone communities all contributed towards a narrative that demonstrated the importance of information about past catastrophes, and the relevance of this information in view of the 2011 disaster (いにしえからの警告 2012).

The challenge now would be to continue building upon knowledge of the past, and to strengthen awareness of this narrative in the current generation.

Information tsunami

"Part of the intrigue and power of the social web lies in its ability to transmit data through a multitude of networks that grow exponentially the more 'popular' the information is." Kawano made this comment about how people spread information via social media during and the days following the 2011 Tōhoku earthquake and tsunami (2014: p.174). The significance here is that the information Kawano spoke of was spread by users via the Internet. Unlike the traditional form of unidirectional broadcast—from broadcasters to audience—such as television and radio, a person can be both the broadcaster and audience, or in essence, a "broadcasting audience," since both the information transmitted and received by the same person can be equally relevant. There is no centralized engine that drives the distribution of this information. The broadcasting audience becomes a part of the medium that transmits the information, in the same principle as how waves would traverse across the ocean, with the water being the medium.

Information shared by the broadcasting audience during the early stage of 2011 Tōhoku earthquake and tsunami was driven by the need for updates and confirmation of the safety of family and friends, both within and beyond the disaster zone. The need for information, a result of the disaster, fuelled the momentum of information flow, a reaction to the disaster.

Since the coming of the next disaster is not a mere possibility but a fact, the need to spread the information and knowledge about place names in Tokyo before the next major earthquake hits should be taken with the same sense of urgency as the information shared during the 2011 Tōhoku disaster.

Giving the past a present voice

While we cannot necessarily avoid all tragedies from the next major earthquake, the awareness and understanding of place names in Tokyo can at the least help minimise damage and casualties and, in the long term, help us rethink and re-examine urban designs and developments. In addition, there is a tragedy we are capable of preventing from taking place: the tragedy of forgetting.

Research is active and ongoing. Information is available to anyone interested. However, the point that needs to be addressed is whether or not this information is reaching the general public, whether or not this information is reaching the current generation, the generation that could be facing the consequences of future catastrophes, the generation that will be responsible for developing and maintaining Tokyo and its infrastructure. People who were brought up with folklore in the Tōhoku earthquake-prone communities and made use of their knowledge during the earthquake survived. If the residents and commuters of Tokyo are brought up with the knowledge of place names, would they not benefit from this knowledge just as the people in the Tōhoku region did? Would they also not benefit from the very idea of discussing, transmitting and spreading, as well as maintaining awareness of this knowledge? In order for this to happen, the knowledge needs to reach the current generation; the research needs to reach its intended audience.

A number of museums in Tokyo dedicate resources to educate the public about earthquakes and tsunamis, and the water-related history of Tokyo. The Edo-Tokyo Museum (江戸東京博物館 Edotōkyōhakubutsukan), a museum of the history of Tokyo, has a permanent

exhibition area dedicated to the Great Kantō Earthquake and the Great Flood of Tokyo. The Nakagawa Funabansho Museum (中川船番所資料館 Nakagawafunabanshoshiryōkan), situated in Kōtō Ward (江東区 Kōtōku), "actively [promotes] an understanding of and [brings] local history closer to local residents through the story of the Nakagawa Waterway Office" (Nakagawa Museum n.d.). Visitors to these and other museums can learn about the water-related history of Tokyo. However, this would still require people to physically visit these museums. While it may not be possible to bring everyone to the museums, is it possible to bring the museums to the people?

Museum in the streets, in the palm of your hand

We have seen how the Tokyo Water Map can function as an online space for gathering and sharing information. Students and researchers alike can access this information on a computer or a mobile device via Internet.

Bringing a museum beyond the limits of its walls is not a new concept. "Historical walking tours" is one form of experiencing the spatial aspect of history by visiting actual historical sites, although the temporal aspect cannot be experienced. Apps on mobile devices, however, have made it possible to (re)create this missing aspect by using geographic information systems (GIS) augmented reality technologies.

Co-developed by the Museum of London and TV channel HISTORY™, "Streetmuseum™: Londinium" is an app available for mobile devices that guides users to tour Roman London, to visit archeological sites, to virtually excavate sites, and to view

re-enactments of activities at historical points of interest via the mobile device (Londinium n.d.). This project is significant on many levels.

Firstly, it is an active step to push the boundaries of the museum beyond the physical walls into the public space in London. By imprinting virtual sites onto the actual locations in the city, the museum is effectively recreating the memories on the landscape, memories that are significant to the locations with associating points in time.

In addition, using an app as the vehicle for projects like Londinium is an efficient way to leverage on the current generation of users' familiarity and dependency on mobile devices. The act of using the app, for example, to virtually excavate a site in London, would be no different from the act of playing a game on a mobile device. In this sense, the app also functions as a bridge that could lead users to an otherwise unfamiliar subject.

Navigating the waters of Edo/Tokyo

A fully-developed version of the Tokyo Water Map could have the same potential as *Streetmuseum*^{TM}*: Londinium* as the vehicle to deliver knowledge about place names in Tokyo to a broader audience, an audience that includes the "broadcasting audience" that could potentially become contributors to this database of knowledge, adding content and relevance to the existing narrative. Users can also visit actual locations and, using the app as a lens to the past, view these locations as they were in different points of time in history. We have seen how the Tokyo Water Map can function as an online space for gathering and sharing information. Students and researchers alike can access this information on a computer or a mobile device via Internet.

Most importantly, this app could potentially be the catalyst to popularise the study of place names, and increase the awareness of this knowledge. Just as a user of *Streetmuseum*^{TM}*: Londinium* could virtually excavate a site in London, a user of a "Tokyo Water Map app" could "discover" a point of interest associated with a name place related to water in Tokyo. This act of discovery may be perceived as a game, and the user might not understand or necessarily appreciate the historical significance of the discovery. However, the user would become aware of this point of interest; the seed of a memory would be planted in the user's mind. Similarly, residents of the Tōhoku region might not have fully understood the historical or mythological significance of shrine legends and folklore when they were taught of these stories at a young age. What is significant, however, is that the memory of the legends and folklore were planted in their minds. The residents were made aware of the knowledge.

続
pronounced "tsuzu[ku]"
meaning "to continue"
the narrative must continue; the sharing of stories must continue

A continuous narrative

At the time when I initially conceptualised this thesis, the "most recent" major earthquake in Japan was the 2011 Tōhoku earthquake and tsunami. The 2016 Kumamoto earthquakes have since taken the top spot on that long list of earthquakes in Japan. In view of historical records, research, and evidence discussed in this paper, the coming of the next major catastrophe is not a mere possibility, but rather a fact.

We have arrived at a point in time in history where, on one hand, there is a wealth of knowledge about earthquakes and tsunamis of Tokyo that accumulated over generations, and on the other hand, circumstances have rendered much of this knowledge forgotten.

In closing this thesis, I would like to propose the following initiatives as potential steps that can be taken forward towards preserving and fostering interest and awareness of, and towards reconnecting the general public—residents and commuters of Tokyo in particular—to this knowledge. These projects are, alas, beyond a Master thesis, but could potentially be engaged in if this were a PhD dissertation.

1. Introduction of water-related local history and folklore of Tokyo into the elementary school curriculum in Tokyo and neighbouring cities in the Kantō region
2. Collaboration with museums to further develop digital maps and apps to spread and popularise knowledge about water-related local history and folklore

Bringing local (hi)stories back into classrooms

The very notion of sharing shrine legends, folklore, and local history, as practiced amongst the residents of the Tōhoku region, needs to be reintroduced back to where public education begins. Creating an app that could share or even popularise water-related place names and history by itself, albeit a significant step forward, would be insufficient. The app can function as the vehicle to spread the knowledge, but the

knowledge itself must be made known to future residents and commuters of Tokyo early in their education.

Considering the current Elementary School Curriculum Guidelines (小学校学習指導要領 shōgakkōgakushuu shidōyōryō) as stipulated by the Ministry of Education, Culture, Sports, Science and Technology (文部科学省 monbukagakushō), the study of the "Waters of Tokyo" could be integrated into the existing curriculum, under the subject areas of "Social Studies" (社会 shakai) and "Integrated Study" (総合的な学習 sōgōtekinagakushuu) in a systemic and logical manner.

Classification		Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
Number of class hours for each subject	Japanese Language	306	315	245	245	175	175
	Social Studies			70	90	100	105
	Mathematics	136	175	175	175	175	175
	Science			90	105	105	105
	Life	102	105				
	Music	68	70	60	60	50	50
	Arts and Crafts	68	70	60	60	50	50
	Home Economics					60	55
	Physical Education	102	105	105	105	90	90
Number of class hours for Moral Education		34	35	35	35	35	35
Number of class hours for Foreign Language Activities						35	35
Number of class hours for Integrated Studies				70	70	70	70
Number of class hours for Special Activities		34	35	35	35	35	35
Total number of class hours		850	910	945	980	980	980

Table 12.1: Japanese elementary school subjects and the allotted time in the respective grades, translated from the original chart in Japanese

The following extracted objectives (bullet points) and contents (indented bullet points) are listed in the guideline under the subject area of Social Studies for grades 3 and 4 students. These objectives are congruent with the study of the "Waters of Tokyo."

- Gaining an understanding in maintaining the safety and wellness of the living environment
- Fostering investigative and interpretive skills about the characteristics and relations about social phenomena in the community by using maps and various materials in an effective manner
    - To observe and investigate characteristics of the geography, land use, and existing buildings from ancient times in the students' own surroundings, their area of residence, and their city, in order to recognise the differences in different areas/locales
    - To foster an understanding of the infrastructure and people who maintain community safety, by learning through investigating and making use of data that pertain to community disaster and accident prevention
    - To foster an understanding of the changes in people's lives and aspirations, the achievements and struggles of ancestors who worked for the betterment of community life, by investigating and recording (1) tools used since ancient times and the time periods when these tools were used, (2) inherited cultural property and annual events, and (3) examples of ancestors working for the development of communities (2008: p. 22 – 23)

The curriculum further develops in both breadth and depth into grades 5 and 6. Part of the curriculum in grade 6 is of particular interest, as it states specifics in the study

of legends and folklore, and the formation of the country (Japan); it lists “Kojiki,” 古事記 (Kojiki) (“Records of Ancient Matter”), “Nihonshoki,” 日本書紀 (Nihonshoki) (“The Chronicles of Japan”), “Fudoki,” 風土記 (Fudoki) (“ancient reports on provincial culture, geography, and oral tradition”) as suggested sources for the studies. “Fudoki” would be of particular significance because it includes information on a local level (小学校学習指導要領 2008) (Kojiki 2016) (Nihon Shoki 2016) (Fudoki 2016).

All of the points I have discussed in this thesis—studying about elements of water hidden in place names (e.g. Ikebukuro), studying the hidden geographical and socio-geographical elements in place names (e.g. Hibiya, Dōgenzaka), studying shrine legends and folklore (e.g. Namiwake Shrine), studying earthquake and tsunami related mythology (e.g. the earth-shaking catfish Ōnumazu, the tsunami “slaying” deity Fudō Myōō) could be integrated into the existing curriculum. What I am proposing is not to create a new curriculum from ground up, but rather to build upon and complement the existing curriculum. Such would be similar to Tokugawa Ieyasu’s idea on building upon the existing Edo Five Routes, i.e. building upon existing (infra)structure and knowledge.

In addition to Social Studies, class hours allotted to “Integrated Studies” could also be used for the study of the “Waters of Tokyo.” As stated in the Elementary School Curriculum Guidelines, one of the objectives of Integrated Studies is to develop students’ nature and ability to subjectively decipher and judge, as well as to solve problems, by having the students, through integrated and inquisitive learning, search for study subjects themselves, to learn by themselves, and to think by themselves (2008: p. 98). Most importantly, because the decision on the “subject of study” rests with the schools, schools

could collaborate with local organisations and museums, and use the study of the "Waters of Tokyo" as the subject of the students' Integrated Studies.

Integration of the "Waters of Tokyo" into the elementary school curriculum is important and effective in that students will be exposed to this knowledge at an early age, allowing them to grow up with an awareness of place names and local history. And as the first "generation" of elementary school students who have learned of this knowledge continues onto junior and senior high school, the curricula in these higher levels of education should also be amended to accommodate the continual study of this knowledge.

Collaboration with local transmitters of knowledge

As a logical extension to introducing the "Waters of Tokyo" into classrooms, collaboration with museums can further promote the sharing and preservation of knowledge, local history, and folklore through the development of the "Tokyo Water Map" app.

This collaboration is vital in that local museums can function as both the source and transmitter of knowledge, the larger version of the "broadcasting audience." Local museums have the advantage of being part of a community—the place where students and visitors from the local community and beyond would visit—and have a more intimate understanding of and expertise in local history, including shrine legends and origin of place names. This is significant in that information of the Tokyo Water Map app requires

information at that level of detail and accuracy to truly convey the importance of the information.

Museums would also be a logical place to introduce the app to the general public, just as the Museum of London did with *Streetmuseum*^{TM}*: Londinium*. The next step would be to approach a museum that can potentially contribute to the development of and benefit from the Tokyo Water Map app.

The Nakagawa Funabansho Project – a starting point

Nakagawa Funabansho Museum would be an ideal museum to collaborate on the creation of a "Kōtō version" of the water map/app.

This museum covers primarily the history of Kōtō Ward, a ward that came about as a result of the land reclamation through history since the Edo Period (江東区 2016). The ward literally expanded southward into Tokyo Bay, increasing its area while decreasing that of the bay. In the wake of the reclaimed areas came waterways, shrines, and water-related place names: all evidence of the ward's aquatic past.

Kōtō Ward encapsulates the many aspects of the intimate relation between Edo/Tokyo and Tokyo Bay. With its richness in local water-related culture and history, it is an ideal stage upon which a Kōtō Water Map and associated app can be created and piloted.

The expertise and knowledge that Nakagawa Funabansho Museum has can be put towards the contribution of data and information for "points of interest," and gauge the level of details appropriate for the app. By the same token, the museum can also benefit

from the app: the museum itself being the physical centre of information and archives, with the app functioning both as the tool users can use to learn and discover about the history of Kōtō Ward, and as the compass that points to the source of information, Nakagawa Funabansho Museum.

Participation from different sections of the community—with the museum, researchers, and enthusiasts gathering and sharing information, with the schools teaching local history, with students growing up learning and potentially becoming contributors of knowledge and managers of the app—is a significant step towards fostering and encouraging the revitalisation of the historical narrative that needs to be carried onto generations to come.

The successful completion and implementation of the "Kōtō Water Map" app in cooperation with Nakagawa Funabansho Museum can be used as a basis to further develop maps and apps on a larger scale, similar to the "Tokyo Water Map" which covers all 23 Wards of Tokyo.

Furthermore, just as water-related local history can be reintroduced into classrooms of Kōtō Ward, the same can and should be done so for other wards of Tokyo and beyond. Just as the initial tremor off the coast of Miyagi Prefecture marked the start of the 2011 Tōhoku earthquake and tsunami, with its effects rippling outward from the epicentre, Kōtō Ward can be that new epicentre of a renewed sharing of knowledge in local history, legends and folklore, and the testament to the importance of remembering knowledge of the past that can help shape the future.

Full circle

Knowledge. This is the gift that Japanese people of generations past have carefully preserved—weaved into the tapestry of mythology, paved onto ancient highways, built into shrines, written into ancient texts and literature, encoded into place names. They made full use of an originally foreign writing system, Kanji, incorporated, adapted and reinvented it, and created the Sino-Japanese vocabulary, which is now an intrinsic part of the Japanese language itself.

Within this language, we find clues to the relationship between Tokyo and its waters, clues that point us to place names of locations with water-related history, which, in turn, could lead us to places that are potentially vulnerable to future earthquakes and tsunamis.

The challenge we face now is how to preserve and spread this knowledge, how to harness the power within this knowledge, and to translate and materialise this knowledge into a renewed way of thinking and designing of living space. This is a *renewed* and not a *new* way of thinking: Japanese people of the past have long been using this knowledge; we simply need to revisit this knowledge now, before the Ōnamazu, the giant mythical catfish beneath Japan makes its next move.

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