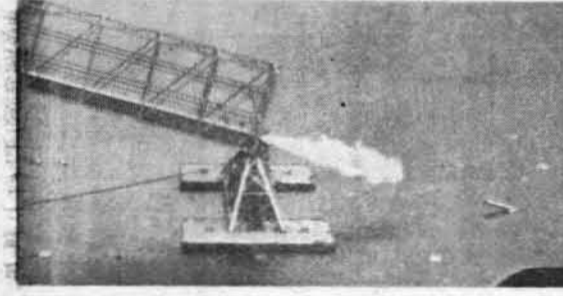
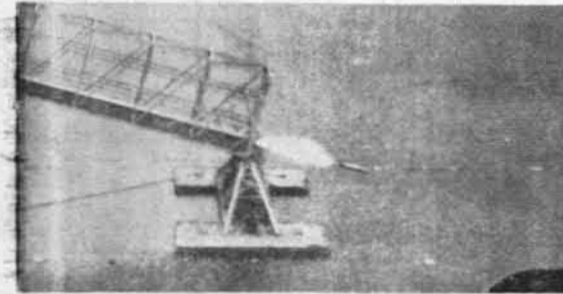
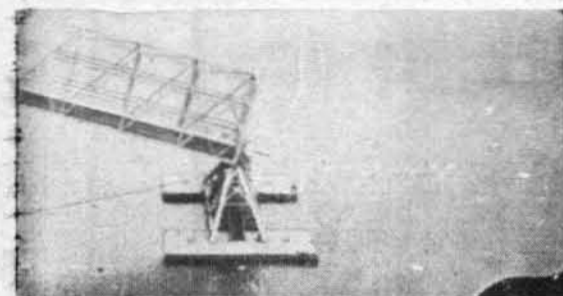
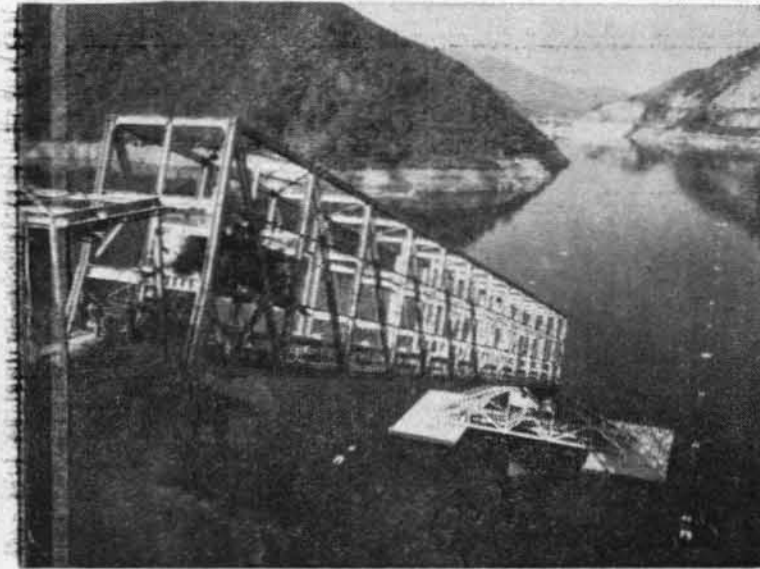


# Pasadena Probes Undersea Weapons Frontier

## Unique Variable Angle Launcher Aids Modern Torpedo Research



VAL, the world's largest blow gun, in action at the Morris Dam Torpedo Range.

The VAL is used to study water-entry and underwater trajectory characteristics of full-scale projectiles.

Shooting missiles from the tubes by means of compressed air, launching velocities up to 1,000 feet per second with a 1,500-pound missile can be easily achieved.

## Our Mission And Activities

The principal objective of NOTS Pasadena is to plan and conduct a program of research and development in the field of underwater ordnance, including complete torpedo and missile weapons systems for the Fleet.

NOTS is able to carry ordnance developments through from inception of an idea to the completion of weapons ready for mass production. It has all the specialized facilities and technical personnel for conducting research, production engineering, and pilot production.

Some of the weapons that NOTS deals with are rockets, guided missiles, torpedoes, and aircraft fire-control systems.

To carry out its work, NOTS maintains many unique facilities.

One of these unique NOTS creations is the Hydrodynamic Simulator which tests torpedoes and torpedo components under simulated hydrodynamic and acoustic conditions prevailing in the actual environment.

In a Hydroballistics Model Laboratory, experiments to test hydrodynamic theory are conducted in a variable-angle, variable-pressure launching tank and the trajectory of the models is recorded on a rotating disk camera.

Other laboratories at the Pasadena facility include a Chemistry Research Laboratory, Hydropropellants Laboratory, Gyro Laboratory, Structures Laboratory, Torpedo Preparation Laboratory, and an Electronics Laboratory.

### Morris Dam

At Morris Dam, on the San Gabriel River about 20 miles east of Pasadena, NOTS maintains many types of launching facilities for torpedoes and underwater rockets, and propulsion laboratory facilities for applied research in chemical power, prime movers, hydroturbomachinery, underwater propulsion, and acoustic measurement.

It is at Morris Dam that

## Welcome Aboard

On behalf of all of us on the NOTS Pasadena team, we extend a welcome to each of you who are observing Armed Forces Day by visiting our exhibit at the Rose Bowl.

In addition to various weapons on display, you may watch a slide showing of a firing of POLARIS, the Navy's 1500-mile ICBM, and see a mock-up of the POLARIS launcher off San Clemente Island. We also invite you to tour the other exhibits we have on display.



Douglas J. Wilcox, Head Underwater Ordnance Dept.



Cdr. Charles J. Beer, Officer in Charge

We trust your visit to the NOTS Pasadena exhibit will be an enjoyable one, and that it will give you an idea of the results of the teamwork here between the Navy and its civilian scientists, engineers, and technicians — toward Power for Peace.

the Variable Angle Launcher is located. This unique structure is used for the study of water-entry and underwater trajectory characteristics of full-scale projectiles.

The VAL has as its main component an all-welded steel bridge (22 feet wide, 35 feet high, and 300 feet long) which supports two launching tubes—one 22.5 inches and another 32 inches in diameter. Missiles are launched from the tubes by means of compressed air suddenly released from a flask.

### Long Beach

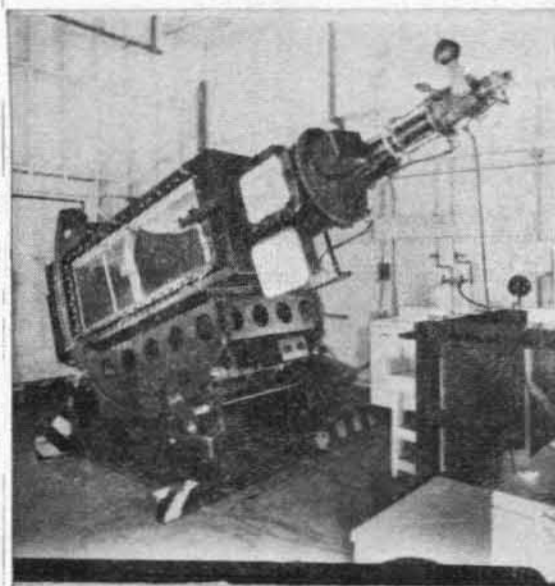
The Long Beach Ranges cover 476 square miles of sea area where torpedo runs are made under actual service conditions. Fleet units and special equipment are used, including submarines, launching craft (surface and air),

and a deep-depth launching and test facility which features a stable platform that can be lowered to 600 feet into the sea for underwater launching of rockets, for taking noise and vibration measurements of underwater missiles, and for study of ocean acoustics.

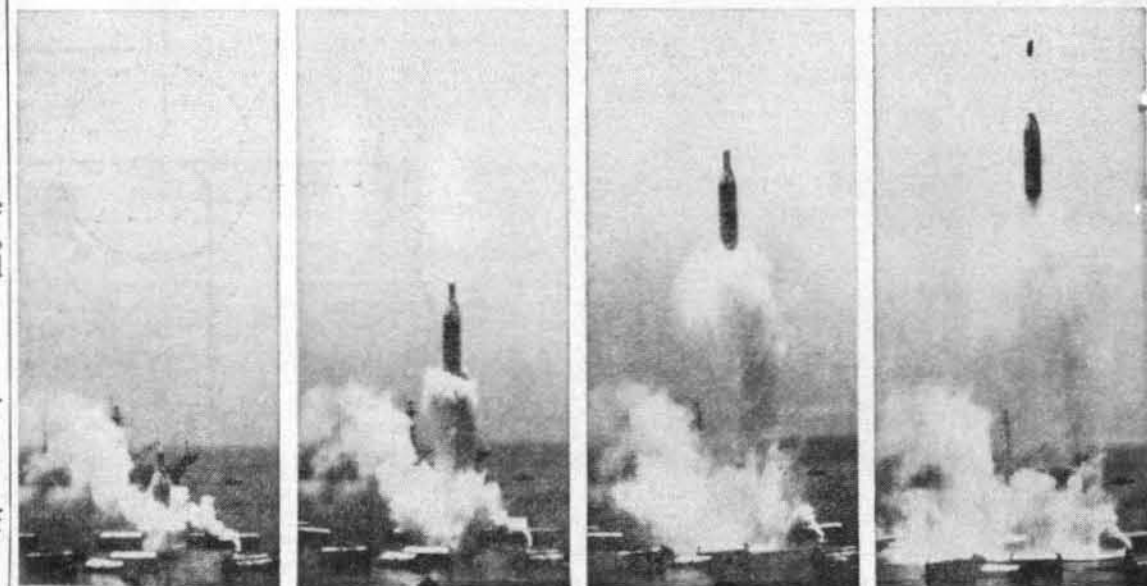
### San Clemente Island

At San Clemente Island, about 60 miles off the coast of Southern California, is a sea range (several thousand feet deep) with permanent installations for testing of antisubmarine weapon systems, torpedoes, and underwater rockets.

Many types of missiles are tested here by NOTS in collaboration with surface vessels and aircraft of the Pacific Fleet.



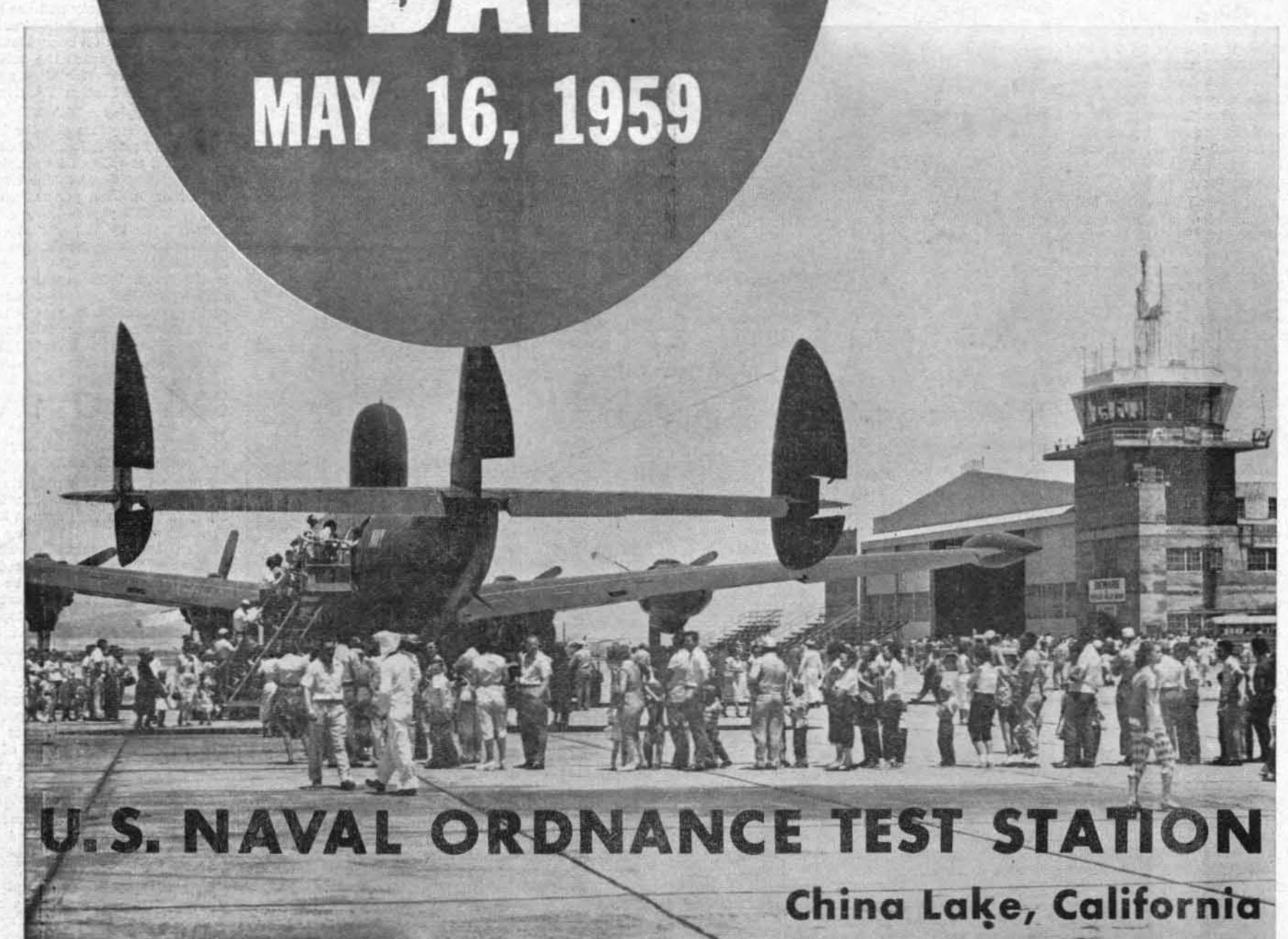
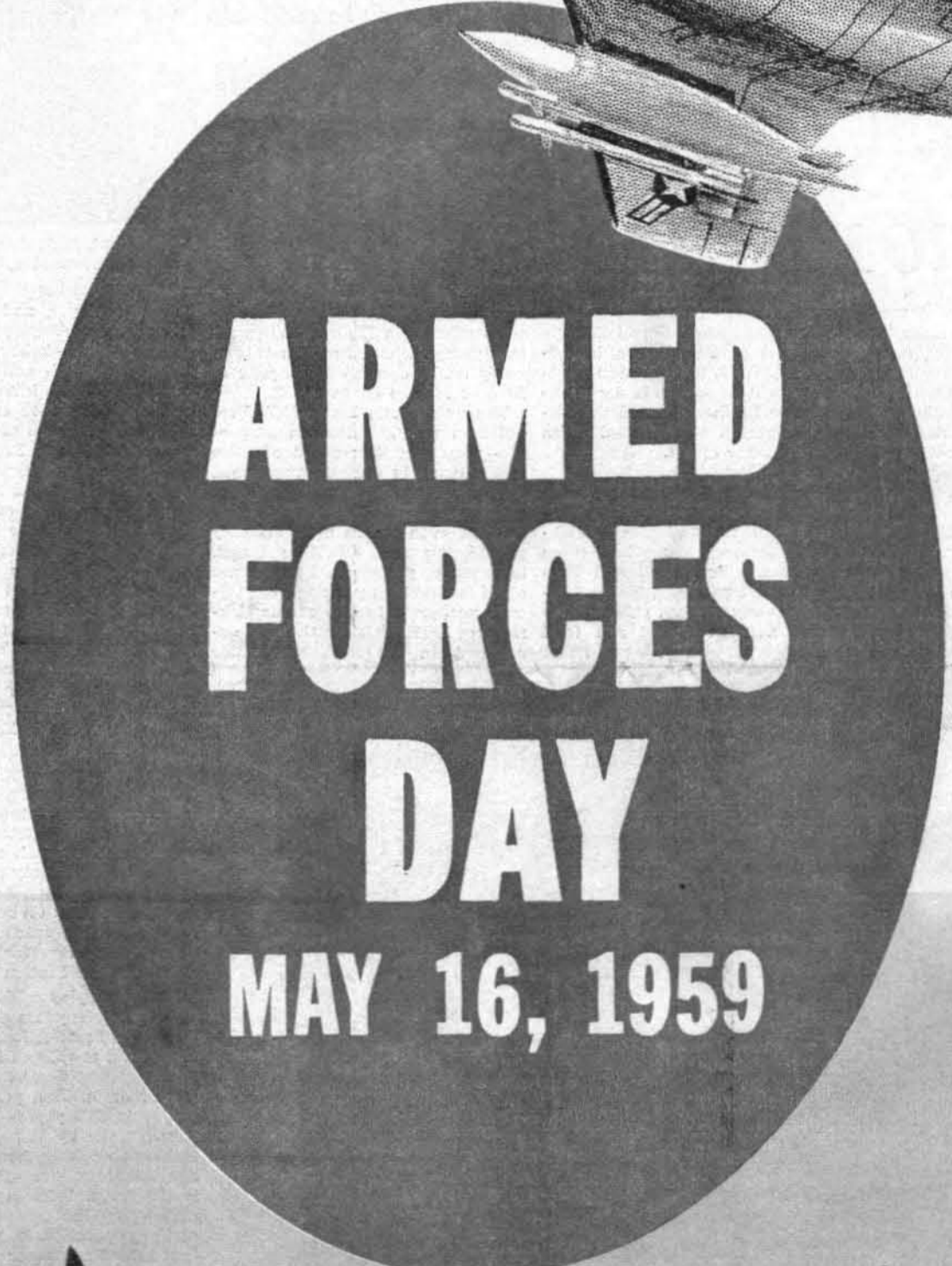
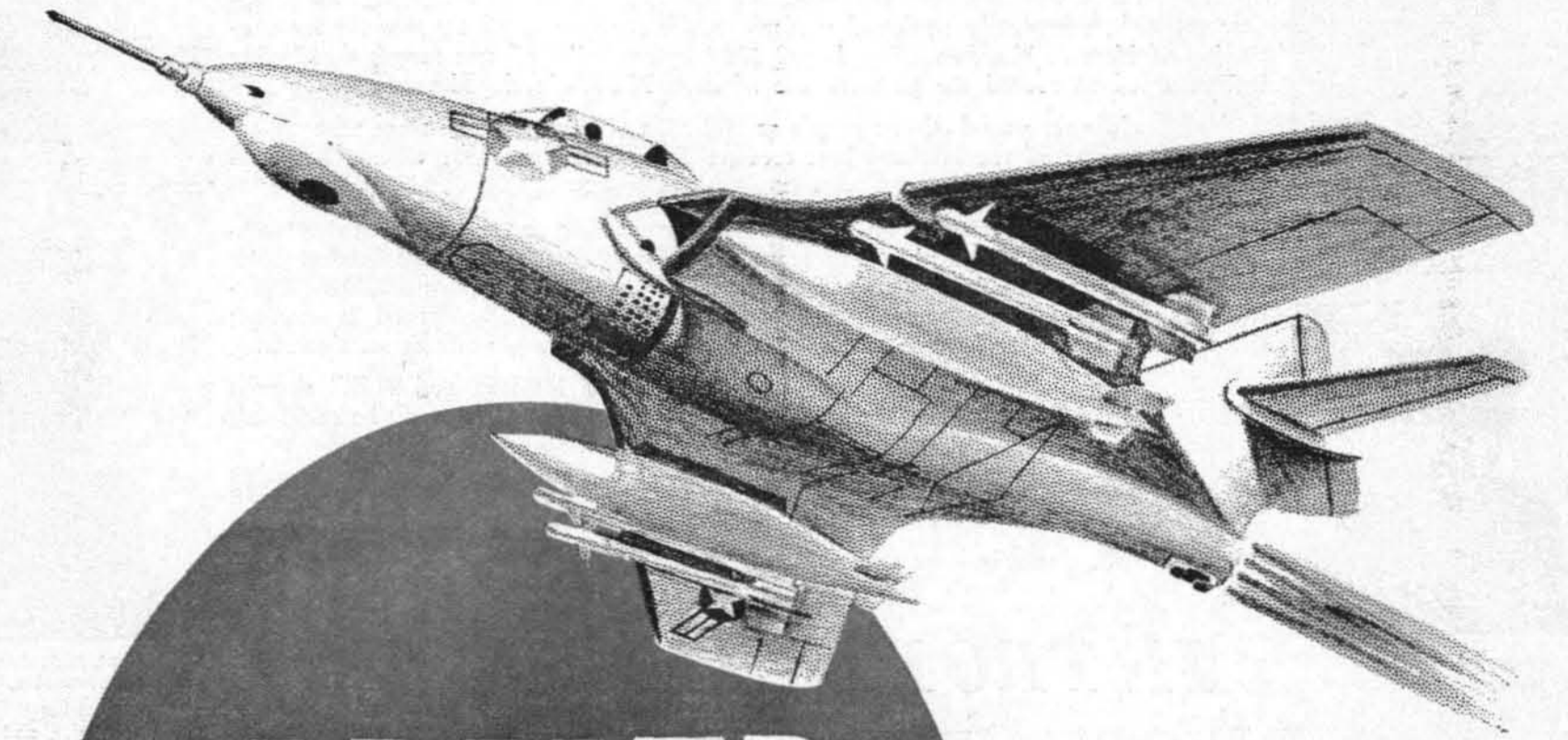
HYDRO-DYNAMIC theory tests are carried out in a variable angle, variable pressure launching tank at the Foothill location.



OPERATION POP-UP—Tests off San Clemente Island prove that POLARIS can be launched from a submarine below the surface of the ocean. A geyser of spray lifts the missile hundreds of feet into the air.



SOUVENIR EDITION



**U.S. NAVAL ORDNANCE TEST STATION**  
China Lake, California

**ARMED FORCES DAY ALL-SERVICES OPEN HOUSE ROSE BOWL, PASADENA**

Open to the public May 16 from 10 a.m. to 4 p.m. are displays and exhibits from all the Armed Forces—Navy, Army, Marine, Air Force and Coast Guard—as well as Red Cross, Civil Defense and other civilian organizations.

**NOTS PASADENA EXHIBITS**

SIDEWINDER, ZUNI, and RAT Missiles.  
Mock-up of POLARIS Launching Facility off San Clemente Island.  
Continuous Slide Showing of a POLARIS Launching.  
Exhibits of Missile and Torpedo Hardware.  
JAKE, the Dummy Diver, fully clothed in 190 lbs. of diving gear.  
Demonstrations of Precision Measurements and Equipment.  
Movies Throughout the Day on Expanding Frontiers in Ordnance.

# WELCOME TO CHINA LAKE



Capt. W. W. Hollister  
Commander, NOTS



Capt. G. J. Anderson  
Commander, NAF

Welcome to the U. S. Naval Ordnance Test Station—the Navy's principal center for the research, design, development, and testing of new weapons.

You will find here the latest and finest of laboratory equipment for scientific research, completely equipped modern machine shops and pilot plants for the conversion of ideas to "hardware," and over 1700 square miles of test ranges thoroughly instrumented to record the performance of these NOTS-developed weapons.

We are proud of our people at NOTS, a civilian-military team who collectively form some of the Nation's best creative and scientific minds with a practical military outlook.

Most important of all, we take pride in showing you the results of our teamwork—the effective, dependable, and economical weapons which we have developed for the defense of our country. You will see an actual firing of the famous SIDEWINDER, the only guided missile ever built which has been successfully proven in combat; and RAPEC, the newest and best device for safely ejecting a pilot from an aircraft.

Static displays of the hard-hitting MIGHTY MOUSE and ZUNI aircraft rockets; and RAT, one of the Navy's newest anti-submarine weapons will be exhibited, in addition to the latest in moonwatch and satellite tracking equipment.

You will also see other vital weapons and some of the Nation's newest and fastest jet aircraft which are used in our research and development programs.

We sincerely hope you enjoy a pleasant and informative visit.

## INTRODUCING NOTS

Everyone visiting today's NOTS 1959 Armed Forces Day activities is seeing portions of a singularly outstanding military installation. The Naval Ordnance Test Station is the only Navy organization whose sole and express purpose is the development of ordnance for the U.S. Fleet. All activity—and the life of every China Lake resident—is geared to this one goal.

Conceived from the need for rocket-powered weapons during World War II, NOTS as it is today, rose from the arid wasteland familiar only to the Sidewinder, a few other forms of subburnt animal life, and to the very hardy souls who tried to make their living from the ore deposits in nearby hills and mountains. Research and development activity was coordinated by the California Institute of Technology, at Pasadena for two years, and in 1945, the Navy's Bureau of Ordnance assumed cognizance of the Station's work.

Although a large portion of the facilities housing the actual work of the Station had been constructed, it was not until after NOTS had become a Navy facility, as such, that homes, schools, shopping facilities, Michelson Laboratory and other permanent buildings rise to virtually transform an area of nothingness into the small, but complete, city seen today.

**Michelson Lab**  
Earthquake-proof Michelson Laboratory, completed in 1948 at a cost of \$10,400,000, is the largest, most completely equipped institution of its kind in the country. It contains some \$10,000,000 worth of some of the most modern and complex equipment available to the scientist, and its 10.3 acres of floor space house a major portion of NOTS research and development activity.

Upon entering Michelson Laboratory, today's visitors are invited to look over the exhibits displayed in the Michelson Museum. Here are congregated a prized collection of the effects of U.S. Navy Scientist Albert A. Michelson, the first American to win the Nobel Prize in Physics, in 1907.

Other outstanding areas which are a part of NOTS are the facilities utilized by the Propulsion Development Department. Located southeast of the main portion of the Station, are facilities known as the China Lake Pilot Plant and the Salt Wells Pilot Plant. Here, propellants and propulsion systems for Navy weapons are conceived, tested and finally pronounced ready for use.

The Naval Air Facility, northwest of the main facilities of NOTS, was established to provide flight facilities and support for the research, developmental, test and evaluation programs of NOTS, and provides virtually all of the flight testing of NOTS-developed items. Indicative of future growth of the Station, and of acceleration of the planned program of NAF, a \$3,500,000 hangar, now under construction, will be completed this fall.

This year's observance of Armed Forces Day at China Lake is planned around the Station's research and development activity, rather than a picture of the Nation's armed strength. The displays, exhibits and equipment available for inspection will demonstrate a portion of the facilities available to our scientists, engineers and other research people.

At the main Machine Shop, the Heat Treating Laboratory, the X-Ray Lab, the Environmental Packaging Test Lab and the Inertial Guidance Evaluation Laboratory, all located in Michelson Laboratory, facilities peculiar to the unique

at 10 a.m., when fired at an airborne target rocket. Static displays of missiles developed here, including Zuni, RAT, Terrier and Sidewinder, will be available for all to see inside the hangar, and the aircraft displayed will be tied down on the hangar apron.

### Reassurance

The Armed Forces Day visitor to NOTS who first views the weapons and aircraft, then goes to Michelson Laboratory to see how these weapons are developed, and then goes to the Supersonic Naval Ordnance Research Track (SNORT) to witness a SNORT Sled run (and also, view, first-hand, the short

Guided Missile Test Unit, and Guided Missile Units 25 and 61 are military groups whose function it is to apply NOTS-developed weapons to fleet or Marine Corps use.

The unique mission of NOTS requires a unique collection of people—people of diversified abilities and learned in almost every field. Each year, Station representatives visit colleges throughout most of the nation in search of top-quality engineering and scientific talent. Such young professional people are aided in developing the specific talents necessary to the accomplishment of NOTS mission through enrollment in the Station's Junior

cient employee, and thus a happier one.

Recreational—hobby, cultural and just plain "fun"—activities provide an outlet for the interests of every Station resident or employee, and for many residents of nearby communities, as well. From skiing to cave exploration, ceramics to amateur drama, concerts to dances and dance classes, art groups to special programs to provide summer-time occupation for school-age youngsters—the available opportunities make for a crowded schedule for anyone who wishes to join in the fun. Special displays provided by many of the Station's recreational organizations are located at Bennington Plaza today and visitors are invited to look over what the people of China Lake do in their leisure time.

The Station's shopping center is contained in Bennington Plaza and includes the Commissary Store, Navy Exchange Retail Store and many services, such as a portrait studio, the pharmacy and the beauty and barber shops. All China Lake and Desert Park (Wherry Housing) residents are granted the privilege of utilizing these facilities and of attending the Station Theatre.

### Employee Youth

Only fifteen years old, the Naval Ordnance Test Station, is, of course, a youthful town, and its people are mainly young people. The average age of the civilian per annum employee is 38.5 years—these graded people make up 68 per cent of the Station's working force. The average age of per diem employees here is 44.9 years. With people under 40 making up the greater percentage of the population it is easy to see that school enrollment numbers into the thousands. Over 2,100 are enrolled in the five elementary schools. Burroughs High School, with its 800 students, is the only high school in the Indian Wells Valley and its students come from China Lake, Ridgecrest, Inyokern and outlying districts.

Among the Station projects that Armed Forces Day visitors will see today is the Variable Thrust Rocket Engine developed here by Propulsion Development Department personnel. Through the closed circuit television screen will be seen the control system for rocket motors in action. Starting, stopping, acceleration or deceleration of a rocket motor is accomplished by manual or remotely controlled movement of a single lever which controls the injector, the system's only moving part solely responsible for control flexibility. Tests have demonstrated that some of the problems of control of space vehicles may have been solved by the perfection of this simple device.

Another singular development of NOTS—the Rocket-Assisted Personnel Ejection Catapult (RAPEC) will be demonstrated on the SNORT (short for Supersonic Naval Ordnance Research Track) this afternoon at 1 p.m. This ejection system test will be an actual research data run for test purposes.

work being done here will be displayed. Scientific equipment on view includes the Gooney Bird mobile tracking camera, the 44-inch and 75-inch optical systems display, China Lake moonwatch instrumentation, a gyroscope, so sensitive that it can portray the rate at which the earth is turning, and instrumentation from the Microlock installation which will reproduce the sounds made by any passing man-made satellites.

This morning, from 9 until noon, some of the Navy's weapons and its aircraft will be on display at the Naval Air Facility. Sidewinder's accuracy will be demonstrated

flight of the dummy catapulted 175 feet up by the Rocket-Assisted Personnel Ejection Catapult system) will certainly be reassured that through such research, development and testing activities by all of the armed services, this nation will remain fully capable of meeting any emergency inflicted upon us.

### Military Units

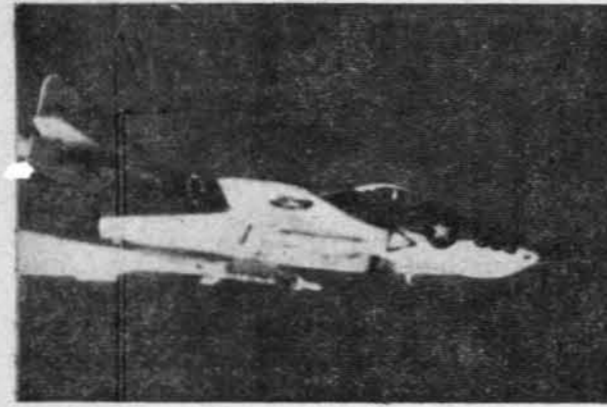
The Naval Ordnance Test Station is manned by some 5000 people, civilian and military. Providing support for the civilian scientists and development people, the military personnel, in general, serve as supporting units. However, organizations such as the Marine Corps



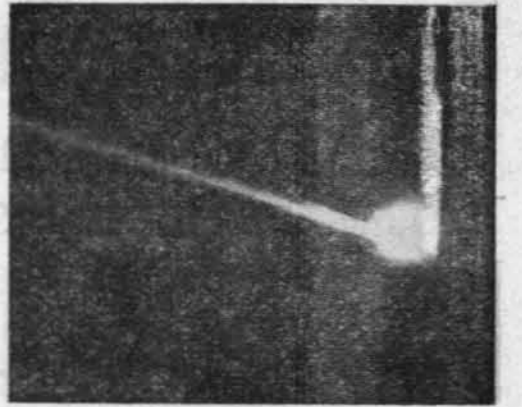
Dr. Wm. B. McLean  
Technical Director



Capt. R. A. Beveridge  
Commander, VX-5



Missile Away! Sidewinder—aerial killer—streaks toward its target.



## Armed Forces Day Bus Schedule Saturday, May 16, 1959

Starting Point	Destination	Time
MAIN GATE	8 to 9:30 a.m. (Buses will shuttle back and forth between points)	BENNINGTON PLAZA (Station Theatre)
BENNINGTON PLAZA (Station Theatre)	8:30 to 11:30 a.m. (Buses will shuttle back and forth between points)	NAVAL AIR FACILITY
NAVAL AIR FACILITY	At conclusion of Sidewinder firing (Buses will shuttle back and forth between points)	BENNINGTON PLAZA (Station Theatre)
BENNINGTON PLAZA (Station Theatre)	Starting at 12 noon as needed (Buses will shuttle back and forth via Michelson Lab)	SNORT TRACK 1 & 3:30 p.m. Firings
SNORT TRACK	Last run at conclusion of 3:30 p.m. firing via Michelson Lab	BENNINGTON PLAZA (Station Theatre)

## Community Life To Be Accented At Plaza Exhibit

In addition to the demonstrations planned for Armed Forces Day, other sidelights have been planned which will give visitors an insight of life and play at NOTS as well as the work mission of the Station.

### Club Exhibits

Bennington Plaza will feature an array of exhibits from various organizations which will include miniature models, art works, charts and equipment.

Organizations to be represented in the Plaza exhibits will be: Quarter Midget Racing Association; Desert Art League, Rockhounds; Hobby Shop, Natural Science Club; Alkali Angels; Ceramics Club; China Lake Archery Club; Astronomical Society; and Moonwatchers. The NOTS Community Church Woman's Guild will sell Sno-Cones.

### Public Works Displays

Public Works Department will sponsor an extensive display which will include charts depicting the scope of their responsibilities at all NOTS stations; unusual heavy duty equipment; pertinent facts about the operation of the department; architectural renderings of prominent Station buildings; miniature models of proposed buildings; models of transportation equipment; samples of construction materials; and a cost of maintenance chart.

### Radio Broadcast

A descriptive report of the Sidewinder firing at NAF will be broadcast over radio station KRKS from 9:45 to 10:30 by Ernie George, Station Information Specialist. The broadcast will cover descriptions of NAF's static displays, functions of the various aircraft at the field, and on-the-spot interviews.

## Armed Forces Day Open House Saturday, May 16, 1959

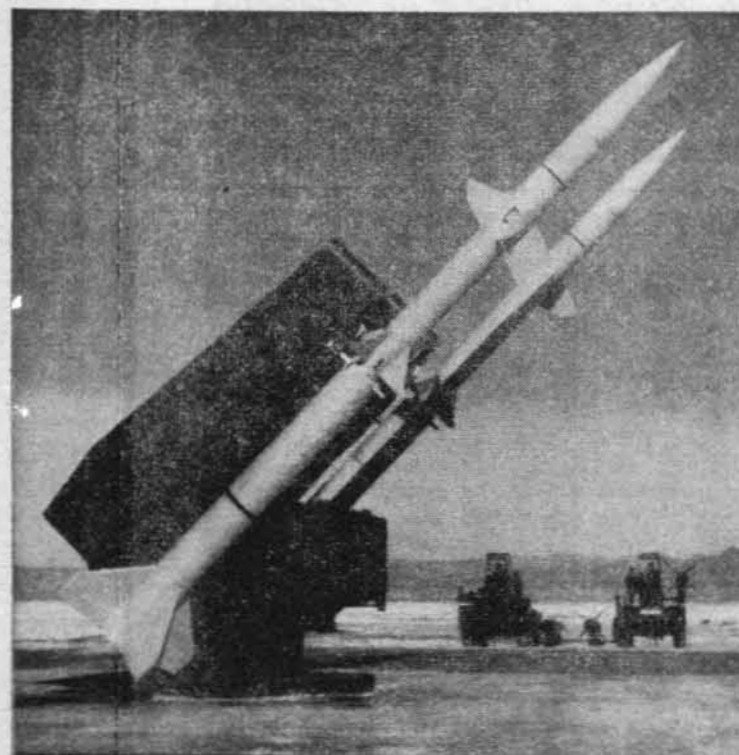
- 8 a.m. GATES OPEN TO THE PUBLIC.
- 9 a.m. Weapon and aircraft displays at the NAVAL AIR FACILITY Closes 1 p.m.) Displays by NOTS hobby groups at BENNINGTON PLAZA (All day). Continuous showing of NOTS and Navy films at STATION THEATRE (All day).
- 10 a.m. Demonstration firing of SIDEWINDER at the NAVAL AIR FACILITY.
- 12 noon Lunch break. Picnic area open at KELLY FIELD (Halsey and Richmond).
- 1 p.m. MICHELSON LABORATORY. Unguided and continuous tours for viewing of working and static displays until 4:30 p.m. SNORT Sled run.
- 3:30 p.m. SNORT Sled run.
- 4:30 p.m. End of OPEN HOUSE program.



ROCKET ENGINE CONTROL—Via the closed circuit television screen visitors at Michelson Lab will see a rocket engine being controlled by the lever shown at lower right. Control inventors (above) are Marshall Klein and Eugene Rutkowski of Propulsion Development.



SNORT SLED—The artistically patterned spray following the moving sled on the SNORT Track will be seen today as the sled is slowed down by the water brake. A double bill will be featured at the Track today—a RAPEC demonstration at 1 p.m. and a High Speed Drag, nearing Mach 1, at 3:30 this afternoon.



TERRIER LOADING—GMTU personnel approach launcher on twin missile carriers. Launcher loading can be accomplished in less than 1½ minutes. The Marine Corps Guided Missile Test Unit and Guided Missile Unit 25 jointly participate in evaluation of Terrier missiles.

## Map for Armed Forces Day visitors

