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ARTICLE

Greening Atomic Bomb Survivor Trees: Ecological Literacy and ENGOs as LIASE Institutional Partners

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This article considers Oberlin College's collaboration with an environmental non-governmental organization (ENGO) in Japan, centering on projects designed to strengthen ecological literacy in the college curriculum, and in the community outreach component of a LIASE implementation grant. The NGO, Green Legacy Hiroshima, exists to "safeguard and spread worldwide the seeds and saplings of Hiroshima's A-bomb survivor trees" (被爆樹木, hibaku jumoku in Japanese). Trees, however, tell only so much of their own stories. Oberlin's LIASE team developed course units, community outreach initiatives, and supplementary materials in order to encourage knowledge about the social, historical, and ecological aspects of the environmental issues that trees face in wartime and the nuclear age. Curricular and community engagement distinguishes the Green Legacy Project from token tree planting.

Keywords: Hibaku jumoku; trees; atomic bomb survivor; environmental literacy; radiological pollution; environmental NGO; nuclear weapons

A black–and–white photograph taken by Hiroshima resident Hayashi Shigeo after the atomic bombing of August 6, 1945, shows an area near the hypocenter devoid of wooden buildings. U.S. Army photos of Hiroshima and Nagasaki from September, 1945, similarly document wide swaths of the cities from which the built environment has utterly vanished, save for the ruins of random reinforced-concrete structures. Viewers often do not pay attention to the trees that are also in these photos. If we do, the bare, dark trees may read as elements of the photographic composition designed to accentuate the horror and gloom of the radioactive landscape. Such a symbolic reading of the trees resonates with the imagination of the bomb in Hara Tamiki's Summer Flowers (1990), arguably one of the most influential literary accounts of the Hiroshima bombing;

"The trees and plants all around me trembled; suddenly, I saw many trees above my head sucked up in the wind…. Dancing crazily in the air, the trees fell into the midst of the maelstrom with the force of arrows…. I think we must have been enveloped in the dreadfully gloomy faint green light of the medieval paintings of Buddhist hell."

The trees signify the ominous start of the nuclear age.

When Watanabe Tomoko and Nassrine Azimi show such photographs of atomic-bombed cities as part of their introduction to Green Legacy Hiroshima, these co-founders of the small NGO always draw the audiences' attention to the trees with charred trunks and the branches denuded of leaves by the bomb's heat flash and shock wave. They emphasize the trees' resilience in environmental degradation in the time of war, and the trees' powerful cultural meanings. Beneath today's Hiroshima, the trees vigorously send out their roots through soil where the war dead also lie. As of this writing, the scorched trees and their hopeful cycles of green, as well as the human costs of war, are still part of living memory (as of this writing, the average age of hibakusha is 82).

It is Green Legacy's mission to research and nurture the hibaku jumoku (被爆樹木, atomic bomb survivor trees). Green Legacy Hiroshima (GLH) seeks to expand understanding of Hiroshima and Nagasaki as ecosystems, not only as cities of humans and the built environment. The stories of the hibaku jumoku offer humans a fresh framework from which to understand the wars of the 20th century and, in particular, Japan's imperial and militarist past that persists as a flashpoint in geopolitical relations in East Asia and the U.S. The trees also promote awareness of habitat and ecosystems even in places like Hiroshima, where contested cultural and political symbols and the fraught and mournful "memoryscape" (to borrow Lisa Yoneyama's notion) cast long shadows across Hiroshima's lush urban green space and deltaic waterways ringed by green mountains and the shimmering Inland Sea. Although the 1945 atomic bombs yielded only a fraction of destructive power of thermonuclear weapons of today, Green Legacy's focus on the trees that survived the violence of the end of World War II can be an innovative means of interrogating militarized landscapes and environmental legacies of war, and of bringing attention to environmental processes and experiences that transcend national borders.

After several years of informal collaboration, in 2015 Oberlin College signed a memorandum of understanding with Green Legacy Hiroshima. Oberlin designated the Green Legacy partnership as a key element of its LIASE Exploratory and Implementation Grant activities. In keeping with two key LIASE goals, Oberlin's Green

Legacy initiative aimed at (a) strengthening relations with institutional partners in Asia, and (b) increasing campus awareness of environmental issues in East Asia. The relationship with Green Legacy originated in the Hiroshima-focused research of an Oberlin faculty member but gained wider recognition from the college's president's office, our students, and multiple academic departments (Biology, East Asian Studies, Environmental Studies).

Among Oberlin's established institutional partners in East and Southeast Asia, GLH has proved a particularly productive partner for Oberlin's LIASE grant. GLH is a small nonprofit with particularly strong international ties and a focus on the environment. There was an enthusiastic and unquestioning response to the Green Legacy Tree Dedication by a wide range of stakeholders from across campus and in the local community. The Tree Dedication Ceremony recognized the planting of the trees on campus and demonstrated the powerful symbolism of these trees and the behavior (planting) associated with environmental stewardship. For our in-Asia grant activities, LIASE-supported study trips to Japan include a unit at Green Legacy and tour of the survivor trees in Hiroshima. Subsequently, multiple Oberlin faculty and students have made Hiroshima a destination, with the primary purpose of walking the city and collaborating with Green Legacy. The goal of fostering meaningful collaborations with GLH has, however, demanded that Oberlin move beyond ritualistic expressions of green collaboration on campus.

Realization of more substantive initiative has required creativity and persistence on both sides. The Hiroshima nonprofit's activities are focused: GLH provides seeds from survivor trees to partner institutions, having determined species suitable for each partner's climate. In return, the receiving organization pledges to care for and to document the growth and health of seeds and saplings. Partners provide regular updates about their trees. For its part, GLH maintains an active website featuring photos and reports on the status of the trees worldwide, including information about the parent trees in Hiroshima and GLH initiatives there. Oberlin's LIASE/Green Legacy team, inspired by GLH's active programming and research into survivor trees and related environmental issues (and by other entities in Japan that focus on the trees) committed to holding at least one Green Legacy campus program per semester.

A Friends of Green Legacy group was formed with community outreach into the Oberlin and Cleveland areas of northeast Ohio.

Trees tell only so much of their own stories. Our LIASE team has developed course units and supplementary materials to encourage knowledge about the social, historical, and ecological aspects of the environmental issues that trees face in wartime and the nuclear age.

Green Legacy Hiroshima

GLH has currently partnered with 87 institutions and entities in 34 countries. According to the webpage, the Green Legacy Hiroshima Initiative is a "global volunteer campaign, aiming to disseminate the universal message of trees that survived the atomic bombing of Hiroshima." Founded in 2011, GLH's mission is to "safeguard and spread worldwide the seeds and saplings of Hiroshima's A-Bomb survivor trees. It is hoped that many partners will join this initiative and become active ambassadors in their countries of Hiroshima, its peace message and its green legacy." The small NGO defines this "peace message" as a conventional antinuclear advocacy with a strong environmental emphasis.

Green Legacy shares worldwide the double message of caution and hope that the unique survivor trees of Hiroshima (and ultimately Nagasaki) represent, recalling on the one hand the dangers of armaments of mass destruction and nuclear weapons in particular, and on the other hand the sacred character of mankind and the resilience of nature. Seeds and saplings from the A-bombed trees are currently growing in more than 30 countries in a sustained, long-term (1000-year) campaign, joining with other efforts for a nuclear-free and more sustainable planet.

One of the GLH co-founders, Watanabe Tomoko, is a Hiroshima native who also heads a grassroots non-profit organization (NPO) called ANTS-Hiroshima, providing a steady foothold in local nonprofit communities and the regional media. Distinct from other individuals and groups engaged in local and national hibaku jumoku initiatives, GLH's aim of international outreach centering on survivor trees is bolstered by its partnership with the Hiroshima Office of UNITAR, a United Nations entity that "delivers focused and relevant needs-based training" on "peace building, post-conflict

reconstruction and disarmament" for United Nations "stakeholders." Nassrine Azimi, who worked with Watanabe to create GLH, is senior advisor to (and past director of) the UNITAR Hiroshima Office. Her international perspectives and professional experience at the UN enhance GLH's vigorous and successful international outreach efforts. A well-maintained website aimed at international audiences with attractive publicity–along with extensive coverage in the regional newspaper Chūgoku Shinbun and support from local businesses and the city—have contributed to Green Legacy's relatively high profile internationally and locally.

Green Legacy on a College Campus

Because GLH requires that partner institutions have staff with tree expertise, the humanities faculty who spearheaded the GLH at Oberlin reached out to the College Grounds Office and to the Biology Department. The biology faculty, Mary Garvin, Michael Moore, and Roger Laushman, and college greenhouse staff enthusiastically took on the task of planting the seeds when they arrived from Hiroshima in 2015, potting up the gingko and wisteria seedlings in the greenhouse and caring for the saplings until they were ready to move outdoors. The head of grounds and that crew took the lead in locating appropriate sites for the saplings, transplanting and monitoring them during the long and often harsh northeast Ohio winters.

Green Legacy's initiative is simple yet tremendously compelling. Once GL team members realized the appeal of the trees, faculty committed to incorporating the trees into the college curriculum. The LIASE team at Oberlin found in the Hiroshima trees a focus for community and campus outreach. The life-affirming and green symbolism of tree events makes them attractive to broad audiences because they offer an opportunity to participate in environmental stewardship. While we were gratified by the campus's positive reception of ritualistic events such as presentations of the seeds and the Tree Dedication ceremonies, the LIASE team was also aware of the hazards of over-reliance on symbolic events and token trees, which may risk trivializing environmental problems.

Curricular tie-ins with Green Legacy first emerged in the Japanese Language Program. Japanese language instructors, inspired by an environmental literacy and

awareness unit developed by the Kyoto Botanical Garden and Charlotte Melin's "Green German" curriculum at the University of Minnesota, designed a "Meet the Green Legacy Trees' Neighbors" module for their Intermediate Japanese class. First, students had to learn basic tree-related vocabulary, since terms such as leaf, branch, trunk, and root rarely appear in Japanese-language textbooks. After the class read in Japanese about Green Legacy and the effects of atomic bombs on trees, they visited the survivor trees—saplings transplanted from the greenhouse to a park-like area of campus–and walked through the saplings' habitat, taking note of established trees nearby. Although more than a few students commented that they had never paid close attention to the trees on campus before, all of the students tackled this project with great interest. Each student then chose a "favorite tree" to observe over the course of the fall semester. Observation included noting seasonal changes, feeling the texture of the bark, listening to sounds, watching for insects, and watching falling leaves and nuts. Students also researched the uses and cultural significance of their tree species, and reflected on why they chose that particular tree. For the final oral presentations in Japanese, the class went back outdoors. Moving from tree to tree, each student used their favorite tree and a poster of the leaf shapes (as the leaves had all fallen by that late date in autumn) as visual aids. Because the audience was required to ask questions in Japanese of each presenter, all participants used their oral/aural skills extensively. This module effectively combined experiential learning with Japanese language practice and had the further positive effect of promoting environmental imagination and literacy.

The potential for other kinds of Green Legacy curricular tie-ins is considerable. Thus far, an environmental humanities course required of all Environmental Studies majors has included guest lectures on the historical contexts of the atomic bombings, World War II, and the cultural significance of the trees in Hiroshima by East Asian Studies faculty. Also included were lectures on scientific aspects by biology faculty. East Asian Studies classes have featured the Green Legacy Initiative in the context of nuclear culture and modern Japanese history. Although biology and botany faculty and students have enthusiastically engaged in Green Legacy, STEM classes, curricular tie-ins still remain a goal.

For many student volunteers planning Green Legacy programs, Hiroshima brought to mind peace activities such as folding origami paper cranes. The LIASE Grant, however, has encouraged an environmental emphasis for the annual "Fall Walkabout" and "Spring Thaw", both of which Green Legacy events are open to the campus and community. Programs have included talks by biologists and botanists about the resilience and characteristics of gingko trees, readings of poems about trees, and lectures about the environmental consequences of nuclear weapons.

Kamishibai for the Trees' Stories

A particularly useful tool for Green Legacy outreach is a set of kamishibai (paper theater) storytelling cards titled The Little Ant and Big Trees (also known as "The Little Messenger," 2018) written by Green Legacy co-founder Watanabe Tomoko and illustrated by graphic designer Takayama Taiji. Colorful, attractive images accompany an affecting story about the venerable Great Auntie Gingko tree who dispatches a little ant to check up on other survivor trees in Hiroshima. Before sending out the little messenger, Great Auntie Gingko tells the story of August 6, 1945. She recalls, "the bomb looked like the sun, but it killed and maimed living things with its extreme heat and strong blast and radiation So many living creatures died—the ants, the dragonflies, the birds, the crabs, .so many trees." Highlighting one reason that the survivor trees took on such cultural significance in Hiroshima, a Camphor Tree reminisces to the Little Ant, "When the human beings saw the tree growing back [after the bombing], they felt hope … The tree gave them the courage to live." This line also recalls an outspoken hibakusha activist Numata Suzuko, who emphasized the role of trees in bringing her back from the brink of despair as a young woman, when her life course and health were radically changed by the bombing.

The large sturdy kamishibai cards can be used for a large audience or small, and the story can be told in English, Japanese, or other languages. Student members of Friends of Green Legacy have used "Little Ant" successfully at a community event in front of a general audience, as well as for K-12 levels. In this way, the kamishibai aims at promoting environmental literacy, while also calling attention to the non-human world affected by the violence of war and militarization. The non-human characters (though anthropomorphized though the talking trees and ants and crabs)

also engage a broad audience in nuclear history. The college's Allen Memorial Art Museum also collaborates with the LIASE Green Legacy program to incorporate the "Little Ant" into K-12 outreach events and programs focusing on Asian art.

When the survivor trees are a starting point for learning about nuclear weapons and war, participants can approach the trees first from the framework of the environment and biology, and the powerful and life-affirming cultural meanings of trees. The affective and psychological appeal of the trees opens up dialogue about the nature of nuclear weapons, the historical contexts of the trees exposure, and the apocalyptic environmental implications of nuclear war. Even 75 years later, the atomic bombings are not settled in public history or in memory cultures. Kurihara Sadako poem's "When we say 'Hiroshima'" vividly acknowledges the still fraught ethical and geopolitical dimensions of the bomb: "Say 'Hiroshima,' and hear 'Pearl Harbor.'/Say 'Hiroshima,' and hear 'Rape of Nanjing'." ... As one, the dead and voiceless masses of Asia/spit out the anger of all those we made victims."

Another goal of the LIASE team is to enable students, faculty, and the community to use the trees in the curriculum and in community events. To that end, LIASE Oberlin has prepared a range of teacher resource materials. Oberlin alumni and biology major Jun Takaki developed a Green Legacy packet of teaching resources appropriate for

middle-school and high-school students, as well as college students, with suggested activities for a range of learners and audiences including links to resources. Takaki designed units about the seeds and survivor trees in consultation with biology faculty. The packet also includes units about the anatomy and benefits of trees, the effects of nuclear weapons and radiation on trees, and the historical contexts of the survivor trees. In Hiroshima, Takaki examined some of the hibaku jumoku with Horiguchi Chikara (arborist and master gardener of GLH) and learned that survivor trees "exhibit scarred barks, irregular root formation, and inclined growth towards the hypocenter…." The teaching packet also surveys scientists and arborists in Japan who have researched the survivor trees and contributed to their care.

Green Legacy and Science

Soon after the world-changing Hiroshima and Nagasaki atomic bombings in 1945, the newspapers reported devastation so complete that plants and grass would not grow "for 75 years" in those cities. Green plants sprouting up from the burnt earth that autumn, and green buds shooting up from roots or charred tree stumps the following spring, brought hope to many residents. There were also Hiroshima residents who took it upon themselves to pay attention to the post-bomb lives of the trees themselves. Who has persisted in highlighting the hibaku jumoku and giving expression to their various stories over past 75 years? A remarkable example of a steward of the Hiroshima survivor trees can be seen in Katsuda Shinnō, who documented 162 survivor trees in Hiroshima and Nagasaki only two years after the atomic bombings.

In 1947, local university student Katsuda Shinnō undertook research for his biology thesis on the trees of Hiroshima and Nagasaki damaged by the bombings, despite dire food shortages and infrastructure breakdown in the heavily damaged city. During the second springtime since the bombing, and into early autumn, Katsuda walked from tree to tree in a six-kilometer radius around Hiroshima's hypocenter, searching for trees budding out and thriving. He made a careful record of damage to trunks, limbs, and bark, and sketched abnormalities he detected in leaves, tree rings, and at the cellular level under a microscope.

By the end of his study in Hiroshima and Nagasaki, Katsuda had documented 500 trees in total, 162 species among them. Many thousands more trees had died instantly, scorched to the ground, or partially so, by the bomb's heat, or uprooted by the blast; other trees had shown signs of life during the first spring after the bombing, only to perish within the year. Species of trees differed in their survival rates according to Katsuda, who discovered prunus and camphor trees (kusunoki) that were sending out new buds less than 0.5 kilometers from the hypocenter. Oleanders were one plant that proved particularly resilient to the atomic explosion. In contrast, many red pines more than 2 kilometers out weakened and died. Katsuda's project required considerable physical effort at a time in the early postwar years when food was in short supply. His labor was motivated only partly by intellectual curiosity. "As a survivor of the bombing, I felt that it was my responsibility to record the damage," Katsuda noted.

Productive Community Engagement in Forest Landscapes

The Green Legacy trees are a good starting point to begin thinking about ways to encourage community engagement in issues of deforestation, sustainable forestry, and the importance of trees. The project potentially promotes psychological,

spiritual, and cultural dimensions to human engagements with trees and forests. Some advocates of grassroots tree planting initiatives argue that participation can contribute to affective engagement with trees and, in turn, help people connect that moment with sustainability concepts. Because people who plant trees realize that the trees will outlive them, they will also wonder about the health of the world the tree inhabits, and how the needs of future generations will be met.

Despite the debate over the ethics and significance of the atomic bombings, the apparent political neutrality and the inherent appeal of trees themselves lower many barriers for many potential audiences to participate in Green Legacy events and affiliation with Oberlin Student Friends of GLH. Planning presentations by human atomic bomb survivors (hibakusha) often engenders careful groundwork on campus in order to clarify the goals of the presentation and to indicate awareness of the contested meanings of the August 1945 bombings and hibakusha testimonials.

Some of the same merits of Oberlin's LIASE's Green Legacy initiative may in some contexts become limitations. As Shaul E Cohen and others have noted, tree

planting has become a "dominant form of environmental stewardship" in the United States. Despite the merits of planting trees, this symbolic practice can be problematic if not accompanied by concern for behavior that promotes biodiversity and that grapples with controversial issues around consumption of trees within a broader context of climate change. Green Legacy institutional partners, furthermore, customarily plant the hibaku jumoku saplings in landscaped environments, and not in highly contested landscapes compromised by practices such as monoculture or clear cutting. Strategically, Oberlin's tree planting ceremony was held in a park-like setting at the center of the college campus to celebrate the of gingko saplings grown from the seeds of Hiroshima's atomic bombed trees, thus attempting to make the event palatable for all by minimizing the controversial and hard issues.

The academic outcomes of the Green Legacy institutional partnership include new environmental humanities courses, and art museum exhibits about representations of plants and trees in Japanese and Chinese art, which student incorporate in research. In the spirit of exploring a theme or issue nearby before doing the same abroad, Oberlin plans a symposium about climate changes and trees featuring Green Legacy, scientists researching the hibaku jumoku, and botanists and arborists from northeast Ohio. Even with the political and ethical complexity that still surrounds the bombings and nuclear weapons three-quarters of a century later, trees remain approachable, likeable, "green" and symbolic of life and hope.

Competing Interests

AS is co-PI of Oberlin College's LIASE Implementation Grant.

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