



THE CHINA LAKER

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Newsletter of the China Lake Museum Foundation

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Secret Weapons of the Secret City

Fat Man and Little Boy. Of all the “weapons that win wars,” the ones that can best lay claim to the title are the first atomic bombs, Fat Man and Little Boy, which helped to end World War II. China Lake was a major contributor to the success of those weapons. The U.S. initiated a program in 1942, under the Army Corps of Engineers, to build a weapon that would allow the U.S. to end the war without having to invade Japan. Several large engineering and production centers were set up at remote sites including sites in Tennessee, Washington (state), New Mexico, and California. In 1945, China Lake (then known as the Naval Ordnance Test Station or NOTS) carried out Project Camel, the code name for the station’s involvement in the Manhattan Project.

China Lake’s Role: Non-Nuclear Components. An atomic bomb is essentially a conventional bomb with a nuclear core. The China Lake and the California Institute of Technology (Caltech) Team, experts at conventional explosives, was tasked to develop the non-nuclear explosive components of the atomic bomb; the conventional explosives were used to trigger the nuclear explosion. China Lake also performed detonator testing; mixed, melted, cast, and machined explosive shapes; air-dropped hundreds of bomb components and shapes from B-29 bombers; studied and solved flight problems; and conducted aeroballistic tests to optimize aerodynamics and to test fuze functions. The team also checked out equipment procedures to be used in the tactical delivery of the atom bomb.

Hiroshima and Nagasaki. The Little Boy uranium-based atomic bomb was air dropped over Hiroshima, Japan from the Enola Gay on August 6, 1945 and exploded with a force equivalent to 12,500 tons of TNT. On August 9, Fat Man, an implosion-type plutonium-based atomic bomb, destroyed Nagasaki with a blast equal to more than 20,000 tons of TNT. The bombings brought a swift end to one of the bloodiest wars in human history. China Lake developed and tested many of the non-nuclear components and the conventional explosives necessary for both types of bombs to work.

Research and Development. Two methods for nuclear fission were studied. One method involved a special gun to fire uranium. The second method involved an implosion method using plutonium. Both methods were used. The first problem was finding reliable detonators with incredibly fast action, a millionth of a second, and multiple detonations timed to within microseconds. China Lake loaded and test fired the new detonators made in Pasadena. China Lake, at its Salt Wells Pilot Plant, also cast and machined precision high explosive lenses that focused blast waves to create the phenomenal heat and pressure required for the plutonium core to fission. The actual nuclear components of the bomb were developed at Los Alamos, New Mexico. No nuclear components were ever developed or tested at China Lake.

Testing. Aerodynamically, the early bomb configurations were incapable of accurate flight. Hundreds of drop tests with different fins and weight distributions were required to solve the problem. This work was conducted at China Lake and several other sites around the country. The first dummy bomb dropped at China Lake from 25,000 feet was buried so deep that crews worked for days to recover it, and the hole that was left could have accommodated a ten-story building. Only dummy bombs (no nuclear warheads) were dropped (Continued on Page 2)

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at China Lake. Sea testing was also conducted to determine whether the shock would detonate the weapons should Fat Man or Little Boy be jettisoned at sea. Commander John T. "Chick" Hayward, NOTS experimental officer who went on to achieve the rank of vice admiral, flew 87 test flights in B-29s at China Lake. On one test flight, while carrying Fat man, Hayward's engine caught fire at 19,000 feet because of the excessive weight of the 10,000-pound bomb, and he had to make an emergency landing at the North Island Naval Air station.

Salt Wells Pilot Plant. The deadline for building at China Lake was set: less than four months in which to construct 80 buildings (52 permanent) and begin operations 100 days after groundbreaking. Challenges in building, equipping, and operating the facility were enormous. Engineers developed remotely controlled melting kettles and built specialized radiographic equipment to inspect the explosive blocks for fissures or cracks. A periscope-type optical system was devised that enabled a control-room operator to safely machine blocks of high explosives to close tolerances while separated from his work by two heavy concrete walls. All buildings were designed to hold a temperature of ± 2 °F.

115 Days-243 Million Dollar Construction. In only 115 days, the \$13,000,000 plant (\$243 million in today's dollars) was melting, casting, and machining explosives for the Manhattan Project. Operations began just nine days after the test of the world's first nuclear weapon at Trinity site, Socorro County, New Mexico.

Bomb Assembly. Materials and equipment shipped to China Lake for Project Camel were intentionally labeled with innocuous and misleading markings. This avoided drawing attention to the items during transport. One such label was "One Kit, Bomb Assembly." Each kit contained everything required to assemble an atomic bomb, including half a dozen Quonset huts and a pair of 40- by 40- foot steel buildings with air conditioners. Two kits (one a spare) were shipped to Tinian and Iwo Jima to assemble the Hiroshima and Nagasaki bombs. One kit was reportedly sent to Wendover Army Airfield in Utah as a reserve. The fourth was a set up at NOTS, near Armitage Field. With that "kit," NOTS employees assembled multiple atomic bombs that were complete except for the nuclear core. China Lake also custom-built a specialized loading pit; the B-29 would drive over the pit, and the bomb would be uploaded from underneath. Duplicate loading pits were built on the islands of Iwo Jima and Tinian.

Western Union. "Today, the whole world knows the secret which you have helped us keep for many months. The atomic bomb, which you have helped develop with high devotion to patriotic duty, is the most devastating military weapon that any country has ever been able to turn against its enemy. No one of you has worked on the entire project or known the whole story. Each of you has done his own job and kept his own secret, and so today I speak for a grateful nation when I say congratulations and thank you all." – Robert P. Patterson, Undersecretary of War

Salt Wells-Post War. In 1946, the Salt Wells Pilot Plant was ordered to step up production. Because Salt Wells was the single source for high-explosive components of the fission-type bomb, no other such facility had been built anywhere.

850 Workers at Peak Production. Through the mid-1950s, China Lake continued to be a major producer of certain chemical explosive components for the atomic weapons program. At the peak of its operation, the Plant had 550 employees plus 300 in support activities. China Lake efforts helped develop a DOD arsenal of dependable nuclear weapons and promoted the development of an industrial sector capable of producing nuclear-weapons components. Initial work at China Lake laid the groundwork for some of today's most advanced nuclear weapon systems.

Post-War Delivery Tactics. From 1951 to 1953, the Air Development Squadron FIVE (VX-5) at China Lake

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(Secret Weapons of the Secret City Cont'd)

was charged with developing a delivery tactic that would get the nuclear weapon on or close to the target while providing an escape envelope for the aircraft and pilot. VX-5's personnel were top caliber; the average flight time per pilot was more than 2,000 hours. These officers and about 100 enlisted men worked tirelessly, testing and perfecting bomb-delivery techniques described as "loft/toss," "over-the-shoulder," and "lay-down." These specialized maneuvers soon became the Navy way of delivering nuclear weapons from aircraft. Testing was intense, including more than ten thousand Mk 76 practice bombs.

Historical Sites. Many of the original buildings used in the atomic-bomb work at China Lake are still standing and have been nominated to the National Register of Historic Places. These buildings include facilities at Salt Wells and main-site China Lake, including the fuze construction facility, steam plant, inert-material research and development laboratory, and develop-process facility as well as the Camel test camera for shelter, four drop-test buildings, the control tower, X-Pad, and Building X.

Fleet Special Weapons. China Lake developed delivery systems—but not warheads—for a variety of strategic and tactical nuclear weapons. China Lake developed an underwater-launch capability for nuclear missiles and conducted penetration and feasibility studies for nuclear weapons. In the early 1950s, China Lake redesigned the **Elsie** (TX 8/TX 11) nuclear-penetrator weapon and developed the Bombardment Aircraft Rocket (**BOAR**), one of the earliest rockets designed to carry a nuclear warhead. China Lake demonstrated a submarine-launched bombardment missile called **Marlin**, in 1957, and supported the antisubmarine nuclear-weapon system **SUBROC**. **Regulus**, an early submarine-launched nuclear cruise missile, came to Point Mugu for T&E in 1949 and became the largest single program in Point Mugu history, in terms of manpower and facilities. In the 1980s China Lake made contributions to fuzing and flight-termination systems of the **SM-2 (N)**, the nuclear version of Standard Missile, and developed the data link for **Seek-Bang**, the Air Force's nuclear Walleye program. The Manhattan Project work influenced the Fleet Ballistic Missile family, beginning with the Polaris missile and culminating with today's Trident II.

Excerpt taken from **Arming the Fleet**. May 2004. Produced by Wallace Martin with production support from the Technical Information Division.

President's Report by Bob Campbell

I hope all of you had a good start for the New Year. We certainly did as we attended the CLMF New Year's Party donated for last year's auction by the Springhill Suites/Hampton Inn. It was a classy event, catered by the Grape Leaf with food donated by Bill Farris Jr., music and lighting provided by Sound Waves and the no host bar provided by Casa Corona. We are looking forward to next year's event and hope you will be able to join the crowd.

We currently have the show of Larry Zabel's combat art displayed in our renovated conference room. Many of the locals loaned original Zabel art they own for the show. It is worth the trip to come up and view the paintings, as it is a great show of the diversity of his painting. Included in the show are three originals he painted when he was fourteen. The paintings will be at the Museum for the next two months.

The building committee is proceeding with further planning on the new Museum concept by seeking additional architectural consultation with those experienced with Museums. The lease with the County for the parcels of land we are working (corner parcel and the parcel east of Maturango Museum) is in the final approval stages with the County.

Bruce Bartels has been working the planning for locating an airplane on the corner parcel and prior County Supervisor Jon McQuiston was able to provide \$20,000 in in-kind support to start the project implementation. We plan to have the airplane display completed this year. This exhibit will be one of the first actions that comprise the first phase of our anticipated move of the Museum into Ridgecrest as part of the expanded museum complex.

Volunteers!



**HELP
WANTED**

We need your help for the Gift Shop, Greeters, Docents and all around help. If you would like to become one of our wonderful volunteers, please call Teri (760) 939-3530.

Margaret Cornelius has been volunteering with us since July 2012 on our education program. She designed the map of the museum and is working on putting together educational booklets for all ages. Margaret was born in the Navy Dispensary here at China Lake. Growing up she felt that the base was calm, fun and a solid place. Since being raised here, there has been a pride instilled in her for China Lake and the Navy for the efforts they do. She wanted to give back to China Lake and decided that since she is a retired teacher that she would do best in our education program wanting to educate the town in what the base represents. Before starting her teaching career, she worked on the NOTS base for 7 years. Followed with teaching at James Monroe and then Burroughs for 25 years. Being a teacher taught her to multitask with having 15 different things given to her at once and being able to sort them and answer them. For the education program underway she understood all the hurdles we would be going over and has been moving them effortlessly. The Museum is so excited to continue to work with Margaret and learn from her knowledge.



Bruce Bartels is volunteering to help set up a static aircraft and weapon display on the empty lot north of the courthouse. He moved to China Lake in 1971 after graduating from UC Davis. He worked on base as a Mechanical Engineer on fuzes. Bruce likes learning and using SketchUp to model and layout the land display in a 3D scale. For his volunteering position he works from home, mostly, unless it comes to meeting with the building committee. This project is not something that normally happens but Bruce was on board as he enjoys helping with building and planning new idea.



China Lake Museum
Challenge Coin

Excitement in the Gift Shop?

T-Shirts



License
Plate Frames

We have so many **NEW** and **EXCITING** items in the gift shop. Please come check it out!

Operating hours:

10am-4pm Monday-Saturday

(760) 939-3530



Model Planes



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Events

STARS AND STRIPES VARIETY SHOW



I WANT YOU...

Come to a USO Style Variety Show!

Saturday, March 29, 2013

7:00PM

Historic USO Building

Tickets are \$15 on sale at Red Rock Books

Cash Bar

Questions Call Becki Cornett (760)939-2916

Proceeds go to the Museum Campaign

Larry Zabel Tribute Exhibit is still at the Museum!
Come see it before it goes!
The sooner the better.
Ending in April.

Save the Date! **Get ready for the Annual China Lake Museum Foundation Auction Saturday June 1, 2013**

*Watch for exciting changes coming this year to make this evening even more fun!
Renowned Auctioneers Jim Sumners of 5-Star Auctioneers in Texas and local talent, Bill
Sumners will lead the evening.*

*Proceeds of the auction will go to building and support efforts currently underway to
construct a new museum facility in the City of Ridgecrest!
The Foundation is seeking auction donations for all categories—Live, Silent, Spirit Cellar,
and Raffle; please contact Teri at the museum office (760) 939-3530 to make a donation.*

Tickets on Sale Soon!

**Don't forget our conference room is open! If you are interested in reserving our
newly renovated conference room please call Teri Sandy (760)939-3530.**

New Year's Extravaganza!

A huge THANK YOU to:

Spring Hill Suites

Hampton Inn

Sound Waves

Grape Leaf

Bill Farris

It was an amazing night!



LARRY ZABEL TRIBUTE

The Larry Zabel Tribute Grand Opening was a great night. We had quite a few paintings loaned to us for this exhibit. Members of the local Ridgecrest community as well as friends and family of Larry Zabel came out to pay homage to his works.. A silent auction on a "Trails Less Traveled" book of Zabel's artwork took place and was won by Shel Simonovich..

We would like to thank those that donated to the shipment of the Zabel paintings from



The Navy art Collection in Washington D.C. James and Joy Colvard; Scott and Ruth O'Neil; Robert and Luverne Hillyer; RADM Mat Winter, USN; Burrell Hays; T.C. Lyster; Wayne and Pat Doucette; VADM David and Cheryl-Marie Dunaway; Mel and Barbara Foremaster; Sterling and LaVonne Haaland; M.G. Mathis; Todd Fisher; John and Dee Di Pol; and Gerri and Mitch Markota.

You help put the pieces together for the museum!

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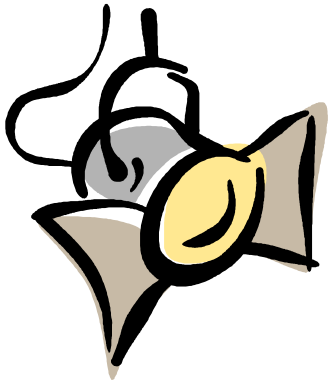
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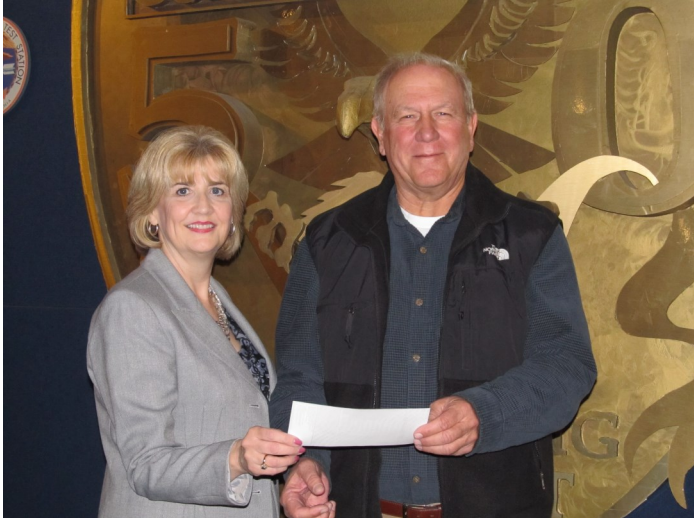
John and Dee Di Pol giving a generous donation to the Building Fund at the Larry Zabel Tribute Grand Opening.



Jacobs giving a donation to the Museum General Fund.

“I wanted to give back to the Navy and China Lake what they had done for me.”

— John Di Pol



Bob Campbell accepting a donation from Dianne Tolliver from L-3 giving to the Museum Campaign.

Pledges to the Museum Campaign

I want to extend my appreciation to those locals who have made a bold statement; they have made a commitment to support the China Lake Museum Foundation as we strive to build a new museum in Ridgecrest that will replace the one at China Lake. Our goal is \$3.6 million.

These donors have pledged to donate a sum of money toward the building of our new museum in Ridgecrest! Using a pledge card as a method of donating brings philanthropy closer to the folks of this community. You can select any amount that you feel comfortable giving, and make payments on that amount according to a payment plan that you design. If we all give something according to our wealth ability, we will meet our financial goal very quickly. Please consider e-mailing Jamie Gallagher at chinalakemuseum@yahoo.com to request a pledge form. We will add all new names to the list each newsletter.

Pat Connell
VP-Development

Pledges

Bob and Alice Campbell

James Colvard

Jack and Pat Connell

John and Dee Di Pol

Jamie Gallagher

Vincent Granato

Jack and Joanne Latimer

James and Patricia Manion

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China Lake Museum Foundation

From the Desert to the Fleet

Preserving the Legacy of Naval Armament and Technology



I want to help build a new Museum in Ridgecrest!

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