

Hallelujah, Amen!

SINGING IN THE CATHEDRAL OF THE NUCLEAR AGE

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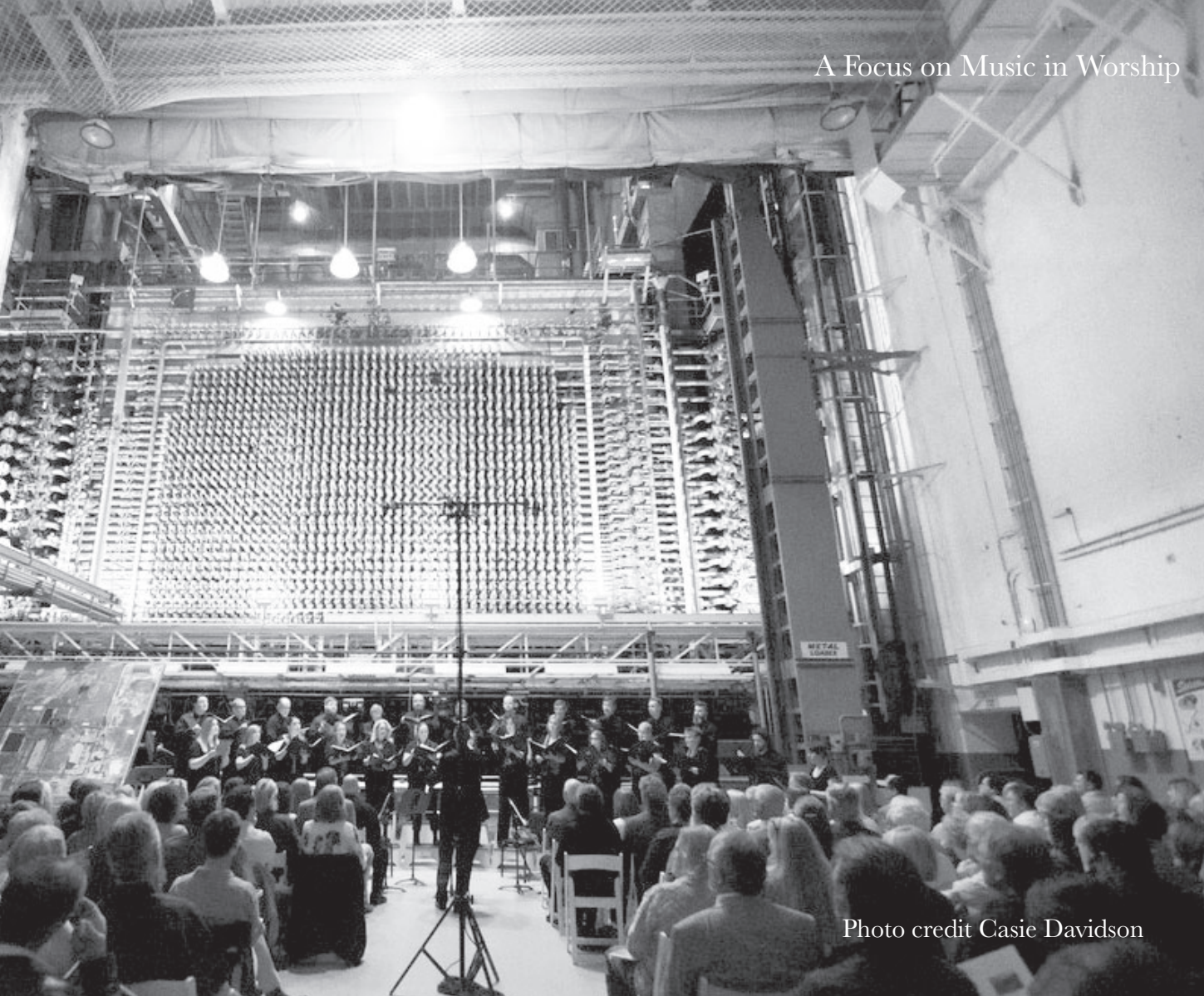


Photo credit Casie Davidson

One dusty day in 2011, Justin Raffa and Reg Unterseher walked into the B Reactor, the world's first full-scale plutonium production reactor, in the middle of the desert in southeast Washington State. They were momentarily transported back seventy-five years, with mint-green paint on the concrete block walls, mid-century fixtures hiding asbestos, and period posters declaring that "Loose Lips Sink Ships." The decaying industrial space didn't immediately suggest itself as a performing arts venue. Then someone spoke aloud and they looked at each other, struck with the same thought: "Listen to those acoustics!" With cavernous dimensions, a graphite core surrounded by cast iron and steel, and an entire wall of aluminum reactor tubes as the backdrop, they

could feel the room resonate with the ghosts of the past. In that moment, the two determined artists knew that one day there would be singing inside the B Reactor.

Raffa, the artistic director of the Mid-Columbia Mastersingers, and Unterseher, the associate conductor and a composer, were on an early public tour of the facility in May of 2011. At that time, access was still tightly controlled, and spots on one of the limited tours disappeared quickly. The transformation from top-secret World War II plutonium production facility to National Historic Landmark, museum, and performance venue took decades, and attests to the perennial transformation from the suffering of war to the healing of art.

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Origins of the B Reactor

Early in 1943, the US federal government chose the remote desert locale of Hanford, Washington, with its flat rocky terrain and proximity to the Columbia River, as one of three locations for its top-secret Manhattan Project—a research and development effort during World War II that produced the first nuclear weapons—along with Los Alamos, NM, and Oak Ridge, TN. Residents of the towns of Hanford and White Bluffs, and Native American tribes who inhabited the area, were given ninety days' notice to move, without explanation. Driven by the urgency of beating Hitler to the atomic bomb, the government brought the nation's top scientists and engineers to Hanford. They were followed by thousands of workers from all over the country, pouring in to build and sustain the brand-new facility and the community that grew around it. The vast majority had no idea what they were creating, only knowing it was in support of the war effort.

In October of 1943, the US Army Corps of Engineers broke ground on the B Reactor, and in less than a year, the world's first large-scale nuclear reactor was in operation. B Reactor produced plutonium for the Trinity Test in Alamogordo, NM, on July 16, 1945, and for the Fat Man bomb that devastated the city of Nagasaki on August 9, 1945. As many as 80,000 people were killed in that single bombing. The news of the bomb being dropped was the first time most of the people of Hanford knew what it was they were build-



The B Reactor National Historic Landmark in Hanford, WA, is part of the Manhattan Project National Historical Park, which also includes sites in Los Alamos, NM; and Oak Ridge, TN. Photo credit: Harley Cowan

ing. Less than a week later, the war was over.

Production at the B Reactor was suspended for a time, resumed during the Cold War, and it was finally shut down for good in 1968.

Journey to Historical Landmark

With war-time production over, the Department of Energy began directing the effort to dismantle and clean up the nuclear waste facilities at Hanford. Even as buildings were being torn down and cocooned, a movement to preserve the B Reactor began in 1976 with the site being named a National Historic Mechanical Engineering Landmark by the American Society of Mechanical Engineers. In 1992 it was listed in the National Register

of Historic Places, and two years later was designated a National Historic Civil Engineering Landmark. In 2008 it became a National Historic Landmark, and improvements were begun in order to make it safe and accessible to the public; tours opened in early 2009 that were led by retired Hanford scientists and engineers, sharing their passion and interest in the monumental work that happened there. November of 2015 saw the establishment of the Manhattan Project National Historical Park, comprising Hanford, Oak Ridge, and Los Alamos. This designation brought more support and interest in continuing to expand the site as a visitor destination.

You Want to Do What in Our Nuclear Reactor?

From the moment they stepped into the B Reactor, Justin Raffa and Reginald Unterseher made it their mission to produce a performance inside the B Reactor with the Mid-Columbia Mastersingers, the area's premier choral ensemble. Even more than noting the remarkable acoustics, they were deeply moved by the historical significance of the space and mesmerized by the visually stunning face of the reactor.

Approaching the Department of Energy with their plan to stage a concert inside the reactor, they were initially met with resistance. Back in May of 2011, the B Reactor tours were limited to US citizens over the age of eighteen, with the requirement that each visitor provide full background information. The residual weight of World War II, Cold War, and post-9/11 secrecy was palpable. In addition, the site itself was inhospitable, to say the least. With no potable water, no restrooms, no heat or AC, the constant background buzzing of transformers, and the possibility of visits by rattlesnakes and other critters, the site was also a forty-five-minute drive from town down a dusty gravel road in the middle of the desert. Who would even want to come to a concert in a space like that?

Persistence Pays Off

As it turned out, a lot of people were initially surprised, offended, and fascinated by the idea, and ultimately everyone was interested. After three years of determined

relationship-building and chipping away at resistance, the Mastersingers were finally invited to perform on the grounds outside the building, providing entertainment for the celebration of the B Reactor's seventieth anniversary on September 26, 2014. The cultural shift had begun, slowly moving from closed secrecy to wary welcome.

The following year, the Mastersingers were again asked to sing for an event, this time inside the B Reactor. On November 12, 2015, they performed the US national anthem and Washington's state song, "Roll On Columbia," for dignitaries including Senator Maria Cantwell at the official dedication of the B Reactor as a part of the National Park Service. With this performance, the Mid-Columbia Mastersingers became the first (and as far as we know, the only) choral group in the history of the world to sing inside

a nuclear reactor. With the barrier beginning to crumble, thus began a series of ever-expanding concert events. Audience members were bussed to the site, deluxe port-potties were installed, permits for food and alcohol were obtained, and one by one the various obstacles were overcome, with the gracious and enthusiastic help of staff from the National Park Service and the Department of Energy.

Programming for the Cathedral of the Nuclear Age

The question of what music would be appropriate to perform in a nuclear reactor where plutonium for wartime defense had been built was one that Raffa and Unterseher took very seriously. It is a sacred space to many people for many different reasons. It is a science and engineering marvel. It is a mon-

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ument to the defeat of Hitler and the end of World War II. Materials produced here killed tens of thousands of Japanese people. It was at the center of the Cold War. It is the former workplace and life-place of so many Hanford employees—a source of fascinating work and a wholesome family life but sometimes also a source of secrecy that could separate families and take a critical toll on their health and well-being.

A concert program that honored all of these perspectives was carefully chosen for the first official concert in the B Reactor, a collabora-

tion with the National Park Service to celebrate their centennial in September of 2016. Beginning with a setting of Emily Dickinson's "Look back on time with kindly eyes" by Joseph Gregorio, the program then nodded to the achievements of science with Eric Whitacre's "Leonardo Dreams of His Flying Machine." Karen P. Thomas's "Over the City," a setting of a poem by Molly McGee, was commissioned in 1995 to commemorate the fiftieth anniversary of the bombing of Hiroshima. Two pieces by Reginald Unterseher were included. "Hanford Songs" for solo soprano and string quartet

is a setting of four poems about the Hanford experience by Kathleen Flenniken, the child of a war-era Hanford scientist and a former Hanford engineer herself, from her book, *Plume*. The other Unterseher piece, "If You Can Read This," considers how the dangers of a decaying nuclear waste site could possibly be communicated to future civilizations. The concert closed with Samuel Barber's "Agnus Dei."

This first concert was met with tears, accolades, and enthusiasm for more. This success illuminated the transformative nature of art and inspired all involved to look eagerly toward the next concert. Exactly one year later, in September of 2017, the Mid-Columbia Mastersingers followed that first emotional program with a presentation of James Whitbourn's "Annelies," a concert-length work for choir about Anne Frank. The beloved victim and hero of World War II was an appropriate subject for the Cathedral of the Nuclear Age and provided another reminder to "never forget."

For the third concert in September 2018, Raffa chose music on the theme of the shining light of democracy. This concert also has the distinction of being the first time a baby grand piano was played inside a decommissioned nuclear reactor. The program included Britten's "Advance Democracy," Stravinsky's arrangement of "The Star-Spangled Banner," the opening chorus from John Adams's *Doctor Atomic*, and "Admonition of F.D.R." by Samuel Adler. Three choral song cycles were included: Trent Worth-



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ington's "And Einstein Said," which sets quotes by the famous physicist; Poulenc's "Un Soir de Neige," a dark reflection on World War II; and excerpts from Britten's setting of "The Holy Sonnets of John Donne," for tenor soloist. On August 6, 1945, the day the first atomic bomb was dropped on Hiroshima, Britten set Sonnet XIV, "Batter my heart, three-person'd God," the same poem Robert Oppenheimer had in mind when he named the first atomic test "Trinity."

György Ligeti's "Lux Aeterna" served as the centerpiece of the program, with its mysterious and evocative micropolyphony. The

programming sought to juxtapose meanings of light, as it is given off during the nuclear fission process and during an atomic bomb's detonation. It included a wish for perpetual light to shine upon the over 60 million people who lost their lives during World War II. The concert ended with "Song of Democracy" by Howard Hanson, a fitting punctuation as the light of democracy continues to be a beacon.

Nuclear Dreams

The program for the 2019 B Reactor concert had its origins, as so many things do now, on Facebook.

But first, flashback to 2006, when Nancy Welliver, an environmental scientist at the Hanford site, was concurrently working on a master's degree in psychology with an emphasis on the psychology of dreams. As she was conducting interviews with former Hanford workers about radioactive landfill history as part of her day job, she would slip in questions about whether they had ever had any dreams about Hanford. Many of them had, and they told her their dreams.

The following year, Welliver wrote a thesis for her master's degree based on the dreams of those Hanford workers that she had start-



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ed collecting during the radioactive burial ground interviews. She interviewed as many as seventy-five workers at the site, developing a portfolio of at least a hundred

dreams about Hanford. The portfolio also includes the stories of some of the people who lived on the land prior to 1943, before the Hanford site existed.

In 2017, Nancy, now living in Honolulu, posted on Facebook about her own vivid Hanford dream. This got the attention of her friend Reginald Unterseher, a composer and conductor who has lived over half of his life near the Hanford site. She told him about the portfolio of dreams, and he immediately became interested in collaborating with her to compose a piece of music based on the dreams that could one day be performed inside the B Reactor.

Welliver worked to shape the collection of dreams into a libretto, choosing the dreams that had the most vivid imagery, taking care that none of the dreams seemed to reinforce the polarization that has arisen between those who focus on the stunning technical achievements of Hanford and others who decry the environmental destruction. Rather, the dreams emphasized personal experiences and feelings. It was important to both librettist and composer that the work be a stories-based piece rather than an opinion piece, focusing on the people associated with the history and activities of the place.

The colorful and moving stories told in the libretto include the childhood recollections of a man who grew up in White Bluffs just a few miles from the B Reactor. There is also narrative from a shaman of the Wanapum tribe who lived on the land that became Hanford until 1943. There is a statement on the ending of the war given by Colonel Franklin Matthias, who was the Hanford District Manager during World War II. Included

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in the libretto is the poignant story of “Atomic Soldiers,” veterans who were stationed in trenches at the Nevada Test Site within a mile of a high yield thermonuclear test shot in 1957. It is likely that the plutonium used in the test shot was produced at Hanford, and the veterans’ dreams bring into focus another perspective of the effects of Hanford. These stories, and many more, are bookended with a paraphrased quote from Shakespeare’s *The Tempest*, “We are such stuff as dreams are made on, and our little lives are rounded with a sleep.”

One of the challenges Unterseher came across in setting the libretto is that it is mainly prose, without the poetic meter that would lend itself more easily to musical phrasing. He was also faced with unusual words and references to Bugs Bunny and George Clooney. Rarely do composers set text like “a fleet of 1951 International Harvester pick-up trucks that were too radioactive to remain in the ‘above’ world,” “no underwear,” and “and my boobs didn’t fit into the ‘whole body’ detectors” and “anything that beautiful can be radioactive if it likes.” In setting the words to music, Unterseher picked up the tone of the dream and the type of music the dream suggested.

With its dramatic and descriptive subject matter, the music itself owes as much to music theater styles as it does to the classical idiom. It is tonal, has a lot of rhythmic impulse, and includes some “quasi-recitative” segments. The variety in musical style is driven by the mood of each dream. Listeners will notice

a Palestrina quotation juxtaposed with Looney Tunes-inspired music. Some of the dreams themselves include references to music. There is a dream about a Renaissance choir, one about a guitar, another about a parade complete with floats and music, and even a prophetic one about songs in the B Reactor.

Welliver and Unterseher decided to call the piece an oratorio, as it is an unstaged concert-length work with a dramatic story arc. It is scored for mezzo soprano and baritone soloists. With storytelling as the main focus, the middle ranges of those voice types can help with intelligibility of text. The solo voices represent the individuals and the uniqueness of the stories they tell, while the chamber choir often provides commentary and emotional underpinnings to the dreams. The limited size of the performance space had a major role in determining instrumentation. Unterseher wanted to have access to the widest palette of musical colors using as few instruments as possible. With piccolo/flute and double bass providing the outer textures, and violin, viola, and cello rounding out the inner voices, he was able to explore a great variety of sound opportunities. The aural diversity expands even further with the addition of bass drum, thunder sheet, marimba, handbells, and other percussion instruments. This allows for a rich and varied musical foundation in support of the dream-text of the libretto.

A Modern-Day Plutonium and Cathedral of the Nuclear Age

Back in 2007, Nancy Welliver took a class based on the work of the great archetypal psychologist James Hillman. He wrote a book called *The Dream and the Underworld* in which he talks about how dreams are related to the Greco-Roman god Pluto. The Greeks and Romans had underground temples to Pluto that people went to for healing. The temples were dream oracles and were unwholesome places full of poisonous fumes, garbage, and underground passages. The parallels to Hanford and all of the underground tunnels, radioactive fumes, and poisonous waste buried under the ground caught Welliver’s attention. She was stunned to find out that the name of these temples was “A Plutonium,” an eerie coincidence that underlines the thread of war that weaves throughout the ages.

“Nuclear Dreams: An Oral History of the Hanford Site” by Reginald Unterseher and Nancy Welliver was commissioned by the Mid-Columbia Mastersingers to commemorate the seventy-fifth anniversary of the B Reactor, a site that has had a great impact on the history of our country, though few people may realize it. “Nuclear Dreams” is a musical tribute to the myriad effects war has on human lives. The performance of this work inside the B Reactor—the “Cathedral of the Nuclear Age”—is a testament to the sacred and restorative power of art.