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［要旨］
近世日本では、将軍や大名のあいだで鷹狩が盛んに行われた。本稿では、まず江戸幕府の歴代の将軍が好んだ鷹狩や、それをささえた制度について具体的に説明した。次に、近世には200以上もの藩がおかれ、大名のあいだでも鷹狩が行われていた。その例として加賀藩前田家に注目し、領国だけではなく、参勤交代で江戸に滞在しているあいだでも下屋敷で鷹狩が行われていたことを紹介した。鷹狩をするには、鷹だけではなく、鷹が捕獲する鳥たちも生息していなければならない。そこで鷹狩を実現できた背景として、近世独自の日本近世型生態系が創出されていたことを明らかにした。

[Abstract]
During the Edo period(1603–1867), falconry (known as *takagari* in Japan) was actively practiced among the shoguns and daimyos. The first part of this article describes the falconry practices used by the successive shoguns of the Edo shogunate and the institutional system that underpinned them. During The Edo period, JAPAN was divided into more than 200 feudal domains, and the rulers of these domains, the daimyos, also enjoyed falconry. The second part of this article focuses on one of these daimyos: the head of the Maeda clan, who ruled the Kaga Domain. This section introduces the falconry activities that the Maeda clan practiced in its domain, as well as those practiced in its *shimo-yashiki* (daimyo's residence in the suburbs of Edo)　when sojourning in Edo as part of the *sankin-kōtai* (a system that required daimyos to move periodically between Edo and their domains). Falconry requires, in addition to the raptors themselves, stocks of fowl for the raptors to hunt. Hence, the article reveals the ecosystem, unique to the Edo period, that enabled falconry.

[Keywords:] falconry, the Edo period, the Shoguns of the Edo, the Maeda clan, ecosystem

Introduction

His Highness's pastimes: Falconry and the suffering of the masses [1)]

The above is a piece of satires dated to the sixth month of Kyōhō 7 (1722). The biting satire refers to Tokugawa Yoshimune, the eighth shogun of the Edo shogunate. However, Yoshimune was by no means the only shogun who enjoyed falconry, or *takagari*.

The founder of the Edo shogunate, Tokugawa Ieyasu, was himself an avid falconer. According to one account, Ieyasu was already handling falcons in his youth, when he was held hostage under Imagawa Yoshimoto, a Sengoku-period daimyo (feudal lord) in the Tokai region. He engaged in the pastime until shortly before his death in Genna 2 (1616) at the age of 75. Likewise, the second Edo Shogunate, Tokugawa Hidetada, frequently went on falconry trips, and the third and fourth Edo shogunate, Iemitsu and Ietsuna, upheld the tradition[2)].

Thus, in practicing falconry, Yoshimune (the eighth Edo shogun) was upholding the tradition of his predecessors. His predecessor, Tokugawa Tsunayoshi (the fifth Edo shogunate), effectively banned falconry, but Yoshimune reinstated it prior to assuming the office of shogun in Kyōhō 1 (1716). To that end, he gathered books on Iemitsu and Ietsuna's falconry methods and interviewed *takajō* (falconers responsible for rearing and training the raptors) to ascertain how Ietsuna had led falconry trips. Then, to create game preserves, he revived the old hunting restrictions in the environs of Edo. Consequently, falconry thrived in the region in May of the following year. Thus, the raptors were set loose to hunt in the region again for the first time in over 38 years, the last time being in Enpō 7 (1679), during Ietsuna's reign[3)].

The first part here describes the falconry practices preferred by successive shoguns and the institutional system that underpinned them. During the Edo period (1603–1867), Japan was divided into more than 200 feudal domains, and the rulers of these domains, the daimyos, also enjoyed falconry. The second part of this article focuses on one of these daimyos: the head of the Maeda clan, which ruled the

Kaga domain. Then this article focuses on the falconry practices of the Maeda clan as an example of such daimyos. Falconry requires that, in addition to the raptors themselves, stocks of fowl for the raptors to hunt should be kept in the area. Hence, the article discusses the kind of natural environment that was cultivated in the Edo period ecosystem in order to enable falconry.

As the above graffiti insinuates, falconry had a dark side. Thus, I aim to give an account of the Edo period falconry that covers both its positive and negative aspects.

1. Falconry as Practiced by the Shoguns

What attracted the shoguns to falconry?

A decorative folding screen painting known as the *Edo-zu Byōbu* depicts Edo and its environs during the years of Kan'ei (1624–44), one of the eras of the Edo period. Much of the screen's content focuses on the deeds of Tokugawa Iemitsu (the third of the Edo shogunate).

Fig.1 A portion of the *Edo-zu Byōbu*[4)]

Most notably, the screen includes many falconry scenes. Figure 1 shows a scene from the *Edo-zu Byōbu*. The scene depicts a procession of Iemitsu and his entourage going to hunt in Kōnosu, a location in the province of Musashi, north of Edo. Toward the front of the line are five *takajō* with raptors perched on their left arm. Note that I use "raptors" as a catch-all term for a variety of birds of prey, including northern goshawks, Eurasian sparrowhawks, Japanese sparrowhawks, and peregrine falcons. Judging from their size, the raptors depicted on the screen are probably northern goshawks. The three men bearing rods are beaters known as *seko*. They would beat the bushes to flush the birds from their cover, exposing them to the raptors. The *seko* were followed in the procession by a band of samurai.

According to this picture, a falconry trip involved a regimental procession of the shogun's whole entourage, implying that falconry served a purpose of training the shogun in military organization. A shogun was a samurai warrior and, as such, was expected to learn the martial arts and engage in military affairs. Falconry played an important role in this. However, a shogun was not only a samurai, but also a commander. According to the Edo shogunate chronicle *Tokugawa Jikki* ("Official History of the House of Tokugawa"), the shoguns' interest in falconry stemmed from a principle Ieyasu would frequently relate:

> *Falconry is not just for pleasure. Rather, it is a chance to venture far from the city walls and observe the sufferings and customs of the common people*[5)].

In other words, falconry trips gave shoguns a chance to learn the condition of the common people.

Gift-giving in falconry

The raptors used in falconry were more than just birds. Since ancient times, they have been symbols of authority and power. Both raptors and game fowl were highly prized as gifts and were offered to, or bestowed by, the emperor and shogun. Falconry-related gifting practices thrived all the more in the Edo period.

An example of such gifting can be seen in the practices of a daimyo in the early years of the Edo period. The daimyo in question was of the Akita Domain, and he ruled the province of Dewa. While the daimyo sojourned in Edo as part of the sankin-kōtai (a system that required daimyos to move periodically between Edo and their domains), the shogun would bestow upon him cranes caught in a falconry trip. One account from Genna 8 (1622) reveals how the daimyo responded to such bestowals: "The daimyo visited Edo Castle to pay his respects to the shogun. He then hosted a banquet

for the shogun's elder councilors and other senior officials. For the banquet, the crane was carved in a certain manner and served as a soup dish. The soup was followed by lavish dishes, and a Noh performance was staged for the guests, as part of a splendid banquet. The daimyo repeatedly organized such extravagant banquets to demonstrate his obedience to the shogun." [6)]

As the above example illustrates, the shogun's bestowals of game fowl, such as cranes and swans, held great political weight. Here again, falconry played an important role. The same was true for the hunting grounds. For political and military reasons, the shoguns set aside areas in the environs of Edo as grounds for practicing falconry. These areas were known as *takaba*, or "falconry grounds." The wider Kanto region, which encompassed the shogun's residence in Edo, consisted of a large plain bordered by the Kanto Mountain Range. Rather than consisting only of rice paddies or dryland farms as far as the eye could see, the plains featured plenty of woodland and *satoyama* (border zones between foothills and flat land), which offered habitats for birds and beasts.

Politically, Kanto was an area where one would expect to see the institutions of shogunal authority firmly in place; the region included territories ruled directly by the shogun as well as territories ruled primarily by the shogun's direct retainers, either the *hatamoto* ("shogunal vassals") or *gokenin* ("lower-ranking shogunal vassals"). At the same time, however, many retainers had their fiefs in Kanto, meaning that the region included a patchwork of locally ruled territories. Thus, shogunal authority was, ironically enough, rather limited in Kanto. In extreme cases, multiple feudal lords controlled a single *mura* (rural jurisdiction).

To address this impediment to shogunal authority, Iemitsu established *takaba* to cover all the village settlements in the Edo's environs in Kan'ei 5 (1628). These environs would encompass a radius of about 20-kilometer (5 *ri*) from Edo. By converting the Edo environs into *takaba*, Iemitsu bolstered his authority across the territory, as evinced by his proclamation that no suspicious persons should set foot therein[7)].

Animal protection laws

Despite Iemitsu's action, his son and successor, Tokugawa Tsunayoshi, took a different turn. After he became the fifth shogun, Tsunayoshi discontinued the pastime of his predecessors.

Tsunayoshi famously instituted a series of animal protection laws known as the *Shōrui Awaremi no Rei*, or the "Edicts on Compassion for Living Things." The edicts are remembered particularly for protecting the welfare of dogs, but canines were not the only creatures protected. The edicts covered all living things, including humans. The shogun included humans in the legislation in response to a societal disregard for the value of human life; around that time, many invalids were abandoned and many infants discarded. Tsunayoshi hoped that including humans in the legislation would inculcate the principle that all life is sacred. In recognition of this, Tsunayoshi's legacy has come to be appraised more favorably in recent decades, with his animal protection policies described as the *Shōrui Awaremi no Seisaku*, or the "Policies on Compassion for Living Things." [8)]

As a blood sport involving the needless killing of living things, falconry contradicted the edicts. Accordingly, Tsunayoshi's reign saw a sizeable decrease in falconry-related gifting and also in the numbers of *takaba* administrators. In due course, the shogun revoked the system of *takaba* altogether and released his raptors into the wild. This development had a significant impact, with the ramifications extending to the daimyos. The Kaga Domain had possessed *takaba* in the province of Sagami (roughly overlapping today's Kanagawa Prefecture), which the shogunate had bestowed upon them. However, in Genroku 6 (the tenth month of 1693), the domain returned the *takaba*, just as other daimyos had returned theirs. The reason was stated as follows:

> *The reason [why daimyos are returning their takaba to the shogun] is reportedly because of the prohibition on killing animals in the Kanto jurisdiction*[9)].

This statement reveals the extent to which the prohibition on killing animals was enforced throughout Kanto.

Takaba in the Edo environs

Tsunayoshi passed away in Hōei 6 (1709), bringing an end to

the animal protection dispensation. Falconry was then revived by his successor, Tokugawa Yoshimune (the eighth Edo shogunate). The reinstated *takaba* continued as an instrument of shogunal rule in Kanto until the end of the Edo shogunate in 1867, although the forms and practices of falconry varied by region and time period[10]. The following paragraphs describe the zones in Kanto where falconry was practiced[11].

—Inner ring: about 20-kilometer (5 ri) radius from Edo

This zone was designated the *Otomeba*. The *Otomeba* itself contained a shogunal *takaba* called the *Okobushiba*. The *Okobushiba* was managed by officials known as *torimi* ("bird watchers"). This inner ring formed a defensive perimeter around the shogunate. Accordingly, all *rōnin* (masterless samurai) dwelling therein were investigated, and criminals were expelled.

Villagers (those classed as *hyakushō*) living in the zone were required to give their produce to Edo Castle and the shogun's household. They also bore the costs associated with falconry. For example, they would provide earthworms and mole crickets and bear the accommodation costs for the falconry officials. The earthworms and mole crickets were fed to birds used as quarry for the raptors, such as pigeons.

—Outer ring: about 20–40-kilometer (5–10 ri) radius from Edo

This zone consisted of *takaba* reserved for the *Gosanke* (the three noblest branches of the Tokugawa clan) and *takaba* that the shogun had bestowed to eminent daimyos. Regarding the latter, there was little consistency in terms of when the grounds were bestowed, where the grounds were located, and the size of the grounds. For these *takaba*, restrictions were imposed regarding what raptors and quarry fowl could be used. The Akita Domain, for example, was forbidden from using cranes or swans as quarry in the *takaba*. Since these birds would be offered by the shogun to the emperor, only the highest-ranking lords were permitted to use them as quarry.

—Beyond the outer ring

Beyond the outer ring lay the *Toraekaiba* (sometimes rendered as *Torikaiba*), which served as both a training ground for shogunal falconry and as a source of quarry fowl. The *Toraekaeba* was governed by an official known as the *takajō-gashira* ("head falconer"). The *takajō-gashira* would leave the day-to-day administration of the ground to caretakers known as *nomawari*. The area was situated in the Kanto Plain and Kanto Basin, but the exact area is unknown. According to Hiroshi Enomoto, toward the end of the Edo period, the *Toraekaiba* encompassed land worth 1.07 million *koku* of rice[12]. If so, then it would have been larger than the fiefs of eminent daimyos. The *takajō-gashira* and his *nomawari* would administer the *Toraekaiba* uniformly, regardless the status of individual lords.

The challenges associated with managing takaba

As we have seen, the Tokugawa regime established *takaba* by intersecting different feudal domains, thereby solidifying shogunal authority throughout Kanto. But how did this situation affect the local villagers?

Once an area was set aside as a *takaba*, locals would be banned from killing birds in the area. This prohibition was enforced in order to preserve stocks of sparrows and other small birds that served as the raptors' quarry or as their daily feed. The restriction made life harder for local villagers. Ducks and geese, among other animals, would flock to the rice paddies to eat the chaff, damaging the crops in the process. However, the villagers were prohibited from capturing such animals.

More problematic still was the presence of the officials in charge of maintaining the *takaba*. These administrators included the *takajō*. They also included men known as *esashi*, who were responsible for capturing small birds to feed to the raptors. *Takajō* and *esashi* would barge unceremoniously into villages, wrecking crop fields and forcing villagers to accommodate and entertain them. When villages became overrun with ducks and geese, the inhabitants would discreetly collaborate in an effort to drive the pests away. However, if a *takajō* or *esashi* got wind of such an activity, those responsible would be arrested and imprisoned. Tanaka Kyugu, a man who lived as a villager before being recruited as a shogunal official, expressed the sense of resentment toward the *takajō* or *esashi* as follows:

> *In inflicting harm on the populace, they are more terrifying than ravenous beasts and more vexing than serpents*[13].

In other words, when one's fields became part of a *takaba*, they would fall under the purview of administrators who were considered more savage than tigers or wolves and more detestable than snakes or scorpions. In addition to the above restrictions, the locals were also forbidden from fishing. Moreover, when they harvested the fields, they had to refrain from irrigating the field or turning over the soil; they were required to leave the chaff where it lay. These measures were intended to preserve an environment amenable to birds that feed on fish or chaff[14].

Thus, falconry had severe ramifications for the agricultural livelihoods of local villagers. Given this, the person who wrote the satire quoted in the introduction was likely venting frustration at plight of the common people resulting from falconry.

2. Falconry as Practiced by the Daimyos: Focusing on the Kaga Domain

The Kaga Domain's takaba

This section focuses on the falconry practices of the Maeda clan of Kaga Domain as an example of how falconry was practiced among the daimyos. The first of the Maeda clan, who founded the Kaga Domain, was Maeda Toshiie. Toshiie served Toyotomi Hideyoshi and showed valor by pacifying the Hokuriku region. In Tenshō 11 (1583), Toshiie occupied Kanazawa Castle. The Maeda clan continued to rule the region until the Meiji Restoration. The Maeda was the largest clan from the pre-modern period, boasting a territory worth 1.03 million *koku*. Their territory encompassed three provinces of Hokuriku: Kaga, Noto, and Etchū.

Figure 2 shows a map depicting, primarily, the citadel of Kanazawa and the Kaga Plain surrounding it. The Kaga Plain extends far longitudinally. To the east and south lies a mountain range with Mt. Hakusan in the center. The shaded area in the center of the map is Kanazawa. The upper part of the map shows the Kahoku district, while the lower half shows the Ishikawa district. The Kaga Plain is situated between the mountain range and the Sea of Japan. Two rivers intersect Kanazawa: the upper river is the Asano River, while the lower one is the Sai River. Further down the map appears a third river, the Tedori River, which forms a natural border with Nomi district (at the very bottom of the map). The map also shows a grid-like network of smaller waterways; these were irrigation channels that contributed significantly to the development of new rice paddies.

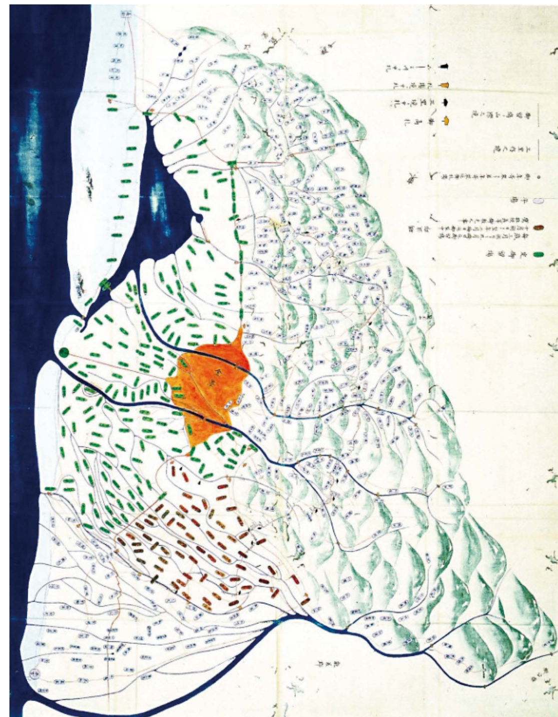

Fig.2 A color-coded map of *takaba* in the districts of Ishikawa and Kahoku during the latter years of the feudal domains[15]

The map displays the names of villages. The villages are color coded, indicating variation in the restrictions related to *takaba*. The Kahoku and Ishikawa districts, which adjoin Kanazawa, contain *takaba* owned by the Kaga Domain. However, depending on the time period, the coverage and role of the restrictions differed. To get an idea of these differences, let us see how the *takaba* were zoned in the Ishikawa district in Tenpō 14 (1843).

The key waterways shown below (southwest of) Kanazawa are, starting with the closest, the Fushimi River, the Nakamura Channel, and the Tedori River. From Kanazawa to the Fushimi River, people were forbidden to hunt or kill anything throughout the year. Only the lord of the Maeda clan was permitted to practice falconry here. From the Fushimi River to the Nakamura Channel, the clan's retainers were permitted to practice falconry, but only from October to

February of the following year. As for the area from the Nakamura Channel to the Tedori River, the retainers were previously forbidden to practice falconry from October to March of the following year, but the rule had been changed to allow them to practice falconry at any time[16].

Thus, in the case of Ishikawa district, falconry rules varied depending on proximity to Kanazawa, with the environs of Kanazawa being subject to the greatest restriction (only the head of the clan could hunt there).

Falconry as practiced by the lord and as practiced by his retainers

To illustrate how the daimyos practiced falconry, this section focuses on Maeda Yoshinori, the sixth head of the Maeda clan. Yoshinori was, broadly speaking, a contemporary of Tokugawa Yoshimune, the eighth Edo shogunate. With the lifting of the animal protection edicts, Yoshinori was able to resume falconry.

In Kyōhō 8 (1723), Yoshinori became head of the Maeda clan at the age of 34, taking over from his aged father Tsunanori (the fifth head of the clan). Tokugawa Yoshimune approved the succession. Yoshinori had already forged a rapport with Yoshimune through falconry. Indeed, four years before the succession, Yoshinori visited Edo Castle for an audience with Yoshimune, whereupon the latter bestowed upon the former a fledgling raptor he had received from Korea as a gift. The shogun then told Yoshinori that he knew how vast Hirao Villa (Yoshinori's *shimo-yashiki*, or daimyo's residence in the suburbs of Edo) was and that Yoshinori should use the area for falconry. When Yoshinori became the daimyo, Yoshimune bestowed upon him cranes that his raptors had captured[17].

From this account, we can tell that the gifting between shogun and daimyos had been revived.

Yoshinori continued his interest in falconry after returning from Edo to his native land as part of the *sankin-kōtai*. In the following year of Kyōhō 9 (1724), Yoshinori practiced falconry for the first time in Awagasaki, in the Ishikawa district. Then in Kyōhō 13 (1728), he let the raptors loose in Kahokugata and around Ota in the Kahoku district[18]. In the map in Figure 2, Kahokugata is the lagoon in the upper portion, while Awagasaki and Ota are shown around the lagoon. Moorhens were frequently hunted here. There were technical hurdles to capturing larger birds such as cranes. It is likely, then, that the typical quarry hunted there were waterfowl inhabiting the lagoon and the coppices around the rice paddies.

The next section discusses the falconry practices of Yoshinori's retainers. I have already mentioned that the retainers could hunt in the area from the Fushimi River to the Tedori River. However, the status of the samurai did not necessarily entail the right to keep raptors. The species of raptors one could keep depended on one's rank, as measured by stipend. For example, until Enpō 5 (1677), retainers of the Kaga Domain could only keep goshawks if their stipend exceeded 3 thousand *koku*[19]. As of Kyōhō 9 (1724), approximately half a century later, the clan counted over 1,100 retainers in total, of which just 43 (about 4 percent) boasted a stipend of over 3 thousand *koku*[20]. Thus, falconry served as a status symbol for the samurai.

The shimo-yashiki in Edo

In addition to practicing falconry in their native lands, the daimyos would practice the sport when sojourning in Edo under the *sankin-kōtai*. I mentioned earlier that the Kaga Domain held a *takaba* in the Sagami province and then returned it to the shogunate in Genroku 6 (1693). The shogunate never again bestowed a *takaba* to the domain, yet the domain still practiced falconry in a certain location: the domain's *shimo-yashiki* ("lesser residence") in Edo, where Tokugawa Yoshimune had instructed Yoshinori to practice falconry.

Originally, the shimo-yashiki was a 20-hectare estate bestowed to the clan by the shogunate in Enpō 7 (1679). It was located in the outskirts of Edo, specifically, in Itabashi-shuku Hirao (one of the stations along the route to Edo). The estate ultimately expanded to around 72 hectares, making it the largest of all daimyo residences in and around Edo. Figure 3 shows a map of the *shimo-yashiki* in Tenpō 13 (1842), or the late Edo period. The map depicts a "wandering garden" (*kaiyū-shiki teien*) with a lake in the center. To the left of the lake is the lord's villa, and to the right are wooded hills.

Fig.3 Schematic of the Maeda clan's *shimo-yashiki*[21)]

This estate not only served as a lordly residence but it also served as a *takaba*. We can be sure of this because the estate had the raptor hut known as *taka-beya* and because there are indications that hunting was practiced here. In the eleventh month of Tenpō 6 (late 1835), Maeda Nariyasu (the 13th head of the Maeda clan) resided at the shimo-yashiki for the purpose of falconry. On one occasion, afternoon rain frustrated Nariyasu's attempts to go falconing after supper. However, he did not come away empty handed, for in the previous night five mallards and one eurasian teal had been netted [22)].

The *shimo-yashiki* included traps designed to lure ducks. If you take a closer look at the upper part of Figure 3, you can see a pond with a few small islands. Hunters would use feed to keep domestic ducks around the ponds. These ducks served as a lure; they would attract other ducks toward a long, thin duck trap. When the ducks entered the trap, hunters lying in wait would emerge with a net. The startled ducks would then take flight but would get caught in the net[23)].

Thus, in this large estate, an environment conducive to ducks was artificially engineered to enable the clan's head to practice falconry or duck hunting there.

Esashi

To return to the Kaga Domain's *takaba,* here too we find evidence of an artificially engineered environment. Several examples are discussed below.

As of Tenmei 6 (1786), net fishing was banned from January to April[24)]. The ban was deemed necessary to prevent the depletion of freshwater fish due to fishing in early spring. Fishing during this time was considered detrimental to fish stocks because the fish are more sluggish during this period and because this is the season when fry emerge. Why would depleted fish stocks pose a problem? Depleted fish stocks would not only pose a problem in itself but it would also affect populations of birds who feed on the fish. Needless to say, this would ultimately mean less quarry for samurai falconers.

When the Kaga Domain set aside land as their *takaba*, local villagers would be prohibited from hunting birds therein, as was the case in the shogunal *takaba*. By Enpō 7 (1679), the Kaga Domain had established a code of regulations for villagers titled the *Murakata Futsukayomi*. The code included a provision stating that dead birds must be collected and reported without delay to the *kōri bugyō* (governor) in charge of rural administration in the relevant district. If the dead bird was a crane or swan, villagers were required to make a report even if it was found outside the *takaba*[25)].

Despite these exacting rules, certain people were permitted to hunt birds within the *takaba*: the *esashi*. Discussed below are two *esashi* who lived in Miyamaru-mura in the Ishikawa district. Their names were Yohei and Heigoro and they were described as *atamafuri* and *sesshōnin*. *Atamafuri* denoted a peasant without astipend, while *sesshōnin* referred to one who hunts or fishes for a living. Yohei and Heigoro donated silver to the domain and hunted birds with nets. In Kanbun 4 (1664), the pair became e*sashi*. In this role, they started hunting small fowl with rods and nets and sold the animals they captured to high-ranking samurai who would use them as quarry for raptors. From October to March of the following year, they captured fowl in the neighboring district of Nomi and sold it[26)].

Three years after Yohei and Heigoro became *esashi*, the domain was keeping 15 *sue* of peregrine falcon (15 falcons). *Sue* was used as a counting unit for raptors in the Edo period. A single *sue* was fed two pigeons a day. Therefore, for 15 *sue*, it was necessary to provide 30 pigeons a day. If the falcons were fed on birds smaller than pigeons, it was necessary to provide some 240 birds per day[27]. Per year, that would be more than about 10 thousand pigeons or more than about 80 thousand smaller birds.

However, this was ultimately for the use of the domain lord, and there were other high-ranking retainers who kept raptors. *Esashi* could always sell their birds to merchants, but the demand for raptor feed was so great that they focused on supplying this demand.

Friction over rice paddies

The life of the common people during the Tenpō era, which ran from 1830 to 1844, is depicted in a collection of illustrations called the *Minka Kenrō Zu*. Of interest here is the illustration shown in Figure 4, titled "Spreading the lines to capture the birds." The *esashi* shown on the right has entered a harvested rice paddy and has erected numerous rods. Suspended from the tops of the rods is twine doused in birdlime. On the left, an *esashi* can be seen lying in a thicket waiting. In An'ei 3 (1774), *esashi* were prohibited to prevented locals from tending to their fields throughout the bird-hunting period[28]. When dusk fell, *esashi* would lie in wait until birds got caught on the wire. However, this strategy would be foiled if villagers were still tending to the field then, as they would scare away the birds. The *esashi* would therefore stop the villagers from performing farm work during that time. Unsurprisingly, this resulted in conflict with the villagers.

Esashi were not the only ones who hunted in rice paddies and irrigation channels. The irrigation channels around rice paddies provided fertile breeding grounds for fireshwater fish. As such, many *sesshōnin*, who fished for a living, would come to fish in the channels, wrecking the crops in the process. To address this problem, the domain introduced a law in Bunsei 1 (1818) banning the *sesshōnin* from entering the paddies between July and August of the year, when the fields were in fruition[30]. As another example, in Kansei 10

Fig.4 An illustration from the *Minka Kenrō* Zu[29]

(1798), a law was passed banning samurai and merchants from fishing carp or catfish. This law was instituted in response to complaints from villagers that these individuals were trampling their crops[31]. Unlike the *sesshōnin*, these samurai and merchants fished in the irrigation channels around rice paddies for recreational purposes.

The paddies stretching across the Kaga Plain were meant to be places for villagers to farm. However, as they also fell within a designated *takaba*, they were also places for samurai to practice falconry. In addition to the falconry, *esashi* would come to the fields to capture birds, *sesshōnin* to fish for a living, and samurai and merchants to fish for pleasure. This situation prevented the villagers from using their own rice paddies freely.

3. The Genesis of the Edo Period Ecosystem

The landscape formed by developing new paddies

Falconry requires stocks of fowl for the raptors to hunt or for the falconers to feed to the raptors. Hence, this section focuses on the role of wildlife in falconry and examines the kind of natural environment that was created during the Edo period in order to foster such wildlife.

Before the Edo period, small clusters of rice paddies were developed in valleys, foothills, and other areas with stable water sources. This changed when the Sengoku ("warring-states") years came to an end in the seventeenth century. The new era of continued political stability meant that the population could devote its energies to developing the

land. In other words, many new rice paddies were created. The result was the creation of larger tracts of rice paddies, collectively covering a much wider space. The new paddies emerged upstream of rivers and gradually spread downstream, reaching down as far as alluvial plains.

This major overhaul of land across the Japanese archipelago almost doubled the area of arable land. For the first time in the archipelago's history, a landscape of vast expanses of rice paddies had formed. The new fields presented farming opportunities to people who had until then only had a modest agricultural holding or who were second- or third-born sons heading up a branch household. The expanded rice production became a major driver in Japan's economic growth in the seventeenth century, which saw the country's population double. Rice also became the chief source of government revenue; in what was known as *nengū*, villagers would pay taxes to the rulers in the form of rice. The higher the rice yield, the more revenue the rulers would receive.

One issue with rice production was that year upon year of tillage would lead to a decline in rice yield. Accordingly, fertilizer became necessary to improve the yield. The main source of fertilizer used in the Edo period was grass. Villagers developed a self-sufficient system for manuring their fields. Under this system, they would mow the grass, pile the grass clippings to compost them, and then add horse or cow manure to the compost. The grass clippings also served as

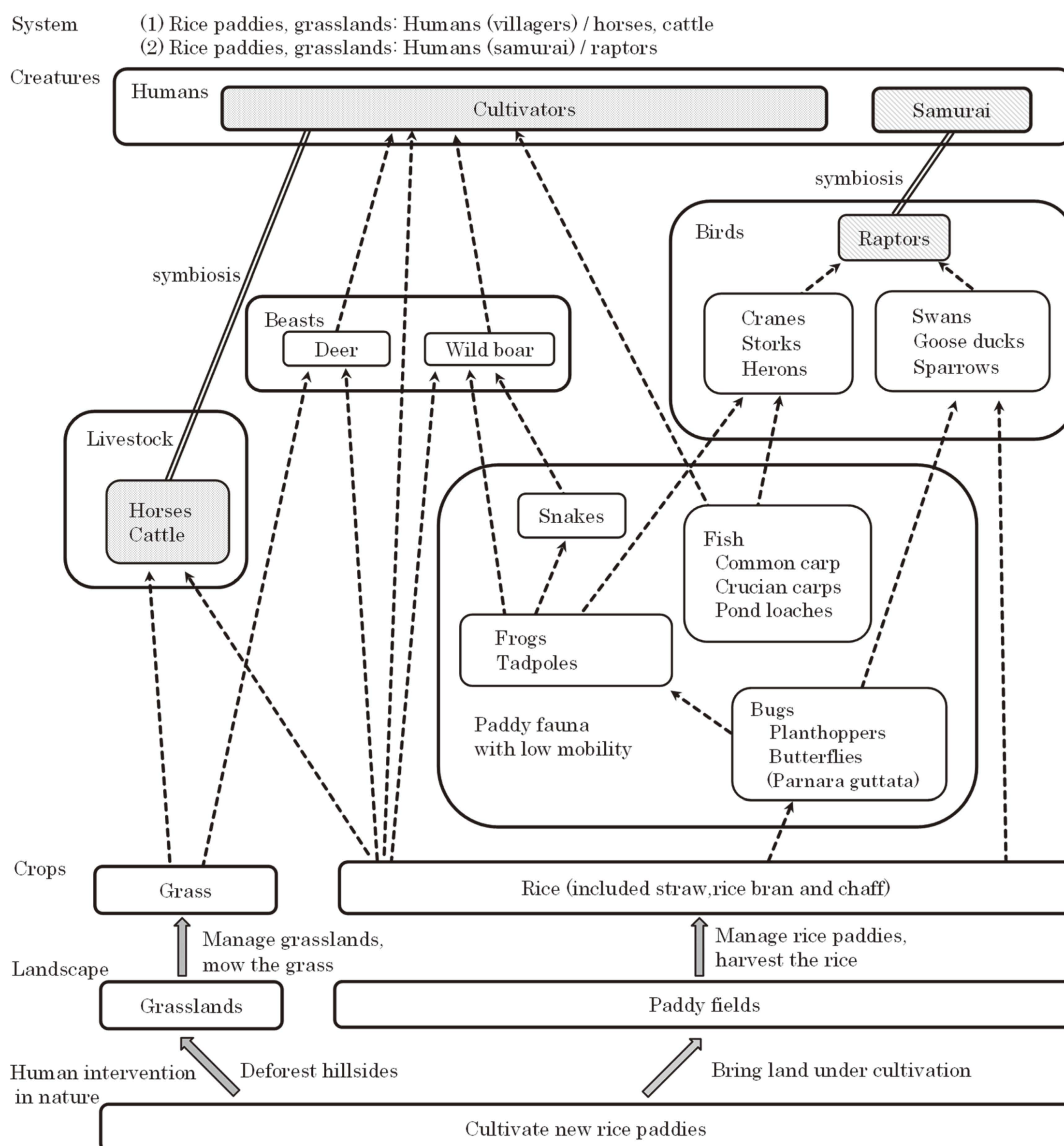

Fig. 5 Conceptual diagram of the Edo period ecosystem[33)]

feed for livestock.

To ensure a steady supply of grass, the villagers created grasslands by deforesting hillsides and leaving the grass to grow wild. Kunihiko Mizumoto estimates that rice paddies would require at least ten times their acreage in grasslands to maintain productivity, underscoring how grasslands emerged in tandem with the new paddies and how important they had become as a source of fertilizer for the paddies[32].

Defining the Edo period ecosystem

Villagers would manage their paddy fields and harvest the rice. They would also manage grasslands and mow the grass. Although this was important from a human economic perspective, to other animals, the fields were nothing other than wetland or riparian habitats.

Take, for example, the water irrigating the rice paddies. The water was inhabited by carp (common carp and crucian carps) and pond loaches. In the spring, frogs would lay their spawn, and the tadpoles would hatch. Both the frogs and the tadpoles became prey for snakes. Herons would then begin to swoop down to the paddies to catch fish, frogs, or snakes. Thus, as a byproduct of cultivating larger expanses of paddies, the population of wetland wildlife exploded, resulting in a richer ecosystem.

Standing at the apex of this food chain were humans and raptors. Humans would prey upon fish and shellfish in the paddies as well as upon the geese and ducks, both for their own consumption and as feed for the raptors. Raptors, on the other hand, would prey upon cranes, geese, and other fowl during falconry trips. I mentioned earlier that cranes and geese were prized as gifts and were used as falconry quarry for that reason. In that respect, humans and their raptors had a mutual interest. Their relation could therefore be described as symbiotic.

The creation of grasslands also led to the rearing of horse and cattle, which fed on the grass. Villagers who reared such livestock would feed the animals mowed grass. They would also use the animals for plowing and as sources of manure. In this way, humans (villagers) and their livestock (horse and cattle), likewise, had a symbiotic relationship.

But the effects of the new paddies were not all positive. With forested hills replaced by grasslands, wild boar and deer lost their natural habitats. Consequently, the beasts descended into human settlements, where they ravaged rice paddies and dry farms. Faced with this threat, the villagers could not stand idly by. Villagers of the Edo period carried firearms, and they did not hesitate to shoot the pests and consume the kill. Thus, as was the case in the rice paddies themselves, an ecosystem formed in the grasslands with man at the apex.

Across the paddies, larger wildlife populations led to a predator-prey dynamic with humans (samurai) and raptors as the apex predators, and the emergence of grasslands led to rearing livestock (horse and cattle). These dynamics engendered a natural environment unique to the Edo period. I call this “The Edo period ecosystem.” Figure 5 presents a conceptual diagram of this ecosystem, using the Kaga Plain as an example[34].

Rice paddies from the perspective of oriental storks

How did the rice paddies serve the larger waterfowl such as cranes and oriental storks? These birds would have seen paddies as a large expanse of wetland—a place for foraging, breeding, and wintering. The bird discussed below is the oriental stork (Ciconia boyciana).

As creatures that lived on pond loaches and frogs, oriental storks would forage around swampy wetlands throughout the year. The population of oriental storks started to decline in the Meiji era (1868–1912) due to overfishing. Further trouble for the species lay ahead. Starting in Shōwa 30 (1955), widespread use of agrochemicals led to a depletion of pond loaches and frogs. Meanwhile, unfavorable environmental changes, such as the practice of draining paddies in the winter, resulted in a loss of habitat. Eventually, the species went extinct in Japan—in the wild at least. Currently, the storks are still bred in captivity under a program based in Toyooka City in Hyogo Prefecture. As part of this program, farmers in Toyooka City started using less agrochemicals and stopped draining their paddies in the winter, in the hope of attracting pond loaches and frogs. These actions ultimately will intend to create rice paddies that could serve as habitats for oriental storks.[35].

According to Hiroshi Moriyama, a single oriental stork would require 500 to 1,000 hectares of marshland, and if the storks are to be reintroduced into the wild, it would be necessary to build the wild population up to at least 1,000. In order for this to happen, it would be necessary to secure 500,000 to 1,000,000 hectares of marshland[35].

At of the end of the sixteenth century, Japan had around 3,675,000 acres (1,500,000 *chō*) of arable land[36]. Due to the cultivation of new rice paddies, the equivalent figure for the middle of the Edo period was around twice as high at 7,276,500 acres (2,970,000 *chō*). Rice paddies accounted for 58% of the arable acreage, or 4214,000 acres (1,720,000 *chō*)[37].

Even if we allow for the possibility that not all these rice paddies were irrigated, this acreage would have easily accommodated a thousand oriental storks. In the middle of the Edo period, when paddy cultivation was at its peak, the Japanese archipelago would have been an ideal environment for oriental storks and other large waterfowl. Moreover, back then, the rice paddies were free from agrochemicals such as pesticides or herbicides.

In summary, it is likely that the Japanese archipelago provided the richest wetland habitats during the Edo period, when new rice paddies were cultivated. The ecosystem formed during that period had humans and raptors at its apex.

Conclusions

In this article, I demonstrated that falconry was practiced extensively by the shogun and daimyos and that the sport was enabled by an ecosystem unique to the Edo period—one that consisted of large expanses of rice paddies and grasslands.

Did the humans of the Edo Period intentionally set out to foster such symbiosis with nature? As much as the rice paddies contributed to biodiversity, the answer must surely be no. In reality, there were two reasons behind the symbiosis.

The first reason can be understood by referring again to the diagram of the Edo period ecosystem shown in Figure 5. The second system (shown in the right half of the diagram) is particularly complex. The system illustrates the principle that the more complex a food chain is, the more stable it is. One species in the chain might increase in population, but the presence of multiple predators will keep the population growth in check; consequently, the ecosystem maintains an equilibrium. But this is a product of random chance rather than design. That was the first reason. There is no reason to believe that villagers, for one, deliberately sought to preserve the ecosystem. They may have valued their livestock, but they had no such concern for oriental storks; they certainly would not have facilitated the growth of the pond loach population expressly for the purpose of ensuring a supply of quarry for the storks.

The second reason concerns the fact that the greatest beneficiary of the Edo period ecosystem were humans; humans had created an environment that suited their interests. Moreover, although the humans had symbiotic relations with other animals, the symbiosis was transient and subject to human discretion; humans started symbiotic relationships as they saw fit and ended the relationships likewise. When the humans did elect to end the symbiosis, the ecosystem suddenly lost its equilibrium. A case in point was the animal protection edicts instituted by Tokugawa Tsunayoshi.

Tsunayoshi released all his raptors into the wild because he saw falconry as a blood sport involving the needless killing of living things. This action dissolved the symbiotic relationship between man and raptor, prompting a collapse in the Edo period ecosystem illustrated in Figure 5. Meanwhile, under the prohibition on killing animals, people were banned from using firearms to protect their farms from wildlife pests. With less predation to fear, bird and beast populations exploded. However, the ban on shooting animals was lifted following Tsunayoshi's death. The return of gunfire scared birds away, leading to a decline in duck and geese populations. Needless to say, no birds meant no falconry. These dramatic changes in the ecosystem eventually culminated in Tokugawa Yoshimune's overhaul of the falconry system.

At any rate, as popular as it was during the Edo period, falconry dwindled after the Meiji Restoration ended the samurai-led feudal system. Did the falconry culture simply die out, or was it preserved in some form? As for the Edo

period ecosystem, in which man and raptor prevailed at the apex, how did this ecosystem transform following the disappearance of the artificially engineered environments known as *takaba* and the release of raptors into the wild? It is necessary to examine these questions, taking into account falconry practices and other hunting practices around the world. Such research should provide essential insights into the history of humans' relationship with raptors.

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