Environmental Culture and World Heritage in Pacific Japan: Saving the Ogasawara Islands

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Japan's Ogasawara (or Bonin) Islands (Ogasawara shotou), dubbed 'the 'Galapagos of the East', are a group of oceanic islands situated in the middle of the Pacific Ocean. Many of their numerous indigenous fauna and flora are at the brink of extinction, mainly caused by human settlement and construction during the last half century. Among those destructive factors, a plan to build a commercial airport was the most controversial and divided the community. Although the airport plan was withdrawn by the Tokyo Municipal Government in 2001, the native species are still facing various dangers.

'Nature' is commonly defined as 'phenomena of the physical world as a whole' and 'culture' as 'refined understanding of the arts and other human intellectual achievements; customs and civilization of a particular time or people; improvement by care and training; cultivation of plants, rearing of bees silkworms, etc' [1]. This paper adopts instead the concept of 'environmental culture' (kankyou bunka) as its core. It has been used in Japan for more than a decade to title books, articles and public talks, and to name university departments. Environmental culture' can be defined as 'the ideas, beliefs and customs that are shaped by a society's understanding of its natural environment, and are used to protect the environment'. This paper focuses on the correlation of nature and culture on the Ogasawara Islands in terms of their continuing evolution.

Muni futomomo (Metrosideros boninensis), **(Yasui Takaya)**

Discovery of the Islands

The Ogasawara Islands, at longitude 136°04' - 153°59' E. and latitude 20°25' - 27°44' N., are located about 1000 km due south of Tokyo and about 1400km due east of Okinawa. They are part of the administrative district of Tokyo, but are accessible only on a once a week, 25-hour long journey on a diesel powered ship.

The islands were formed by eruptions of submarine volcanoes about 50 million years ago. Having no connection with any continent, geologically they are 'oceanic islands'. They took biological shape over millions of years as flora and fauna gradually crossed the 1000km

kilometres of ocean from Polynesia, south-east Asia or south-west Japan, thanks to the wind, or the birds, or logs floating on the ocean waves [2]. Settled on the islands, the various species evolved uniquely according to their environment, becoming distinctive species [3], and remaining mostly undisturbed until human settlement began in 1826.

By comparison with the better known oceanic islands such as Galapagos, Hawai'i and Easter Island, the Ogasawara Islands are tiny in scale, with a total area of a mere sixty-one square kilometres, which amounts to just one fortieth of Okinawa, one hundredth of the Galapagos and two hundredths of Hawai'i. The largest island, Chichijima (Father Island), is twenty-four square kilometres. In Okinawa, in an area of twenty by twenty metres it is possible to find at least fifty species of trees, but in Ogasawara, no more than twenty species are found even in the most densely forested area [4].

Ogasawara is a perfect place to observe the development of species. Some species which might not have survived the processes of competition and natural selection on a continent could survive in these oceanic islands because of the lack of natural predators [5]. Birds living in Ogasawara tend to combine functions usually shared by different birds on continents. The typical example is the meguro (warbler, Apalopteron familiare hahasima), which like the silver-eye eats flowers and fruits at the top of trees, like the titmouse runs up and down the branches of trees to catch insects, and like the thrush also hops along the ground to search for food. With few rivals, the meguro was able to develop an ability of searching for different sorts of food [6]. However, island species were extremely vulnerable to change because the small area offers them no place of refuge. The new environmental conditions brought by human settlement and imported animals and plants proved fatal to many indigenous species.

The islands were long thought to have been discovered in 1593 by Ogasawara Sadayori, an historical figure known to have been in the service of the warlords Toyotomi Hideyoshi (1537-98) and Tokugawa Ieyasu (1542-1616). However, the evidence for such a claim is tenuous. The claim was made – or perhaps reiterated - in 1675 by Ogasawara's son, in 1702 by his grandson and in 1727 by his great-grandson, all seeking official permission to travel to the islands. Although these claims were subsequently found to be dubious, the islands nevertheless came to be known as 'Ogasawara Islands' and were also given names that suggested a large, extended family [7].

The first confirmed record of the discovery of the islands concerns a Japanese ship blown off course and wrecked there in 1670 on its way to transport mandarin oranges from Kishuu (today's Wakayama Prefecture) to Edo (today's Tokyo) [8]. Five years later, in 1675, the Edo Government sent an exploration ship led by Shimaya Ichizaemon to investigate the islands. This expedition called the islands Bunin Shima (Uninhabited Islands), and built a shrine to commemorate their landing.

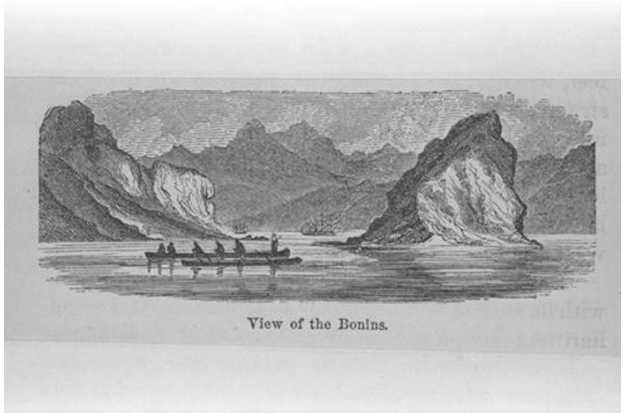
The 1820s mark a period in the islands' history of increasing contact with humankind. In 1823, the British whaling ship, Transit, arrived and its American captain wrote of the abundance of turtles and rufous turtledoves, the absence of four-legged animals, snakes and ants, the thick forest coverage that extended over the island, and the absence of any human habitation [9]. In 1826, another British whaler, the William, was wrecked on the shore, where the crew took refuge. Most were later rescued, but two of the sailors decided to remain on the island and began cultivation and raising pigs.

In the following year, 1827, H.M.S. Blossom arrived, its captain describing the islands as a paradise of green turtles, 'so numerous that they quite hide the colour of the shore' and so inactive

that they could be easily upturned. Already, he observed, the pigs introduced by the William had become wild and, he predicted, would in a short time destroy all the tree roots on the island [10]. One year later, in 1828, the Russian exploration ship, Seniavin, arrived with zoologists, botanists and ornithologists who documented and took specimens of native birds that were soon to become extinct. The Russian captain observed that profits gained from the pigs were cancelled out by the damage they caused, since the pigs consumed a huge amount of turtle eggs [11].

Kanaka village on the Bonin Islands in Francis L. Hawks (compiler), Narrative of the Expedition of an American Squadron to the China Seas and Japan, performed in the years 1852, 1853, and 1854, under the Command of Commodore M. C. Perry, **Washington:** A.O.P. Nicholson, 1856 (International Research Center for Japanese Studies)

In 1830, a group of two Americans, one Dane, one Italian, one Briton and fifteen islanders from Hawai'i arrived. Cultivating corn, pumpkin, potato, bean, melon, banana, sugarcane and pineapple, and raising pigs, chickens, turkeys, ducks, goats and deer, they became suppliers of provisions to the crews of various whaling ships. Their lifestyle was documented by Commodore Matthew Perry's American naval squadron who passed by the islands en route to 'open' Japan in 1853 [12]. No sooner did human settlement on the islands begin than the environment began to suffer.



A view of the Bonins, in Robert Tomes, The Americans in Japan: an abridgment of the government narrative of the U.S. expedition to Japan, Under Commodore Perry, Wilmington, Del.: Scholarly Resources, 1973, reprint of originally published by New York: D. Appleton, 1857 (International Research Center for Japanese Studies, Japan)

As a multi-racial, multi-lingual society began to take shape, the Japanese Government in 1861 sent the ship Kanrin-maru to explore and formally name the island group [13]. The name Ogasawara was officially adopted for the whole complex of islands. The central cluster, Chichijima Rettou (Father Island Archipelago), consisted of Magojima, Otoutojima, Anijima and Chichijima (Grandchild, Younger Brother, Elder Brother and Father Islands); the southern cluster of Hahajima Rettou (Mother Island Archipelago) included Hahajima, Anejima, Imoutojima and Meijima (Mother, Elder Sister, Younger Sister and Niece Islands); and the most northerly Mukojima Rettou (Bridegroom Archipelago) comprised Mukojima, Nakoudojima and Yomejima (Bridegroom, Go-between and Bride Islands). The scattered islands were united in the idealized form of an extended family.

In 1876, a Japanese Government office was built

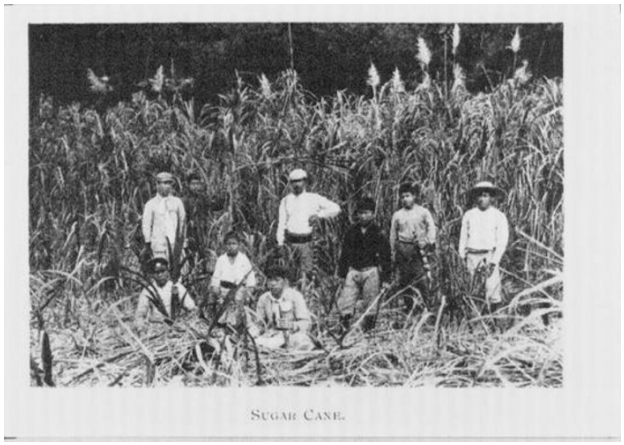
on Chichijima to govern the then motley group of 69 inhabitants [14]. Teaching of the Japanese language was started and settlement systematically encouraged. In 1882, the early settlers all took Japanese citizenship. Six decades later, just before the advent of the Pacific War 7711 people lived on ten of the islands but in 1944 virtually the entire population was evacuated. When the war ended, only those islanders of American and European origin were permitted to return, and the islands remained under United States military occupation, and became known as the Bonin-Volcano Islands until 1968. After the US Government handed sovereignty of the islands to Japan, the evacuated Japanese also returned.

At present, only Chichijima and Hahajima are inhabited, and the total population on 1 April 2009 was 2,450 [15]. In this multi-racial society, one in ten of the islanders is descended from Europeans, Americans and Pacific Islanders. This exoticism is still an attraction today to visitors from mainland Japan.

The islands have long been a highly sought-after place for people longing for a different life. In the eighteenth century, those self-claimed 'offsprings' of Ogasawara wanted to travel there. In 1839, the Dutch studies scholar and artist Watanabe Kazan (1793-1841) and Takano Chouei (1804-50) were arrested because they planned to visit the islands [16]. In modern times, the poet Kitahara Hakushuu (1885-1942) took his wife, who was ill with pulmonary tuberculosis, to the islands to escape the social pressures of the time. In a similar vein, in the late twentieth century and early twenty-first century, people have moved to the islands to escape the stresses of city life. For humans and botanical and zoological species alike, Ogasawara is often regarded as a kind of fantasy land, as its name suggests an ideal family frozen for eternity, and a remote island paradise beyond the reach of modern civilization.

Destruction of Nature

However, what today excites visitors as untouched nature is actually an environment transformed beyond recognition. In almost two centuries of human settlement, the islands have been subject to two different waves of development, the first lasting from 1826 to 1945, and the second beginning in 1968 and continuing today. The former approximated to the classic description of 'future eating', and resource depletion [17]. After the arrival of the Japanese settlers in 1876, about two to three thousand turtles were removed from the islands to be consumed [18]. Similarly, albatross soon disappeared after massive slaughter in the quest for their feathers and eggs [19].



Sugar cane workers in Lionel Berners Cholmondeley, The History of the Bonin Islands from the Year 1827 to the Year 1876, and of Nathaniel Savory, one of the original settlers to which is added a short supplement dealing with the islands after their occupation by the Japanese, **London: Constable, 1915 (International Research Center for Japanese Studies, Japan)**

This was accompanied by a timber and sugar boom in 1880s. In only a decade, half of the islands' forests disappeared. On Hahajima, huge and ancient trees were felled, some over two thousand years old. The forest was either burned

to produce dead trees for growing kikurage (fungus) or cleared to make way for farms and sugarcane plantations and to provide fuel to fire the sugar kilns. Only trees that did not seem to be profitable or were located in inaccessible places survived this onslaught [20]. During World War Two, Chichijima, Hahajima and Ioutou (commonly known as Iwojima) were so heavily bombed that their very topography was transformed [21]. Not only was the human toll immense, but also the plant and animal world suffered dramatically.

After 1968, following their reversion to Japanese control, the Ogasawara islands were subject to development plans. Funded by lavish central government subsidies, importance was placed on the development of infrastructure and public works. During the twenty-six years to 1995, the government poured more than 83 billion yen into the islands. Construction replaced primary industry as the major sector of the economy and accounted for 43.3per cent of its total income [22]. According to a survey by the Village Office in 2000, the employment proportion was:

Type of Employment	Percentage of Employment	Actual number	Percentage (%)
Public Sector	648	32.5	
Services	475	23.8	
Construction	405	20.3	
Shops and restaurants	213	10.7	
Fishing	100	5.0	
Agriculture	69	3.5	
Transportation and communication	45	2.3	
Electricity and gas	21	1.1	
Banking, insurance and real estate	4	0.2	

More than twice as many people are employed in construction as in agriculture and fisheries combined. Had the construction works been occasioned by need, one would expect the role of public works to be high in the early years after reversion to Japanese rule, but, as that need was being met, it would begin to decline. The fact that this did not occur points to the inherently pathological quality of the process. Public works-led development did not satisfy social need, but tended to breed more and more public works [23].

Roads, harbours, bridges and coastal and river works proliferated. The environmental effects of this construction 'boom' were widespread. As the bulldozers used in construction felled native trees, and roads were widened and paved, the ferns in surrounding areas dried up and died, and it became easier for imported plants to supplant native ones [24].

On the islands, human impact on nature is extensive. Among 109 kinds of birds sighted in Ogasawara from 1995 to 1996, fifteen are known to breed there, yet only one native species, meguro, and five native subspecies survive. The latter are: Ogasawara nosuri (buzzard, Buteo buteo toyoshimai), Akagashira karasubato (red-headed-pigeon, Columba janthina nitens), Ogasawara kawarahiwa (brambling, Carduelis sinica kittlitzi), Ogasawara hashinaga uguisu (long-beaked-bush warbler, Cettia diphone

diphone) and Ogasawara hiyodori (brown bulbul, Hypsipetes amaurotis squamiceps). Meguro's closely related species, Mukojima meguro, have disappeared, following the extinction of four native birds, Ogasawara mashiko (brambling, Chaunoproctus ferreorostris), Ogasawara gabichou (fly-catcher, Cichlopasser terrestris), Ogasawara karasubato (Bonin fruit-pigeon, Columba versicolor) and Hashibutogoi (thick-beaked-heron, Nycticorax nycticorax).

As for sea birds, the short-tailed-albatross (ahoudori, Diomedea albatrus) disappeared a long time ago, although small colonies of laysan albatross (koahoudori, Diomedea immutabilis) and black-footed-albatross (kuroashi ahoudori, Diomedea nigripes) still survive in remote outcrops [25]. Ogasawara accounts for five of the ten species of birds that have become extinct in Japan as a whole [26]. It is estimated that only ten of the highly endangered pigeon Akagashira karasubato (red-headed-pigeon) are now living in Chichijima, fifteen in Hahajima, and fifty in total in Ogasawara. From April 2001 the Ueno Zoo in Tokyo started an artificial breeding project, and managed to successfully breed twenty-two chicks by May 2008 [27]. But this success is still very limited and the problem of returning them to Ogasawara and protecting them from cats remains formidable.

Red-headed-pigeon, Akagashira karasubato (Columba janthina nitens), **(Watanabe You)**

Nor is the destruction limited to birdlife. Ogasawara has various native butterflies, moths and dragon-flies, and as was recently discovered, some rare kinds of snails. Two of 23 kinds of butterflies, five of 12 kinds of dragonflies, twelve of 247 kinds of moths, 30 per cent of about 300 kinds of beetles and 90 per cent of about 100 kinds of snails are native. However, most of the snails are now extinct because of environmental changes, desiccation caused by forest destruction, illegal gathering or the use of agricultural chemicals [28].

Among trees, many of the common species to be seen today, such as the Ryukyuan pine, camphor-tree, Indian rubber tree (mokumao) as well as banana and pineapple, are imports. The introduced trees akagi and ginnemu proliferate and threaten native plants [29]. Giant trees such as momotamana (Terminalia catappa), Ogasawara-guwa (mulberry, Morus boninensis), udonoki (Pisonia umbellifera), akatetsu (Pouteria obovata), and local varieties of palm that were sighted by seventeenth century visitors and featured in nineteenth century paintings and engravings, are now rare. At present, 42 per cent of 121 native flora species are being harmed by goats. Among 73 endangered species, 55 per cent has been severely damaged [30]. The rat, kumanezumi, is another major introduced pest responsible for destroying native plants.

Currently, 40 per cent of about 400 flora species are indigenous. Many smaller native botanical species, including distinctive varieties of fern, fungi, chrysanthemum, orchid and azalea may still be found in the more inaccessible mountains and valleys or on the uninhabited islands. In 1985, the 'Emergency Investigation for Ogasawara Native Plants Protection' project discovered that eighty species, about half of the native ones, were on the brink of extinction, twenty of them unable to grow and propagate in the natural environment [31]. One decade later, in the '1997 New Red List of Plants', published by Japan's Integrated Biodiversity Information

System managed by the Ministry of Environment, 134 species of Ogasawara were listed as endangered species. Elsewhere in Japan, only Okinawa has a comparable density of endangered species [32]

Wild peony, Munin nobotan (Melastoma tetramerum) **(Yasui Takaya)**

The wild peony munin nobotan (Melastoma tetramerum), and the azalea Munin tsutsuji (Rhododendron boninese) are especially rare because only a few plants survive in the wild. Scientists have succeeded in planting about two hundred cuttings from the surviving wild peony, but these cloned 'children' have the same genes as the mother tree, and have difficulty adapting to the changing environment [33]. Since the early 1980s after countless failures, the experts of the Botanic Gardens of the University of Tokyo succeeded in multiplying several endangered species and then transplanting them back to Ogasawara, including the wild peony and the azalea, the native shrub kobanotobera (Pittosporum parvifolium), native orchids asahi ebine (Calanthe hattorii) and hoshitsuru ran (Calanthe hoshii). In 1998, the wild peony even germinated by itself and blossomed [34]. Ogasawara's nature is fragile, and the threatened biodiversity, is not easily preserved.

Hahajima wild peony, Hahajima Munin nobotan (Melastoma tetramerum var.pentapetalum**),** (Yasui Takaya)

Airport Plans

From 1968, the Village Office began to press the Tokyo Government to construct an airport in Ogasawara. With the Japanese bubble economy of the late 1980s, the resort development 'boom' seemed irrepressible and in June 1988 Tokyo governor Suzuki Shunichi announced that an airport would be built on Anijima (Elder Brother Island). In 1991, an Ogasawara airport plan was incorporated in the 'National Airport Development Plan', which was enthusiastically endorsed by local construction companies [35]. However, the proposal was rather implausible. A modern airport with a 1800m long runway was to be built on the uninhabited island, and then linked to the population centre on Chichijima by a 500m-ropeway across a windswept ocean.

Pleas of opposition to the plan were entered by Ogasawara residents and conservation groups inside and outside Japan. Local people, led by botanist and high school teacher Yasui Takaya, argued that a large-scale commercial airport was unnecessary and urged that proper attention be paid to possible alternatives such as a turboprop plane requiring just a 1200m-runway; other types of plane requiring even shorter runway; an airship; a flying boat; re-use of a war-time airport in the Suzaki region of Chichijima with an 800m long runway; a vertical take-off and landing

aircraft; an amphibian; a plane that flies between Ogasawara and the Izu Islands via Ioutou; a high-speed ferry; and a floating airport [36].

In 1991, researchers conducted a five-day investigation along the planned runway. New discoveries were made one by one, including more than ten species of snails, already lost in Chichijima and Hahajima [37]. It was in the end the fact that Anijima was home to the biggest area of salt tolerant shrubs (xeric sclerophyll) and the most concentrated population of terrestrial snails in Japan that proved decisive. In January 1996, the Environment Agency (today's Ministry of Environment) called on the Tokyo Government to reconsider its plan, and to give due weight to preservation of biodiversity. The decision by the Japanese Government to give priority to environment over development was at that time unprecedented.

When the airport plan was also referred for environmental assessment, a list of nine potential sites—five on Chichijima, two on Hahajima, two on other smaller islands—was considered, and in April 1998 the best solution, according to the advice received, was held to be Shigureyama of Mt. Tsutsuji, slightly to the south of the centre of Chichijima [38]. It would involve extensive works over the years 2001 to 2008 to level a 1720m strip of land across the island, at a height of 230m above sea level. The airport would completely transform the island's topography.

This location, however, was a nesting site for the native buzzard (mentioned above), and home to the wild peony and the azalea. The sole surviving wild clump of the azalea happened to grow just below the summit of Mt. Tsutsuji because it is the only place moist enough to allow the azalea to survive. Its favoured topographical and climatic conditions simply could not be reproduced elsewhere. Besides, the forest around the location forms part of the catchment area for drinking water [39]. A survey conducted by Yasui Takaya found that 88 of the 217 plant species on the Shigureyama site were native, including twenty-seven which were classified as 'endangered', and another five as 'at some risk' according to the 'Red List of Plants' [40]. Under pressure from the local opposition the airport plan was officially withdrawn by the Tokyo Government in November 2001.

Native azalea, Munin tsutsuji (Rhoodendron boninense**), (Yasui Takaya)**

Meanwhile, in January 2001, the Ministry of National Land and Communication considered introducing the newly developed TSL (technosuper-liner) by which an express ferry of 15,000 tons could shorten the voyage time between Tokyo and Chichijima from 25 to 16 hours [41]. That project, which would have cost an estimated 11.5 billion yen, was abandoned on the eve of its launch in October 2005 because the fuel cost could not be subsidised by the

Government and might incur at least 2 billion yen deficit annually [42].

The withdrawal of the two airport plans and the TSL project left many residents with mixed feelings. Some could not understand why native species had to be prioritized over their want of an airport which they believe would overcome the long distance between the mainland and Ogasawara and provide better medical treatment and economic opportunities. Based on my experience of taking the 25-hour ferry six times, constantly tossed about by rough seas, I sympathize with the residents who long for a faster means of transportation especially for emergency medical treatments. A plane which requires only a small-scale airport and causes minimal impact on the native species can be justified.

Instead of pouring more concrete on to the islands, many people there have realized the possible benefits of eco-tourism, fully utilizing the value of Ogasawara's nature. An effort to promote Ogasawara by the Ministry of Environment and register it as a World Heritage Site began in 2003 [43]. Based on the information from monthly 'Ogasawara Villagers' Newsletter' (Sonmin dayori) published by the Village Office from May 2002 to May 2009, the publications from NPO, and my own observations, residents' attitudes to nature are changing and an appreciation is growing of the need to maintain the sensitive balance between native species and human life if both are to have a future [44].

The Formation of an Environmental Culture

The uniqueness of the islands can be seen from the research pioneered by local resident, Abe Tetsuto. Over the last thirty years, he and colleagues have been investigating the newly formed oceanic island Nishinoshima (Western Island), located 130km west of Chichijima, which formed when a volcano erupted in 1973. This research is the first of its kind to detail the process of how an oceanic island, isolated from any continent by more than 1000km, becomes colonized by plants and animals. Nowhere else on the planet is there so remote a new-born oceanic island [45]. In other words, it is thought that this tiny island may display the process of evolution the Ogasawara Islands went through during the last million years. The importance of saving the fauna and flora of the Islands is being gradually understood.

Thanks in part to the activities of botanist Yasui Takaya and his colleagues, as well as the efforts of various local organizations, more and more people have become conscious of the fragility of their natural surroundings and an environmental culture is developing in Ogasawara. 'Protection of biodiversity' has recently become a buzzword in the islands at various levels, from ordinary people to the Ogasawara Branch of Tokyo Government and the Ogasawara General Office of the Japanese Government. Activities by volunteers to eradicate introduced plants and goats and to help plant native plants are becoming commonplace. For instance, the introduced grass, kurinoiga, has been cleared from Minamijima (South Island) because the island's karst landscape was considered to be 'the most precious ecosystem in the world'[46]. And the karst landscape was designated 'Japan's natural monument' (Nihon tennen kinenbutsu) in May 2008 [47]. Native trees Shimahoruto no ki (Elaeocarpus photiniifolius) have been planted on parts of Hahajima after the invasive tree akagi (Bischofia javanica) was removed [48]. Weeds and plastic rubbish at the beach of Ougiura of Chichijima are regularly cleared [49]. The local government's Construction Section participated in the movement to clear the introduced Taiwan tree, mokugenji [50].

Minamijima, (Tokyo Convention & Visitor Bureau)

From 1997 to 1999, about 400 goats were removed by local hunters from Nakoudojima (Go-between Island) at a cost of 100 million yen. In 2002, Mukojima (Bridegroom Island) was declared free of goats. Now the northern Mukojima Archipelago is goat free, and newly planted native plants are growing surprisingly well and enjoying a paradise without natural predators [51]. On Anijima, it is estimated that it will take at least seven years to eradicate the goats. Today the local government organizes goat hunting four to eight times per month. On Chichijima, there is still a long way to go before even significantly reducing the goat population, but goat hunting events are being conducted several times a year [52].

In Ogasawara, cats remain a serious threat to endangered native birds. The red-headed pigeon karasubato sometimes comes to visit villagers and eat papaya without noticing the waiting cats [53]. Research has shown that between 1998 and 1999 a single cat could kill five of the native warbler meguro and at least one brambling kawarahiwa. About one hundred cats are still wandering in the forest of Hahajima, driving the number of brambling down to 200 [54]. Between 1996 and 2006, more than 370 wild cats were caught and sterilized. In January 2006, during the breeding season of the native pigeon, it was deemed necessary to send the cats to the mainland to be adopted. At the same time, lectures on how to minimize cats' impact on native birds were given by experts in July 2006.

Hahajima meguro (Apalopteron familiare hahasima), (Outsuka Hiroyuki)

Other native species are also being protected. A re-discovery made in 2005 of one of the two native butterflies, Ogasawara Shijimi (Celastrina ogasawarensis), thought to have disappeared after 2002, aroused interest in a project designed to rescue them from the introduced iguana, green anole (Anolis carolinensis), their primary predator. An 'Association of Ogasawara Shijimi' to protect the butterfly was even started [55]. 30 per cent of the insects on the Islands are native. But their populations are decreased by the green anole, and it is very time-consuming and costly to eradicate it [56].

The most representative conservation organization in the islands is the Ogasawara Wildlife Research Society (OWRS) headed by Yasui Takaya. Since its establishment in 1997, OWRS has energetically conducted research on native flora and fauna, issuing newsletters to disseminate research results, raising seedlings, planting trees, cleaning beaches, culling goats, and organizing public lectures and observation trips. Yasui and his members successfully planted the native trees takonoki (Pandanus boninensis), Ogasawara biro (Livistona chinensis

var.boninensis), momotamana, hasunohagiri (Hernandia sonora) and kusatobera (Scaevola ssericea) on Yomejima (Bride Island) after the goats were cleared in the year 2000. They keep going back to see how the trees are enjoying the regained rival-free environment. In May 2006, OWRS was awarded the 'Prize of the Ministry of Environment' for its nine-year activities and achievements. In 2007, another NPO organization which has actively been engaging in the protection of the birds and plants, the Institute of Boninology (Ogasawara shizen bunka kenkyuujo) was awarded the same prize [57].

Education and entertainment groups have also put much weight on promoting a closer connection between humans and the land and sea. The Ocean Center, Ogasawara Whale Watching Association (OWA), the OWRS and the Ogasawara Nature and Culture Research Institute, have organized various exhibitions and lectures on Ogasawara's nature. The monthly newsletter by the Village Office has reported the efforts of school pupils to protect turtle eggs, and the joy of the students on seeing baby turtles hatching. The OWRS encouraged children to plant seedlings of the native orchid asahi ebine, successfully raised by students outside Ogasawara, on Mt Asahiyama. Education for the younger generation is an effective way of deepening the connection between nature and humans.

The influence from the music and dance of the Pacific Islands is prevalent and this has become part of the islanders' identity [58]. Local residents try to not only revive the traditional dance, Nanyou odori (South Pacific Dance), but also further develop it with their own variation and creation. These performing arts, including musical instruments kaka, Bonin taiko (drum), and Fura Ohana dance are often used to accompany unique festivals such as the 'Passion Fruit Festival' in June and the 'Whale Festival' from March till May. The emphasis on the uniqueness of the local products and the local performing arts can gradually help shape local people's sense of 'self'. When the 'self' is inseparable from nature, then it is possible that a love for nature will be deep-rooted in people's minds.

Since 2004, 'Ogasawara Native Night' has taken place in the evening of 21 June, the shortest night of the year. People are encouraged to turn off lights for two hours to enjoy the starry skies. Such events reinforce the image of the Ogasawara as 'eco-islands'.

Eco-tourism

The Village Office has decided to make eco-tourism the main industry of the islands, along with a promotion of recreation, leisure and historical sites, as well as further development of agriculture and fishery in order to make Ogasawara a sustainable society. Encouragement to consume locally produced vegetables and fruits and save energy in transporting goods has been made recently.

In Japan, Ogasawara is the only place where dolphins and whales can be seen all year round. The OWA is a pioneer in eco-tourism. In 1988, for the first time in Japan, it organized a whale watching tour near Hahajima, and produced a guideline for whale watching, which is Japan's first for protecting tourism resources. The OWA started dolphin tours in 1992 during which 250 people swam among dolphins. According to OWA's estimation, one whale and one Ogasawara flying fox (Pteropus pselaphon) can bring 550,000 yen and 63,000 yen respectively each year [59]. By July 2004, the profit gained from whale watching and dolphin tours amounted to 436 million yen. Ogasawara's native plants have also been an attraction to tourists. During Japan's long depression from the early 1990s when there was a downturn in tourism, diving, tramping and whale watching remained profitable [60].

An Ogasawara flying fox (Suzuki Hajime)

In June 2002, the 'Committee for Promoting Eco-tourism in Ogasawara' was established, and has been actively engaging in activities such as conferences and observation tours. For instance, it tried to become familiar with Australia's system of certifying eco-tourism, and to study the experiences of the Barbados Island of the Caribbean Sea, Norfolk Island of Australia, the Galapagos Islands, and the Oze region in Japan [61]. In Okinawa, members were taught that it was important to conduct eco-tourism by local guides so that profits could be returned to the local community. Also, they understood that it is essential to establish a research institute to supply high quality information and guides, and to avoid harming the ecosystem by ecotourism [62].

In July 2002, the Village Office signed with the Tokyo Government an 'Agreement on Proper Use of Natural Environment Protection and Promotion Areas in the Ogasawara Islands'. Visits to Minamijima's karst landscape are restricted by a ban on landing during the November-February period. Outside that period, only 100 people per day are allowed to the island for no more than two hours, and each guide may have no more than fifteen tourists in a group. Hahajima's Sekimon area can be viewed only with guides who have been educated by the 'Forest Guide System' and can be visited by no more than 50 people per day. Visitors must also be in a five person group accompanied by one guide. More and more local people want to become guides [63].

From August 2004, the Tokyo Government established a policy to respect the uniqueness of the Islands while still maintaining public works [64]. This is an impressive shift, since the Government had long ignored the fragility of Ogasawara's ecosystem and applied only the rules for metropolitan cities. The Village Office also started a series of workshops from February 2002 on using renewable energy as part of eco-tourism industry. A new school complex in Hahajima utilizing solar power generation (50 kw/ hour) and rain water collection was completed in February 2005 [65].

In April 2008, in order to celebrate the 40th anniversary of the return of the Ogasawara Islands from the US to Japan, a one day cruise tour was organized by OWA to watch two kinds of albatrosses which have been living on Mukojima Archipelago, the laysan (koahoudori, Diomedea immutabilis), the black-footed- (kuroashi ahoudori, Diomedea nigripes), as well as one other albatross which were transported by helicopter to Mukojima in February 2008 by the Ministry of Environment and the Yamashina Institute for Ornithology from Torishima of the Izu Islands [66] where became dangerous to the birds because of volcanic activity. In the Northern Hemisphere, Mukojima Archipelago is the only place where three kinds of albatrosses can be observed [67].

A movement to have Ogasawara registered as a UNESCO World Heritage Site began in 2002, but failed because of a lack of sufficient systems to protect the environment. The Village Office eventually realized that only when the local people understand the value of the ecosystem and are determined to pass the islands to future generations, will the islands be successfully recommended. The Tokyo Government decided

to concentrate on promoting Ogasawara from 2004. Fortunately in 2004, the Ministry of Environment had also decided to choose Ogasawara as one of thirteen model regions for its programme, 'Promotion of Eco-tourism in National Parks'. With the support of the Ministry, Ogasawara could do more to investigate natural resources, develop tourism organizations, create different tours, train staff and establish rules [68].

In January 2006, the Ministry of Environment eventually decided to recommend about 60 per cent of the Ogasawara islands for UNESCO registration. To help lift the image of Ogasawara's ecosystem to the level required for successful registration, about 61 per cent of Chichijima and 59 per cent of Hahajima were designated as Japan's 'Protected Forest Ecosystem Areas' (Shinrin seitaikei hogo chiku) in August 2006 [69].

However, several problems slow the process of registration. Firstly Ogasawara's capacity to supply itself with livelihood essentials is extremely low: only 32 per cent. Of local commodity requirements of about 15.5 billion yen, local industries only provide 5 billion yen worth and the rest is supplied from the mainland. By contrast, Okinawa's self-dependence is 72 per cent. The cost of transport of mainland products to Ogasawara is high, and two thirds of the profits occurred from eco-tourism will mainly go back to the main island. Secondly, there are very few connections among local industries. For instance, the agriculture and fishery products from the islands are mainly sent to the mainland, and therefore the proportion consumed by local restaurants or hotels is low, which in turn depresses the development of local industries. Thirdly, tourist accommodations are not fully used because the weekly ferry only stays in Chichijima for three nights after each journey, and tourism activities other than whale and dolphin watching are limited [70]. Fourthly, the limited infrastructure of water supply and sewerage discharge on Chichijima and Hahajima will be quickly under pressure of a larger number of tourists, and the fragile forest environment can be easily destroyed by the footprints of sightseers. Therefore if one day Ogasawara is registered as World Heritage, the number of tourists must be strictly controlled in order to protect the islands' nature.

In January 2007, Ogasawa was put in a temporary list submitted to the UNESCO by the Japanese Government to apply for Heritage status. When the problems of foreign invasive plants and animals, especially wild cats, goats, pigs, green anole, ants and rats, are basically resolved, and the natural environment has its secured future, the Japanese government will provide a recommendation in January 2010. If everything goes smoothly after scrutiny Ogasawara might be formally registered in July 2011 [71]. For this purpose, in June 2009, the Ministry of Environment will further strengthen the protection system by newly designating 193 hectares of the habitat of red-headed pigeons and rare snails as National Park. The current National Park of 1957 hectares will all be changed to 'special protection area' in which native animals and plants are strictly prohibited from being hunted. This area will cover 74 per cent of the land area. A further 307 hectares will be designated as Marine Park to protect the coral reefs near Hahajima [72].

Conclusion

In September 2006, the Tokyo Government stated that its airport plan will be discussed in the 'Ogasawara Development Plan' (Ogasawara shinkou kaihatsu keikaku). This new plan stresses a harmonious relationship between the residents and nature [73]. It is speculated that the old wartime airport with its 800m long runway in the Suzaki region of Chichijima is a possible location for the new airport plan [74].

The Suzaki site may place little stress on the

surrounding environment and 'public involvement' seems to favour it. If the airport plan materializes, that should provide a sense of security to the local residents who need quick transportation to the mainland in the event of medical emergencies [75]. However, according to the local government's survey, currently 70.65 per cent of the population wants to have an airplane connection, and the rest either seem not to want it, or have no particular opinion [76].

The lack of such a means of transportation has caused apparent resistance to the preservation of native species in the islands. This is one of the major obstacles to saving the ecosystem of Ogasawara, along with indifference to eradicating introduced species, persisting thirst for construction works, and a lack of knowledge of the natural surroundings.

Nevertheless, as discussed above, many local residents have decided to live with nature as humbly as possible. They acknowledge that Ogasawara is a place where nature has to be prioritized over construction works, and where civilization will not have a future unless the ecosystem is protected. In other words, they believe the natural environment of Ogasawara should not be sacrificed for commercial reasons or convenience. On the Ogasawara group, nature and culture are inter-dependent. The law of the jungle cannot be applied, and a world where the stronger prey upon the weaker cannot be allowed. Therefore the Ogasawara group constitutes a laboratory for observing the evolution of symbiotic relations. Ogasawara offers a microcosm of the global ecological crisis.

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For more on the history and ecology of the Ogasawaras see David Chapman, Inventing Subjects and Sovereignty: Early History of the First Settlers of the Bonin (Ogasawara) Islands (http://japanfocus.org/-David-Chapman/3169).

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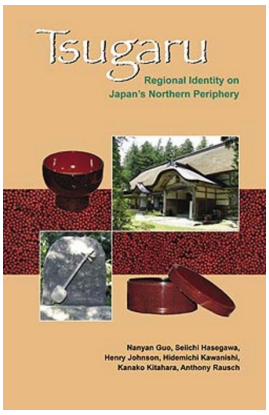

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