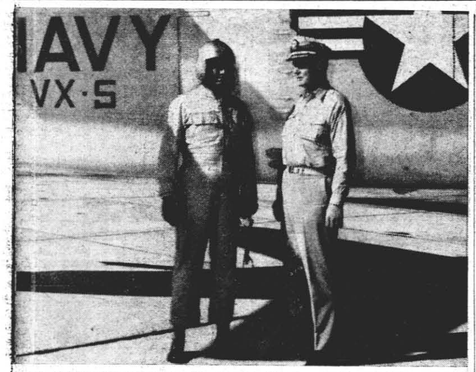


VX-5 OFFICIAL—RAdm. Charles K. Bergin (left), newly appointed commander of ComOpTevFor, is shown with Capt. K. S. Van Meter, Commanding Officer of VX-5, before taking an orientation flight of the area in the A3D-2 shown in the background. Adm. Bergin is on an inspection tour of Operational Test and Evaluation Forces before relieving RAdm. William D. Irvin in his new post with the Atlantic Fleet's Test Force in Norfolk.

Seapower: Part IV

Navy Tests, Evaluates Missiles and Satelites

Missiles, satellites and space vehicles must be tested and evaluated and men must be trained to use them. These functions are being performed at the three National Missile Ranges.

They are the Atlantic Missile Range, Cape Canaveral, Fla., managed by the Air Force; the White Sands Range in New Mexico, managed by the Army; and the Pacific Missile Range, managed by the Navy. This latter range extends from California seaward and has a growth potential needed for long term United States space program. It will provide the means for launching satellites from the sea. Like its sister bases at Canaveral and White Sands, the Pacific Missile Range is used by all four services and both space agencies.

Eventually the Pacific Missile Range will be a complex of five ranges. Although the complete system will take 15 years to complete, some ranges are now in use. The sea test range is now being expanded for test of SPARROW III CORVUS, EAGLE, NIKE-ZEUS, and for fleet training. The IRBM range was established in December 1958 with the firing of a THOR missile. The polar orbit range was established in January 1959 and the ICBM range to Wake Island was established with the firing of an ATLAS in September 1959.

Today our Navy is being called upon to do more jobs than ever before in its history. These jobs range from maintaining control of the seas to supporting scientific expeditions such as we now have at the South Pole. At the same time we are continually seeking better ways of doing our jobs. In the not-too-distant future, naval operations will be improved by the use of satellites for more accurate navigation, for long range weather forecasting and for communications and reconnaissance.

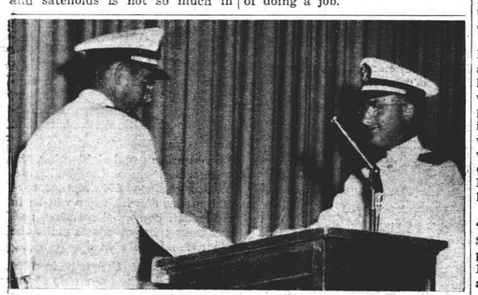
Our main interest in satellites and satelloids is not so much in their launching and recovery, but instead it is focused on what they carry. Much valuable, possibly vital, information unimpeded by radio interference and weather conditions, can be obtained from navigation, meteorological, communication, reconnaissance, early warning, and other space vehicles.

Direct Navy participation in the satellites and satelloids is important to insure that the information is readily and quickly given to the fleets in usable form. Properly engineered, these space vehicles should be responsive to interrogation by ships at sea and by aircraft development and employment of in flight, and should transmit the information to them directly.

Under project YO-YO, the Navy has under study a concept for a single pass, photographic reconnaissance satelloid. Through the selection of sites and directions of launch at sea, such a satelloid can be programmed to pass over any preselected point on the earth in its first pass and subsequently recovered at sea upon completion of a single orbit.

Many government agencies are making contributions to the National space program. The Navy has been active for many years solving a variety of problems for the most part unique to the Navy. However, in today's space programs, we find that the solution to purely Naval problems provides the key to the solution of many space problems.

The aim of the Navy in the utilization of space is to accomplish naval objectives and prevent space from being used to the detriment of these objectives. We will use space whenever it offers a less expensive or more effective method of doing a job.



CHANGE OF COMMAND—Lt. Dean E. Roberts (left) wishes his successor Lt. (jg) E. I. Ewoldsen good luck during Change of Command ceremonies of Guided Missile Unit No. 25 at the Community Center. Lt. Roberts has served as Officer in Charge of the unit since August, 1957. He will report for duty aboard the USS Norton Sound at Port Hueneme. Lt. Ewoldsen has been the unit's Missile Officer and Personnel Officer since March 1959.

Two TV Shows Will Feature Stationites

Members to two women's organizations and one prominent family from China Lake will be featured on two television broadcasts within the next two weeks.

Ed Romero and his family of 606-A Nimitz will be included in the "Person to Person" (Channel 2) broadcast on Friday, July 15 or 22, when movie star Caesar Romero and his family will be interviewed by Charles Collingwood in his regular weekly show at 10:30 p.m.

On Monday, July 18, members of the Navy Wives Club and the CPO Wives Club will be featured on "It Could Be You" (Channel 4) from 11:30 to 12 a.m. The entire show will be based on the China Lake tourists.

The broadcast was filmed earlier as part of a pre-arranged one-day tour of Hollywood on June 28 when 55 women of the two clubs boarded a chartered bus arranged by the Hucek Travel Service.

Other side trips were a tour of Farmers Market, lunch at the Moulin Rouge, and TV shows "Queen for a Day" and "Truth or Consequences." NBC "spies" require several weeks in advance of the scheduled show to gather secret information about the participants and arranging for the "surprise guests."

Any club or group in the area interested in chartering a similar tour should notify the Hucek Travel Service located at 101 Ridgecrest Blvd. at the corner of China Lake Blvd. Hucek's also provide airline travel service to any place in the world.

NAVY NURSE — LCdr. Agnes C. Stillinger, NC, reports to the Station Hospital from the U. S. Naval Hospital at Philadelphia, Pa. A graduate of Holy Cross Hospital, Calgary, Alberta in Canada, LCdr. Stillinger has served with the Navy six years. A two-year duty was with the U. S. Naval Hospital in Oakland, Calif., and the following duty was two years in Naples, Italy.

Engineer's Tutoring

(Continued from Page A-1)

Pearson was able to dissuade her from attempting to conduct actual tests with live explosives and to concentrate on a static display emphasizing government and industrial accomplishments in this process.

Several other letters followed as Diana began preparing her exhibit, and Pearson continued to answer her questions, providing advice as well as published material and photographs which could be used in the exhibit. Nearly two months went by without further inquiries when Pearson learned the final outcome in a letter of thanks from Diana for the Station's help and his effort in her behalf.

She had placed first with the "Top Girl Award" at the Greater St. Louis Science Fair, and later placed among the top four at the National Science Fair in Indianapolis. Topping her many awards was a four-year scholarship to the University of Missouri.

Dr. McLean Criticizes Complexity of Weapons

A treatise by Dr. Wm. B. McLean, NOTS Technical Director, appearing in the July issue of Ordnance Magazine, published by the American Ordnance Association, points out that we are making weapons so complicated they aren't workable in the field.

Complicated U. S. defense systems were sharply criticized as conglomerations of expensive gingerbread threatening national survival."

"I would like to predict that our national survival in the future may very well depend on a re-awakening of appreciation for simple design such as the 20-millimeter gun fuze to replace the complication of our existing missile systems," he said.

Need Change

Such a change in design taste, he said, would be analogous to the change in architecture from the gingerbread of the 1850s to the aluminum and glass of today.

He wonders how this nation's forces would fare after unloading a complicated missile system on a beachhead while the enemy waited behind the jungles armed with something as simple as a deadly blow gun.

Dr. McLean, who designed the effective Sidewinder guided missile with no more parts than a portable radio, suggested that complication of weapon systems has come about because of public awe for things exceedingly complicated.

"We are beginning to have some vague worries about the increasing costs of these complicated systems, but these worries have not yet become sufficiently strong to make us stop buying them—either in our commercial products or in military equipment," he stated.

The approach to most of the problems in developing guided missiles, fire control equipment, and long range search and detection equipment is to add more components and increase the price, he declared.

Weapons Design an Art

He claims the solution to this mass trend of weapons complication lies in recognition of weapons design as an art. A designer of weapons for 19 years, he called for an appreciation and fostering of creative design capability—design by a single, qualified, creative individual, followed by final criticism and selection of the best weapons by a committee of experts.

Now, he says, a committee goes over the problem in detail, arrives at a series of detailed specifications, and then gives the responsibility for production to an entirely different group, the corporation with the lowest bid.

"I expect that our military equipment will continue to be a conglomeration of expensive gingerbread until such time as we learn to recognize and appreciate creative design ability," he stated.

In conclusion, he emphasized the need for ordnance engineers and industrialists to "find some way to rescue the design of our military equipment from the morass of integration, coordination, centralization, and detailed specifications to which it is sinking."

TO VX-5—Ensign Thomas E. Leach reported to NOTS, as VX-5 Material and Public Information Officer, for his first military assignment. He attended W. Virginia Wesleyan prior to entering Flight School at Pensacola. He and his wife, Reva, have been assigned temporary quarters at 303-C Blandy.

There are more than 4,700 drive-in theaters in the United States, reports the Automobile Club of Southern California. Texas leads all other states with 482.

CSC to Convert Some Temporaries

The Civil Service Commission has announced it will soon issue instructions to agencies to give effect to an Executive order recently signed by the President which authorizes the conversion to career or career-conditional standing temporary and indefinite employees serving under "Temporary Appointment Pending Establishment of Register" (TAPER) who:

- **are recommended for conversion by the head of their agency,**
- **have actively served three years or more in a competitive position or positions, with at least two years continuously on the rolls immediately preceding the date of the order, June 7, 1960, and**
- **qualify, or have qualified in an appropriate civil service examination and meet other CSC requirements.**

Separate instructions for substitute postal employees covered by the order have been issued to the Post Office Department because the service requirements for conversion of these employees differ from those applying to other Federal workers.

The Commission pointed out that employees need not take any action on their own. Since the recommendation of the agency head is required, agencies will determine eligibility of employees and decide whether to recommend conversion. Agencies have through June 7, 1961, to make recommendations for conversions.

NEW ENSIGN—Capt. T. A. Grell, NAF CO, pins Ensign bars to Donald H. White's uniform upon his promotion from Chief AG through the LDO program. He has 17 years of service beginning with the Amphibious Radar Group at Okinawa during WWII. He reported to NOTS in March 1958 from the USS Yorktown where he served as Weather Service Chief and was assigned to NAF in that capacity. Ensign White lives at 302-B Tyler with his wife Juanita and children Donna 6, and Steven 2.

OPENING CEREMONY—Babe Ruth players Roger Martin, Bob Barney, and Little League players Albert Hyles and Eddie Lusher raise the new 50-star flag commemorating the Fourth and as a prelude to McLaughlin Memorial Park dedication ceremonies. The flagpole base bears a plaque noting McLaughlin's contribution to Little League.

Red Cross Annual Awards Presentation Titles Carol Chatterton 'Woman of Year'

At the 43rd annual meeting of the Kern Chapter of American National Red Cross held in Bakersfield on June 28, Carol Chatterton of China Lake, Water Safety Chairman for the Indian Wells Valley Branch since 1954, was named the "Woman of the Year" in recognition for her outstanding work for the Red Cross water safety program.

Her dedication to water safety started for Carol when she was 7 years old as a member of the Red Cross Beginners Class in Reno, Nevada. Up to the time she first came to NOTS in 1951, she had served as a director for the Red Cross and as Water Safety Instructor. Until 1959, she had served locally as Instructor-Trainer, directed the China Lake Summer School Swimming Program, and served as advisor, and still does, to the Water Safety Instructor's Association.

Carol Chatterton

Year of Achievement

During the year 1959, she taught two Water Safety Instructors classes at China Lake; one for servicement from Boron, Barstow and Camp Irwin; and one for civilians and servicemen from China Lake and Ridgecrest. She served on the staff of the National Aquatic School at Tulequoia; helped organize a 10-day Learn to Swim campaign for beginners; directed a Summer School Swimming Program in which 375 children received Red Cross certificates; and coached and managed the local swim team.

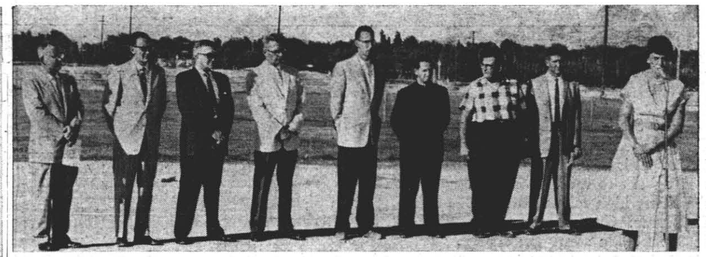
As advisor for WSIA, the program grew to the largest proportions since its origin here. Lectures were given to various organizations on artificial respiration, assistance was rendered in swim meets and the organization of Red Cross Swimming and Life Saving Classes, lifeguard workshops were held; assistance was given to Boy Scouts for obtaining swimming and life saving badges, and Girl Scout Day Camp programs. In addition classes were started for handicapped children.

According to Marge Daiber, chairman of the IWV Branch of the Red Cross Kern Chapter, other meritorious service awards were given to groups within the chapter.

At a local meeting of the IWV Branch, Rita Huddleston received her certificate at the termination of her one-year term as Home Service chairman. Replacing her will be Helen Fletcher with Rosemary Fisher as co-chairman.

TEMPERATURES	Max.	Min.
July 1	101	78
July 2	97	75
July 3	99	69
July 4	100	68
July 5	100	70
July 6	100	71
July 7	102	70

☆ Swim Meet June 9 at Club Pool ☆



DEDICATION OFFICIALS — Participants in the July 4th dedication of McLaughlin Memorial Park (l-r) are: Chaplain Robert "Q" Jones, Grant C. Pinney, Haskell G. Wilson, Robert W. Anderson, Charles G. Martin, Rev. Father Joseph Pacheco, Robert J. Freedman, Harold F. Metcalf, and Doris Hammer at microphone. Dedication honored the late John J. McLaughlin, Station employee from Dec., 1944 to Feb., 1959, whose untiring efforts were instrumental in establishing the Little League here.

ROCKETEER
BUDD GOTT, EDITOR PHONES 71354, 72082, 71655 OFFICE, HOUSING BLDG., TOP DECK
Vol. XVI, No. 27 NAVAL ORDNANCE TEST STATION, CHINA LAKE, CALIFORNIA July 8, 1960

Gould to Head Kern County HS&JC Unit

Albert S. Gould, consultant with the Weapons Planning Group at NOTS, was elected president of the board of trustees of the Kern County Union High School and Junior College District for 1960-61. He has been a member of the school board since May, 1950.

He was elected at the annual reorganization session of the school board on Friday, July 1. Prominent in community affairs since he first came to China Lake 15 years ago, Gould was head of the Rocket Ordnance Division of the former Rockets and Explosives Department before he transferred to the Office of the Commander.

Albert S. Gould

During his years at NOTS, Gould served as president of the China Lake P-TA the year prior to his appointment to the Kern County Union High School and Junior College District board of trustees, and is now the treasurer of the Desert Area Emergency Relief in addition to being an active member of the Rotary Club of China Lake.

He holds a bachelor of science degree in electrical engineering from the California Institute of Technology. The Goulds returned recently from a 7-week tour of several European countries.

Capt. Quense' Relieves Capt. Brooks as Exec

Captain John A. Quensé officially assumed the duties of Station Executive Officer on Tuesday of this week. He relieved Captain Sidney Brooks who has held the billet since Captain H. B. Hahn was transferred to the Naval Academy. Capt. Brooks' next duty will be a staff assignment at the U. S. Naval Postgraduate School, Monterey.

Capt. Quensé reports here following duty as Commander of the Naval Ordnance Laboratory, White Oak, Silver Spring, Md. His first duty at NOL was as Assistant Technical Director for Administration and Logistic Support.

This will be the second tour of duty at NOTS for Capt. Quensé. During his tour here from October, 1949 to August, 1953, his various assignments included Assistant to the Head of the Test Department, Acting Head of Staff, and Associate Head of the Test Department during the period of intensive evaluation work on Terrier.

Captain Quensé was born in Seattle, Wash. He attended high school there and graduated from the University of Washington in 1935 with two degrees—Bachelor of Arts, and Bachelor of Science in Chemistry.

Commissioned in 1934 under the University's ROTC program, he served his first active duty as a Naval Reserve Ensign, assigned to the Civilian Conservation Corps. He returned to the University of Washington in September 1936 to serve as teaching fellow in chemistry and to work on his doctorate in this field, which he was awarded in June 1940.

He then returned to active duty with the Navy, and for the next five years was an instructor in mathematics at the Naval Academy.

In 1946, after a year's graduate work in ordnance engineering at Cornell University, he received the degree of Master of Science in Engineering from that institution. In 1946, also, he transferred from the Naval Reserve to the Regular Navy.

Capt. Quensé has served two tours of duty at the Bureau of Ordnance, now BuWeps, the first 1946 to 1949, ending this tour as Head of the Rocket Research and Development Section. In the second, from 1953 to 1957, first as Assistant Head and later as Head of the Ammunition Branch, Material Division.

The Captain married the former Helen H. Howe of Seattle in 1935. In 1943 they became the parents of triplets, Nancy Anne, John Henry and Eric Lawrence.

Engineer's Tutoring Boosts Girl Student To National Award

Scientists and engineers at NOTS frequently receive requests from high school and college students for information related to term papers and other projects. NOTS employees are generally very happy to take the time to answer these requests although the end results of these inquiries are rarely known.

One such inquiry, and the final outcome, was experienced recently by John Pearson, Head of the Detonation Physics Group, Research Department.

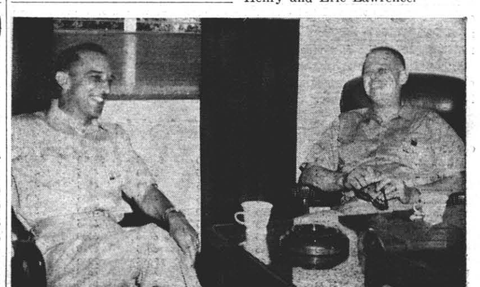
In August, 1959, Pearson received a letter from a Miss Diana Maxwell, a high school senior in Jennings, Mo., requesting additional information and advice pertaining to his articles on the use of explosives in the forming of metal parts. She wanted to enter an exhibit on that subject at the 1960 St. Louis Science Fair.

(Continued on Page A-4)

Navy Relief Fund Drive Nets Over $3000

The 1960 Navy Relief Fund Drive has netted a total of $3,036.89, according to a final report by Chaplain Robert "Q" Jones. The largest single contribution to the fund was $1,340 by the Women's Auxiliary of the Commissioned Officers' Mess (WACOM). GMU-25 came through with a high average of $6.04 per man in contributions. A breakdown of contributions is listed below.

Guided Missile Unit No. 25	$ 272.00
Marine Corps Guided Missile Test Unit	85.00
Air Development Sqdn. Five	320.50
Naval Air Facility	300.09
Marine Barracks	160.15
NOTS Enlisted Personnel, BOQA, Commissary	105.59
Medical & Dental Depts.	76.00
Navy Wives Club	44.00
CPO Wives Club	19.00
Joint Contribution—Navy Wives and CPO Wives Clubs	26.33
WACOM	1,340.00
Pasadena	64.23
Officers not elsewhere included	60.00
Misc. Contributions	164.00



COFFEE BREAK—Capt. John A. Quensé (right) draws laughter from Capt. Sid Brooks as he recounts some of the amusing incidents which occurred during his first tour of duty here from 1949 to 1953. Capt. Quensé officially relieved Capt. Brooks as Station Executive Officer on Tuesday.

Sports Slants

By Chuck Mangold, Athletic Director

The Station baseball team will play the Los Angeles Dodger rookie team here Friday and Saturday nights, July 22-23. This is an attraction the baseball fans of the Station won't want to miss. The Los Angeles Club is made up of the finest high school and college ball players in Southern California. Game time at Schoeffel Field both nights will be 8 p.m. No admission charge.

Tonight at 8, the Station baseball team will take on the March AFB club at Schoeffel Field. A second game between the two teams will be played tomorrow afternoon at 1:30 at the same place.

Intramural Softball Standings

Team	Won	Lost
Pilot Plant	16	2
VX-5	12	6
Station Restaurant	12	8
Station Officers	9	8
Marine Barracks	6	13
NAF	4	11
Public Works	3	15

Intramural Softball Schedule

July 11—NAF vs Station Restaurant, 6 p.m.
July 11—Pilot Plant vs Station Officers, 8 p.m.
July 12—VX-5 vs Public Works, 6 p.m.
July 12—Pilot Plant vs Marine Barracks, 8 p.m.
July 13—VX-5 vs Station Restaurant, 6 p.m.
July 13—Public Works vs Station Officers, 8 p.m.
July 14—VX-5 vs. Station Officers, 6 p.m.
July 14—Pilot Plant vs Station Restaurant, 8 p.m.
July 16—Los Angeles Hubs vs NOTS Doubleheader—First game 7 p.m.

California Cuties Show

The famous California Cuties Softball Show will appear here Saturday, July 30, at 8 p.m. at Schoeffel Field. The California Cuties are a novelty team that has been rated the top comedy softball attraction of the nation. The Cuties are a men's team that is attired in women's clothes from head to foot. Yes, including high heels! The Cuties put on a show as never put on before by any novelty team. They have dancers, singers, a chorus that always brings laughter to the most hardened softball fans.

The Cuties will bring such stars as: Grandma Gruber with her cane and rocking chair on the pitchers mound; Beulah, the glamour midget star who claims to be the smallest pitcher in the softball world; Christine, the exotic rage of softball with a wardrobe that will make the women fans chill with desire; Windbag Gladys Happybottom, star catcher, and the "girl" you will hear all over the park with her loud mouth; last, but not least, the star of the show, Liza Jane, the bowlegged pitcher, with the most peculiar windup you will ever see on a mound. Liza Jane is also featured in her famous pantomime song that always brings the house down.

All these and many other characters will be here on July 30 to give you softball fans the craziest softball game that you have ever witnessed in your life. The other members of the troup are Lotta Fanny; Julie, the Hillbilly; Patricia, the Moocher, Hefty Helen, and Main St. Sally. There will be no admission charge. Everybody is welcome.

Little League Standings

As of July 6

Team	Won	Lost
"A" League		
Giants	10	3
Tigers	10	3
Yankees	6	6
Red Sox	5	7
Dodgers	4	8
Pirates	3	9
"AA" League		
Cards	6	1
Braves	3	3
Eagles	3	3
Athletics	3	4
Indians	2	3
White Sox	2	5
"AAA" League		
Ducks	5	0
Padres	4	0
Terriers	3	1
Angels	2	2
Cubs	2	2
Senators	2	2
Mounties	2	3
Buccaneers	1	3
Hawks	1	3
Reds	0	5

Babe Ruth League

Cards	7	2
Indians	6	2
Cubs	5	3
Reds	5	4
Yankees	1	6
Tigers	1	8

YIPPEE! He's in the chips! His Benny Sugg was adopted!

Navy Incentive Award Program

Safety Belts

GREAT LAKES (NAVNEWS)—Officials at the Naval Training Center here do more than worry about Traffic Safety. They get out and do something about it.

The Center's Engineman School is installing automobile safety belts free of charge. These belts must be purchased from the Navy Exchange and are installed by appointment. The use of safety belts not only saves lives but can reduce backache

Graded Pay Raise to be Effective July 10

The 7½ percent pay raise voted last week by Congress over the President's veto, applies to all of the Station's graded employees, according to Rudolph Sauser Jr., Head, Wage and Classification Division.

The increase is effective on July 10. Current information from Washington indicates that all employees hired prior to July 10, who are currently above the first step of their grade under the increased minimum rates provision of the Classification Act will receive the full benefit of the increase and retain their current ingrade step.

The increased minimum rates or in-hiring step will be adjusted on July 10 to that in-grade step which is at or just above the current increased minimum rate.

New Graded Pay Schedule

GRADE	PAY						
1	$3185	$3290	$3395	$3500	$3605	$3710	$3815
2	3500	3605	3710	3815	3920	4025	4130
3	3760	3865	3970	4075	4180	4285	4390
4	4040	4145	4250	4355	4460	4565	4670
5	4345	4510	4675	4840	5005	5170	5335
6	4830	4995	5160	5325	5490	5655	5820
7	5355	5520	5685	5850	6015	6180	6345
8	5885	6050	6215	6380	6545	6710	6875
9	6435	6600	6765	6930	7095	7260	7425
10	6995	7160	7325	7490	7655	7820	7985
11	7560	7820	8080	8340	8600	8860	
12	8955	9215	9475	9735	9995	10,255	
13	10,635	10,895	11,155	11,415	11,675	11,935	
14	12,210	12,470	12,730	12,990	13,250	13,510	
15	13,730	14,055	14,380	14,705	15,030		
16	15,255	15,515	15,775	16,035	16,295		
17	16,530	16,790	17,050	17,310	17,570		
18	18,500						

'Personal Affairs' DOD Publication Being Released

WASHINGTON — A new pamphlet, "Your Personal Affairs," is now being released by the Department of Defense to guide military personnel in arranging their personal affairs.

The 24-page booklet stresses the importance of having an up-to-date record of vital personal and family documents and papers and letting other family members know its contents and location.

The new DOD publication explains the purpose of a will, a power of attorney, a joint bank account, and a safe deposit box, and points out that military legal assistance officers can advise and help military personnel in a wide range of personal matters.

Subjects covered include Federal and State income taxes on military active duty and retired pay, government and commercial life insurance, Federal Housing Administration in-service and Veterans Administration "GI" insured home loans, military retirement, social security, etc.

"Your Personal Affairs" also gives details about military dependents' benefits provided by the Armed Forces, the Veterans Administration and the Social Security Administration.

Fleet Reserve Unit To Install Officers

Installation of newly elected officers of the Fleet Reserve Association, Branch No. 95, will be held in the VFW Hall in Ridgecrest Friday, July 15, at 7:30 p.m. Dancing and a buffet will be served following the ceremonies.

Elected president for the 1960-61 term is Arthur L. Trent; vice-president, Bernard G. Clarke; and secretary-treasurer for a second term, Terry M. Driver.

Four delegates and four alternates have been designated to attend the Southwest Regional Caucus in Pomona, August 13-14. Captain W. W. Hollister, Station Commander, will be the principal speaker at the caucus.

All Fleet Reserve Association members are urged to attend the caucus. Further information may be obtained from any of the new officers.

Any member of the Fleet Reserve or persons with six or more years of active service are eligible to joint the Association.

NOTS Lauded on Latest Polaris Firing

A TWX from Admiral W. F. Raborn, Director of Special Projects for BuWeps, was relayed from NOTS Pasadena to China Lake last Friday afternoon regarding the June 30 Polaris firing from San Clemente Island:

"Heartiest congratulations to all concerned for last night's successful shot. This success is a further indication of the determined effort and inspired performance by the team which is bringing ever nearer the fulfillment of the promise of Polaris. Who said we couldn't keep our powder dry."

State Official Lauds Cal-Vet Support

Joseph M. Farber, State Director of Veterans Affairs, expressed his appreciation to California voters for their support of Proposition 1 authorizing the sale of $400,000,000 in veterans assistance bonds during the next two years.

In existence since 1921, Cal-Vet makes loans to qualified veterans at low interest rates from the sale of bonds. There is no tax support involved and, further, makes a sound and productive contribution to the building, real estate, and allied industries of California.

Application for Cal-Vet eligibility may be obtained at the Veterans Service Office, 236 Ridgecrest Blvd. Juanita Cox, Service Officer, will be available upon her return from vacation on July 11.

A scandalmonger is one who puts who and who together and gets whew!

Dr. Murray Reports on BHS Statistics On Eve of His Retirement as Principal

The move to the new Burroughs High School campus for the 1959-60 school year contributed toward better student morale and pride in the new school which resulted "in a very good year," Dr. Earl Murray, Principal, indicated.

Dr. Murray reviewed accomplishments of the school, along with an outline of needs and problems in his annual report for 1959-60 submitted to Dist. Supt T. L. McCuen of the Kern County Union High School and Junior College District.

The school is located near Ridgecrest on the Naval Ordnance Test Station, China Lake. The new campus, opened in September, provides for ready access by both off-Station as well as on-Station students and their parents.

"We have been able to maintain high standards in scholarship which are borne out by our test results both locally and nationally," Dr. Murray commented. He pointed out that six of the graduates qualified for California State scholarships and five of the grads earned Honors at Entrance at four different institutions.

"Our mathematics students did well above average in the college board examinations and were outstanding in winning the championship in our Mathlete League," Dr. Murray wrote. "Our science students did very well and were outstanding in science fairs including the National Science Fair at Indianapolis." He said that the number of students who passed the English A test was quite gratifying.

Outstanding Curriculum

"Our curriculum is outstanding in terms of its diversification and depth, and we are providing a good program for all of our students," the principal stated. "The plans for next year will improve our situation even more in science and foreign languages." Murray said that faculty and parents are to be highly congratulated for the fine attitude and work which is evident in Burroughs High School.

According to information in the principal's report, enrollment was 864 when the official check was taken in October. Some 48 faculty members conducted the school program. Courses were offered in 13 departments, including art, business education, drawing, English, foreign language, home economics, mathematics, industrial education, music, natural science, social science, boys and girls physical education.

Breakdown

Toward the close of the school year a check showed that 44.1 percent of the freshmen, 47.1 percent of the sophomores, 52.4 percent of the juniors and 53.5 percent of the seniors were enrolled in college preparatory majors. The largest single group of students in the school were 14 years of age and in the 9th grade; the next largest were 16-year-olds in the junior year; while there were 142 sophomores 15 years of age to form the third largest group. The fourth largest numbered 129 seniors 17 years of age. There were two freshmen only 12 years of age and one junior only 14.

Several standard tests were given the students to assist in educational and vocational planning.

The largest number of students, 393, were California-born, with the next largest, 44, from the state of Washington. Students also enrolled who were born in Turkey, Canal Zone, Philippine Islands, Canada and England. Thirty-four states of the Union were listed as birthplaces, in addition to the District of Columbia.

Faculty

Of the faculty, 28 were men and 20 were women. Highest degrees held were one doctorate, 24 with master's degrees and 23 with bachelor's degrees. The average length of women teachers teaching in the high school-college district was 5 years, with the men averaging 6 years. Teachers participated on a number of school and district committees.

New courses added to the curriculum were merchandising, student accounting and French. Spanish 9 was dropped.

Dr. Murray reported that each student is given general education and vocational guidance. "Extensive emphasis is placed on post high school training," he said.

Dr. Murray retired from his position as principal July 1, to be succeeded by Vice Principal Kenneth W. Westcott. Murray will teach at Kern Valley High School. "Upon retirement as principal of Burroughs High School, I would like to say that this experience has been extremely stimulating, challenging and satisfying," he wrote.

Vacation Halts HS, College Study

No high school classes or lower division college classes will be offered by the Adult Education department during the summer months. Classes at both levels will be resumed on Tuesday, September 6.

Bakersfield College and Burroughs Evening High classes are under the supervision of W. J. Shortt, 91 Halsey, China Lake. All requests for information should be made at that office, Ext. 72019.

Registration for the fall semester will be held in the Burroughs High School library from 7 to 9 p.m. on August 22, 23, 24, and 25.

China Lake Players Elect New Officers

Five new officers were elected at the general meeting of the China Lake Players on June 30. Outgoing president Ed Romero presided at the meeting.

Newly elected officers are: Mary Wickenden, president; Ralph Claassen, vice-president; Helen Breslow, secretary; Ruth Rekosh, business manager; and Jim Rhodes, director at large.

Other items on the agenda were the discussion of a fall production and a possible benefit performance.

Persons interested in having the Players produce a favorite play may suggest their preference to one of the members.

Promotional Opportunities

Current Station employees are encouraged to apply for the positions listed below. Applications should be accompanied by an up-to-date Form 58. The fact that positions are advertised here does not preclude the use of other means to fill these vacancies.

Clerk-Stenographer, GS-5, PD 20013, Code 304. Prepares formal and informal technical reports including the quarterly progress report for the entire department. Initiates and prepares all types of correspondence and other forms pertinent to the division; supervises division clerical personnel and performs other varied secretarial duties.

File application for above position with Pat Dahling, Room 34, Personnel Bldg., Ext. 72032.

Clerk, Dictating Machine Transcriber, GS-4, PD 31496, Code 4574. Performs duties for branch employees. Originates correspondence, types from hand written drafts and from dictating machine transcriptions, routes and screens mail, files, makes travel arrangements, acts as receptionist, arranges meetings and performs miscellaneous clerical duties.

File application for above position with Dixie Shanahan, Room 26 Personnel Bldg., Ext. 72676.

THE ROCKETEER

OFFICIAL WEEKLY PUBLICATION of the U.S. NAVAL ORDNANCE TEST STATION China Lake, Calif.

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Station Commander

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DEADLINES

News Stories ..... Tues., 4:30 p.m.
Photographs ..... Tues., 11:30 a.m.

PASADENA

Nova Semeyn ..... Correspondent
Phone Ext. 482
Shav Monsen, A. E. Black, D. Sanchez, Photographers

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What's Doing

IN RECREATION

By Jean Cone, Recreation Director

The Adult Station Dance on the 15th of July will be a Shipwreck Party. All Station personnel 21 years old and over are invited. Music by the "Crescendos" of Antelope Valley.

Reservations are being taken for groups of eight or more. For your group reservation call the Community Center, Ext. 72010.

Laguna Beach Festival

Reserved seat order forms are available at the Community Center for the Pageant of the Masters at Laguna's annual Festival of Arts. The 25th anniversary of this famous event will be celebrated from July 16-August 14. The Festival of Arts features displays in art, ceramics, handcrafts, woodcarving, and sculpture. At the Pageant, the men, women, and children of Laguna Beach portray roles in the "living picture" reproduction of the greatest of works of master artists and sculptors.

POP Discount

A new special discount certificate for Pacific Ocean Park is available at the Community Center. According to POP officials, you and your family can enjoy all of the rides and attractions for $1.25 per person with these special discount certificates—good Mondays through Fridays. You can ride as much and as long as you want. This admission includes over 30 rides and attractions—plus Super Sea Circus, Neptune's Kingdom, Baby Animal Farm, Children's Fun Forest, and many others.

All discount certificates and coupons may be obtained Monday through Fridays from 8 a.m. to 5 p.m. (including the lunch hour) from Ann Seitz or Ronald Mahoney, SA, at the Community Center receptionist counter.

Civil Air Patrol

The China Lake Civil Air Patrol Composite Squadron 84, USAF Auxiliary, meets each Tuesday evening at 7:15 p.m. in the NOTS Safety Building, located at Hussey and Nimitz Streets. Membership in the Cadet program is open to high school students (boys and girls) from the 9th grade and up, 14 to 17 years old.

Applicants must be approved by the Squadron membership board and be able to provide for aviation study manuals, uniform and accessories.

Successful completion of preflight subjects, character guidance, leadership courses, and one summer encampment at an Air Force Base qualifies the Cadet for Certificate of Proficiency leading to Cadet commission and for extracurricular school activities such as the Foreign Exchange Student program.

Summer classes will include preflight aviation studies, orientation flights, preflight glider instruction, marksmanship, and radio.

An annual membership fee of $2 includes registration and group insurance coverage. Contact Capt. Louise E. Richards, Administrative Officer, Ext. 72043, or P. O. Box 63, China Lake.

Summer Recreation

The Indian Wells Valley Recreation District is offering a summer recreation program from June 20 to July 29. Activities are offered for pre-school, elementary, sub-teen, and teen-age groups.

Classes include acrobatics, art, baton, ceramics, charm and personality, crafts, drama, reading, mechanical drawing, music, nature study, photography, sewing, story hour, and tumbling.

Activities are held at James Monroe School, Ridgecrest Park, Inyokern Park, and Kern County Library. Activity schedules are available at the Community Center receptionist counter. Further information may be obtained from Mrs. Pearl Tallackson, Kern County Recreation Director, Ridgecrest, phone 51432.

RAFT Club

During the summer months the RAFT Club opens at 2 o'clock each afternoon Tuesday through Saturday. Club membership is open to single military and civilian Station personnel under 21 and students of Burroughs High School. Monthly activity calendars and further information is available from the Club Director, Stefa Delys, Ext. 72091.

Station Pool

The Station swimming pool is open to all Station residents daily from 1 to 8:30 p.m. There is no admission. Life guards are on duty. Also, a wading pool is available for the youngsters.

COMPARISON FIGURES—In addition to the above military statistics, the U.S.S.R. has 957 active warships to the United States' 383. They have 27 cruisers to our 14 attack and 9 support carriers. We have 234 destroyers in commission while the U.S.S.R. has 480 destroyers and frigates. The above figures are reported by the Associated Press to be from U. S. Navy intelligence sources.

SHOWBOAT

TODAY JULY 8
"CIRCUS OF HORRORS" (87 Min.)
Anton Diffring, Erika Remberg
7 p.m.
Plastic surgeon successfully operates on circus owner's daughter and obtains partnership in the circus. His future patients become circus people. A thrill or shock a minute! Not for the squeamish. Adults-Young People.
SHORTS: "Billy Boy" (7 Min.)
"White Peril" (8 Min.)

SAT. JULY 9
MATINEE
"CATTLE EMPIRE" (83 Min.)
Joel McCrea
SHORTS: "Igloo For Two" (7 Min.)
"Zorro's Fighting Legion" No. 3 (17 Min.)
EVENING
"BATTLE IN OUTER SPACE" (90 Min.)
Fantastic Japanese Film
7 p.m.
SHORTS: "Life With Loopy" (7 Min.)
"How To Stuff A Woody" (7 Min.)

SUN.-MON. JULY 10-11
"PLATINUM HIGH SCHOOL" (93 Min.)
Mickey Rooney, Terry Moore
6 and 8 p.m.
(Mystery) A father investigates his son's "accidental" death at an exclusive military school on a California island. Lots of suspense and even action here. Adults-Young People.
SHORTS: "Half Pint Palomino" (7 Min.)
"Ready Woolin' And Able" (7 Min.)

TUES.-WED. JULY 12-13
"CRACK IN THE MIRROR" (97 Min.)
Orson Welles, Juliet Greco
6 and 8 p.m.
(Drama) Confusing but amusing tale where the three leading characters each play a dual role. A triangle in the Dregs of Paris results in murder, and the elite trio are involved through lawyer's doublecross. Adults-Young People.
SHORTS: "Littlest Bully" (7 Min.)

THURS.-FRI. JULY 14-15
"BLUEBEARD'S TEN HONEYMOONS" (92 Min.)
George Sanders, Corinne Calvet
7 p.m.
(Horror) Antique furniture dealer falls for night club gold-digger so he commences series of murders-for-money to keep the doll. Good—and gruesome. Adults-Young People.
SHORTS: "Thousand Smile Checkup" (7 Min.)
"Ageless Artistry" (10 Min.)

AAUW to Meet

AAUW members of the International Relations Study Group will meet at the home of Evie Ashburn, 100-B Ellis, next Thursday, July 14, at 8 p.m. to discuss the Life Magazine series, the "National Purpose," led by Carolyn Lindberg. Public is invited.

Invention which contributes to progress, on rare occasion, may be the offspring of unaided genius; far more frequently, it is but the wise extrapolation of the lessons of history. —V. C. Muller, Code P75401

News From Pasadena

Coffee Port Personnel Lauded for Services

"Service with a Smile" is indeed the motto practiced by members of the Coffee Port staff. Headed by Esther Talbert, Manager, the Coffee Port is made an enjoyable and relaxing atmosphere in which to take that "coffee break."

On behalf of NOTS Pasadena employees, Virginia Banister, Chairman of the Canteen Board, extends appreciation and thanks to Esther and her staff representing the West Coast Food Service.

Each holiday finds the building appropriately decorated, and each month those employees having birthdays are presented with a small individual cake. These little extras, and the continuous excellent service are appreciated.

Assisting Esther in the Coffee Port are Myra Hinkle, Edna Miller, Catherine Potts, and Cecile McCollough.

MORALE BOOSTER—Esther Talbert puts the finishing touches on July 4 decorations, another morale booster provided by NOTS Pasadena Coffee Port staff employees.

Service Pins Are Earned by Three

Length of service pins have been presented to three employees of the Quality Engineering Division, Engineering Department. Recipients are Walter D. Syberg, Eugene J. Thirkill, and Clyde B. Flynn. The lapel pins were awarded at a recent division all-hands meeting at Foothill.

An Inspector with the Source Inspection Branch, Syberg has been with NOTS 10 years, first with UOD and since 1954 with Engineering.

Thirkill, a supervisory mechanical engineer, came aboard five years ago as a Junior Professional. Following a year of training in the program, he joined the Engineering Department.

Flynn has been with the Division's Engineering Branch for three years. He is a Draftsman (Mechanical). Prior duty includes two years at China Lake with the Test Department.

Summer Golf League

At the end of the eighth week of play in the Summer Golf League, Team 6—Bill Derby, Bill Aitchison, John Gannon, and Cy Martens—hold a one-half point lead.

Low net winners for the week were Arnold Livingston with 31 strokes and Gene Osuch with 34. Low gross of 38 was shot by Bill Derby but since he was not eligible, having won the previous week, the golf ball was awarded to Tom Paine who shot a 41 game.

Promotional Opportunities

Model Maker (Machining), $3.01 to $3.27 p/h, Code P8094.

Duties: Machines, fits and assembles parts to construct experimental devices, models, and prototypes for developmental work, scientific testing, training and other purposes. Devises and manufactures jigs and fixtures, and sets up and operates all varieties of machine tools such as lathes, shapers, planers, milling machines and profiling machines.

To apply for position, contact Nancy Reardon, Extension 104.

Over 900 People Hear Local Talks

Informing the general public of the Navy's contributions to our nation's security is a task carried locally by members of the Speakers' Bureau. During the last year, reports Nova Semeyn, coordinator of the program, about 35 groups totalling more than 900 persons have heard presentations by NOTS Pasadena speakers. Three such engagements were filled during June by UOD men.

Speaking to members of the Cal-Poly Mechanical Engineering Society in Pomona on June 1 was Frank G. White, Associate Head of Systems Operations Division. "The Polaris Program" was the topic of his talk.

Members of the Arcadia Civitan Club on June 9 heard a program on "Modeling of Underwater Missiles" presented by Gerald G. Mosteller, who heads the Hydroballistic Model Laboratory of the Propulsion Division.

T. F. Gautschi, Associate Head of Product Engineering Division, on June 15 spoke to a gathering of about 200 students at LA State College, Institute on Government. "Getting the Most for the Public Dollar" was the subject of his talk.

USC Students to Visit

About twenty students from USC's School of Public Administration will visit here on Wednesday and Thursday afternoons, July 20 and 21.

Meeting with Captain Charles J. Beers, OinC; D. J. Wilcox, Head of UOD; and George Pollak, Deputy for Administration, a seminar on NOTS administration will be held including discussions on organization and mission, operating philosophy, and management problems.

A session will also be held on management programs in the fields of personnel, management analysis, budget, and procurement.

The students attend the School on a part-time basis; all are under the sponsorship of their respective employers who are fire administration and law enforcement agencies and the Armed Services.

ASROC Program Plans Set for NOTS Family

NOTS employees and their families will have an opportunity to see first-hand the ASROC missile and hardware when the Pasadena Foothill Plant opens its gates for the presentation on Sunday afternoon, July 24.

Programs will be presented throughout the afternoon from 1-4 p.m. This invitation is not extended to the general public.

Included in each program will be a brief introduction, film and a question-answer period. ASROC hardware may also be viewed in the display area just outside the Building 7 conference room.

First film showing will be at 1 p.m. with others at 1:45 p.m., 2:30 p.m., and 3:15 p.m.

Hoolaulea Half-Time Program Features Hula, Fire Dancers

Authentic Hawaiian-style entertainment is to be featured at the NOTS Hoolaulea half-time intermission, reports Dance Co-Chairman Lt. R. Jackson. Engaged for the July 16 occasion are hula dancers Tani Marsh and her partner, Manu, who will also do a fire dance. Both entertainers will earlier in the evening perform at the Ambassador Hotel before proceeding to the Ba-

Hula Artists

Tani Marsh and partner, Manu, have been signed for NOTS party, July 16, 9:30 p.m. to 1 a.m. at 250 W. Foothill Blvd.

hama Inn Annex in time for the NOTS party.

The half-time program will be MC'd by our own LCdr. Pali King, formerly of Hawaii. In addition to the dancers, the program will include drawings for three "surprise" door prizes.

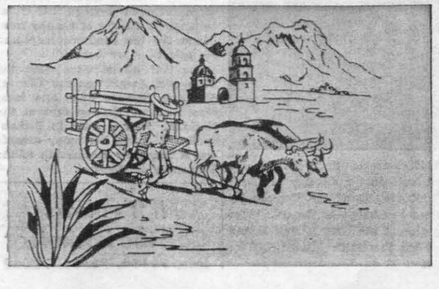
Sarongs, muumuus, and bright shirts are the dress for the evening, though not required, members of the dance committee have said. There will be dancing under the stars and plenty of luau tables and seating for everyone.

Tickets are available at $1.25 each throughout NOTS Pasadena. In each building, look for the door sign that reads "Hoolaulea Tickets Here," and get yours today.

Reservations for 1960 Mexico Trip Now Being Taken By NOTS Club

Reservations for a 15-day holiday in Mexico are now being taken by the NOTS Overseas Club, Leonard Semeyn, Chairman, has announced. Dates of the trip are October 22-November 5.

Departing from Los Angeles, a non-stop flight will be made to Mexico City. The tour will include five days in Mexico City and three in Acapulco. Other areas to be visited include the Pyramids, Sierra Madre Mountains, Taxco, Cuernavaca, Chapingo, Texcoco, Santana, Spa Penefiel, Huejotzingo, San Martin Texmelucan, Santa Barbara, and Los Reyes.



Besides the usual sightseeing, the tour will include the bullfights, floating gardens of Xochimilco, several parties of which one will be in a Mexican home, sail boating, and numerous other events to make the trip a memorable one.

Total cost of the trip is $359 which includes the round-trip flight, all hotels, all transportation in Mexico, sightseeing, tips, taxes, and all meals outside Mexico City. The group is limited to 20 persons.

Itineraries may be obtained at Pasadena from Nova Semeyn, or at China Lake from Marlyn Dempsey.

Weapons Planning Group

The Weapons Planning Group assisted in developing the broad objectives and composition of the ASROC system during the early formative years of the program. Feasibility studies were made to determine whether a destroyer-based rocket-projected aircraft torpedo could effectively acquire and attack submarines at ranges permitted by the detection ability of shipboard sonar equipments.

These studies pointed up the ways in which the performance of the principal components of the system influence over-all results and the payoff that accrues from improvements in the significant areas. It was shown that from a systems point of view the relationship between torpedo acquisition range, the combined error of target localization and weapon delivery, and the distance the target submarine can travel during the blind time of the system are extremely important.

The studies that were made guided the research and development steps necessary to improve torpedo acoustic performance, volume search rate and system blind time so that these relations could be maintained as submarine speeds and detection ranges increased.

The name of ASROC was given to one of four methods of payload delivery that were analyzed. In addition to investigating and reporting on the possibility of drone delivery (ASDRONE), the Weapons Planning Group participated in the ASROC phase and in the final recommendation that ASROC, because of its effectiveness and fast attack action, offered the best over-all system for destroyers.

In particular, it was shown that for the time scale of interest an aircraft torpedo could be developed that would be both competitive with and complementary to the depth-charge payload of ASROC. This work influenced the decision that ASROC would have a dual payload capability. Thus ASROC provides the fleet with a flexibility of weapon choice of significant consequence in its ASW posture.

Test Department

The Test Department was active in all of the early planning stages of ASROC, which also involved other NOTS departments, other naval activities, and prime contractor personnel. This close coordination continued through all stages of the missile's development, materially aiding the hardware designer in getting quick and accurate answers from ASROC field tests.

Test procedures used were the result of intensive participation in all stages of planning by personnel from range operations, data recording, and assessment groups. Special handling and launching equipment and facilities were designed and developed by Missile Range Division personnel working closely with project and contractor representatives. The use of specialized camera equipment enabled the detection and subsequent correction of several missile airframe and hardware problem areas.

Most of the field test firings were conducted on the several ranges of the Test Department. Firings were conducted on the G-2 ground ballistic range and on the K-3 crosswind firing range. Special component tests were conducted on the G-1 and SNORT ranges to obtain special ballistic and functioning data.

Of particular interest was the role of Test Department in planning, establishing, and operating unique range facilities for payload water-entry tests at Walker Lake, Hawthorne, Nevada—an operation demonstrating the ability of the Department to establish and operate a complete data-gathering range facility at a remote location. The deployment of extensive precision equipment and personnel owed its success to the cooperation between range and instrumentation personnel along with the personnel of the Supply and Public Works Departments. Data instrumentation support of ASROC field tests at San Clemente Island and on the aircraft ranges at China Lake was provided by operating groups of the Department.

There was constant activity in the data reduction and assessment groups of the Department on the ASROC programs. The ASROC ballistic program necessitated close contact between assessment personnel and groups at NOTS and at the Naval Weapons Laboratory, Dahlgren, in the proper reduction and assembly of data for ballistic firing tables. This group, under the active guidance of Grace Rowlinson, included G. Ness, J. Saitz, J. Dorgan.

Personnel assigned to coordinate Test Department aspects of the ASROC program included E. Simmons, D. Rossin, R. Harris, A. Staud, R. Nesbitt, A. Pezzuto, P. Blew, P. Lilly, D. Tiemann, C. Reeves, and W. Smith.

Propulsion Development Department

On the basis of stated weapon design characteristics, the China Lake laboratories of the Propulsion Development Department furnished a locally developed and tested propellant for the ASROC weapon system. The laboratories provided a significant portion of the design work and specialized technology for the development of such components as the large propellant grain and motor parts, and the ignition and thrust termination devices.

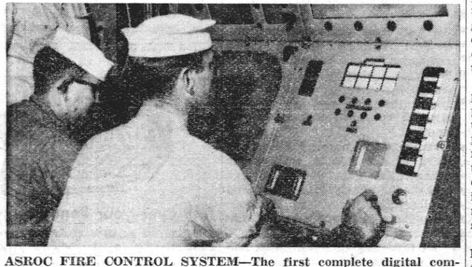
The initial static test of an ASROC motor occurred in less than two months from the date the design was conceived. Since that date, hundreds of ASROC grains and motors have been manufactured in the China Lake Propulsion Laboratories for a multitude of developmental and qualification test programs.

In a reliability and evaluation program, the propellant grain and loaded motor were subjected to a series of severe environmental tests. Included were such treatments as drop, thermal shock, aging, and vibration, and static and field firings over the operating temperature range.

In addition, a number of tests were conducted to establish realistic manufacturing specifications and tolerance limits. Through close liaison with the Naval Propellant Plant at Indian Head, Maryland, it was possible to reflect important processing and production data from pilot lot manufacture in the final Bureau of Naval Weapons propellant grain and loaded motor documents.

The China Lake Propulsion Laboratories produced and delivered to the Fleet a total of 117 motors for the BuWeps and OpTevFor evaluations.

Pilot production has been successfully completed at the Naval Propellant Plant, and manufacture of production lots is under way. Tests at both the Naval Propellant Plant and the Naval Ordnance Test Station have clearly shown that the ASROC motor has exceeded all design requirements and is a highly reliable and reproducible large-caliber rocket motor.



ASROC FIRE CONTROL SYSTEM—The first complete digital computer installed on a ship locates the target and aims the missile automatically.

Engineering Department

In December 1958 the Engineering Department became responsible for the engineering, development and fiscal planning for a number of ASROC system components. Design problems and work with the prime contractor on the motor, programmer, igniter, explosive blocks, test sets and other mechanisms were handled by various divisions in the department.

The Electro Mechanical Engineering Division worked on an electronic programmer which causes the ASROC missile to separate and glide to designated ranges. About a year ago the Bureau agreed to fund the development of an improved design known as Mk1 Mod 1 RASP. The Electro Mechanical Division successfully completed the development of the improved design which resulted in improved reliability and reduced cost through the use of modular construction with printed circuits.

One month prior to installation of the ASROC system on the USS NORFOLK tests disclosed mechanical design weaknesses in the relay transmitter which is a part of the fire control system. On a crash basis the Electro Mechanical Division was assigned the task of making major changes and delivering this piece of equipment to the ship on time. An around-the-clock effort of design, fabrication and test delivered an improved relay transmitter one day before the target date set. About one year of use aboard the USS NORFOLK has shown the relay transmitter to be a well-designed piece of equipment.

The pressure of delivery schedules caused the Bureau to assign the task to this group of designing, testing and fabricating two relay transmitter test sets and manufacturing six additional test sets for BuWeps use. This task has recently been successfully concluded by this Division and production is proceeding at the Naval Avionics Facility in Indianapolis.

The Mechanical Engineering Division worked on several different types of fabrication for the ASROC motor chamber before a rolled and welded type of construction was selected. Fabrication problems that developed during manufacture caused many changes that resulted in a safe and reliable design.

It was determined during development that a capability for static firing the ASROC motor was needed. The igniter was re-designed with a pressure take-off and fully evaluated by the Mechanical Engineering Division before a release was made to the prime contractor to manufacture.

Late in the program there became a need to improve the nonpropulsion attachment (NPA) which permits safe handling of the missile. Changes to the NPA and a test program provided the improvement required.

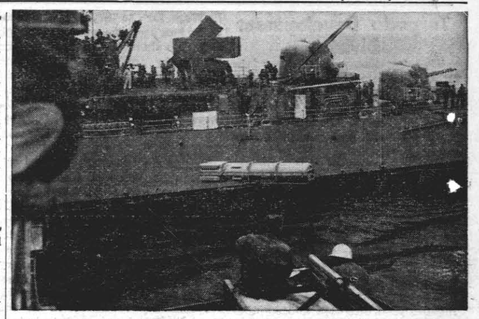
This Division has handled all the specifications and documentation for the Engineering Department on ASROC. Coordination between other ASROC groups, BuWeps, and many naval and industrial facilities has been accomplished by this group.

The In-Service Weapons Support Division had the responsibility for the programmer field test set. An accelerated effort was undertaken to correct deficiencies discovered during type testing. A successful solution was found without interfering with production schedules.

The Quality Engineering Division had the task of obtaining needed components for the Station's use on the ASROC development program. Many special components were located and delivered to the development and design groups on urgent schedules in order that prototype hardware could be expeditiously built and tested.

When some difficulties were experienced with the computer drum, personnel of the division aided in the solution of the problem by supplying methods and equipment to measure certain variables in order that their effort on performance could be determined. This effort involved highly precise measurements and the development of some new measurement techniques.

Other components of the system have been redesigned, engineered for greater reliability and ease of production by members of the division.



TRANSFER AT SEA—Ship is replenished with ASROC missiles at sea. Eight-celled ASROC launcher aboard ship is seen in left center.

Supply Department

In the course of ASROC's development, the Supply Department was called upon to negotiate contracts with the Minneapolis-Honeywell Regulator Company and to purchase many items to be furnished the contractor. Contract administration was delegated to the Inspector of Naval Material, Minneapolis, who in turn redelegated certain areas of the administration to InsMat, Los Angeles. Underwater Ordnance Department personnel were assigned technical cognizance.

The NOTS contracting officer handled many details including printing of training ordnance pamphlets. The Purchase Division also successfully purchased material and services needed in the development program.

A particularly interesting job of transporting the half-million dollar instrumentation over 3,000 miles in two truck vans to Norfolk, Virginia, for the evaluation program was worked out by the Pasadena Purchase Division in cooperation with Military Traffic Management. The delicate instrumentation required careful handling and the complete and successful operation was written up in the National Defense Transportation Journal.

Systems Develop...

(Continued from Page B-2)

Fire Control Branch. The mechanical design, development and testing of the launching group, the coordination of the missile-launcher interfaces, and coordination of the development of the launcher power drives with the Naval Ordnance Plant, York, Pennsylvania, were performed by John B. LaBosky.

In addition, Bob Hudson participated in the installation of the system on the USS NORFOLK and John LaBosky in the evaluation program at Key West. Fred Eaton coordinated the loader and handling system design with BuShips Personnel and made studies of loader and handling system components. Tom Boyle designed the required modifications and improvements for the field launchers for use in development firings, and provided design studies for the prototype launcher.

The Fire Control Branch, headed by Edward Perry, was responsible for the development of the ASROC fire control system and, with the Naval Weapons Laboratory, Dahlgren, the generation of ASROC ballistic firing tables. In addition, the branch participated in both the installation of the system and in the evaluation program.

Technical direction of the Fire Control Group Mk 111 was provided by Tom Cloer and Ronald Thuleen. Mr. Cloer, NOTS Associate Director of the ASROC concurrent evaluation at Key West, was assisted by Frank Ludwig and Ina Squire in the coordination of the ballistic range table program.

Technical direction of the Fire Control System Mk 114 was provided by Charles Black, assisted by Richard Flanders. Mr. Black provided Station liaison in the conversion of Destroyer Tenders to handle ASROC missiles, and, in addition, he chaired the ASROC Stockpile-to-Target Sequence Subcommittee of the ASROC Coordinating Committee.

The Airborne ASW Branch, headed by Jesse M. Rowe, effectively directed the experimental testing of ASROC. John Fogarty contributed greatly with his analysis work on causes for failures in the initial experimental missile firings. Homer W. Lineberry ably directed the ballistics program in which over 70 firings of the ASROC missile were made at China Lake by the Test Department. Effective program planning by Herb Summers, and scheduling were instrumental in maintaining the development pace.

Public Works Department

Two complete shallow-depth test ranges were constructed, and an existing deep depth range was rehabilitated. The first new range was constructed at Walker Lake, Hawthorne, Nevada, with the excellent cooperation of the local Hawthorne Naval Ammunition Depot, Public Works Department. The second was constructed on the west coast of San Clemente Island. In both instances, the construction problems of building roads, camera stations, launching bases, power and instrumentation lines, etc., were greatly magnified, due to the remote locations, limited transportation facilities, and rugged terrain.

The facility and support requirements for ASROC were achieved by the combined concentrated efforts of Public Works personnel at China Lake and Pasadena. Functioning as an organized task team, they planned, designed, and built the facilities and then provided the necessary general support to the operating groups of the complex test programs.

Technical Information Department

The Technical Information Department claims an important contribution to the ASROC program because of its role as principal disseminator of scientific information for NOTS.

In connection with ASROC, TID has published and distributed, during the time that the ASROC program has been in full swing, some 30 formal publications. Some of these were written or edited, illustrated, and composed within the department. Most of them were printed by TID.

The NOTS libraries at China Lake and Pasadena maintain extensive files of publications on ASROC and components of the weapon system.

Continuing service to the ASROC program marks the activity of the Documentary Film Production Branch, which has captured on film the development of ASROC since its birth.

Several patents in connection with ASROC have been processed through TID's Patent Division.

The Department's Information Specialist was available as a consultant on ASROC news release.

Task Team...

(Continued from Page B-2)

for achieving objectives within the established time scale and available funds and by insuring the engineering compatibility of the various components. Throughout the program his broad planning and coordination with the many activities involved assured that the suitability and timeliness of all component development would produce a well-integrated system.

Providing coordination of tests at the various sea ranges was the Pasadena Range Director, M. V. n Reed. Although not a technical task team leader, his efforts in directing the development test work contributed significantly to the success of the program.

ROCKETEER

Budd Gott, Editor — Office, Housing Bldg., Top Deck — Phones 71354, 72082, 71655

Vol. XVI, No. 27 — U. S. Naval Ordnance Test Station, China Lake, California — Friday, July 8, 1960

New Navy Weapon -- ASROC -- Unveiled

Bureau Plays Lead Role In ASROC Story

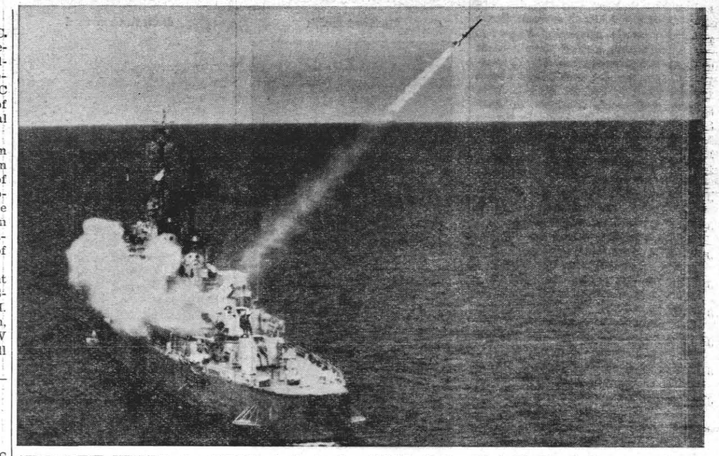
"A significant advance in the Navy's anti-submarine warfare program" is the way Rear Admiral P. D. Stroop, Chief of the Bureau of Naval Weapons, described ASROC.

RAdm. P. D. Stroop

Providing direction and management of the complex program, culminating in the successful development and evaluation of ASROC were individuals of the Bureau of Naval Weapons who deserve special recognition.

Over-all program coordination was under the direction of Captain E. A. Ruckner, Assistant Chief of the Bureau for Research, Development, Test and Evaluation. The program was directed by Captain W. C. Abhau, ASW Officer, assisted by Cdr. L. H. Keator, Head of the ASW Weapons Division.

Effective program management was provided by the Bureau's ASROC Project Officer Cdr. H. H. Scales, assisted by R. S. Johnson, H. Stone, H. Silk of the ASW Weapons Division, and G. G. Beall of the ASW Missile Group.



SUBMARINE KILLER—An ASROC missile heads for submarine target after firing from the USS NORFOLK off Key West, Florida, during a recent successful Bureau of Naval Weapons evaluation.

America's Defense Program Bolstered By NOTS Development of New Weapon

ASROC—the Navy's newest submarine killer—was revealed to the public at a recent press preview held at Key West, Florida, where newsmen viewed firings from the Destroyer-Leader USS NORFOLK. Key speaker at the press conference was RAdm. P. D. Stroop, who discussed the potential contribution of the new weapon to the nation's defense. ASROC's effectiveness was clearly demonstrated to the press against the target nuclear submarine, USS SKATE.

Fleet Requirements And Operations Are Key Functions Of Naval Officers

One of the key functions of the naval officers at NOTS is to communicate fleet requirements and operational knowledge to the scientists and engineers. To assure a weapon system compatible with fleet use, the Ships' Characteristics Committee was organized early in the ASROC development program as an integral participating team member.

Serving as an advisory board, the Committee made recommendations to project personnel on items affecting shipboard installation, operations, safety, handling, and maintenance.

Chairman of the Committee is the Officer in Charge, Capt. Charles J. Beers. During his naval career, he has served aboard submarines and the cruiser USS DES MOINES, commanded the USS REDFISH (SS-395) and the USS ALLEN M. SUMNER (DD-692), and directed the Underwater Ordnance Fire Control Section of what was then the Bureau of Ordnance.

The Technical Officer, LCdr. E. P. K. King, had spent most of his naval career aboard submarines prior to his NOTS Pasadena assignment. His job on the committee is to provide inputs to the technical effort at committee meetings as well as through informal discussions.

Other line officers on the committee include the Operations Officer, LCdr. J. D. Schnepp, and his assistant, Lt. J. Palmer.

Members of the Ship's Characteristics Committee include W. E. Hicks and L. Freinkel of the Underwater Ordnance Department Office; W. S. Burlem, a former submarine officer now attached to the BuWeps Technical Liaison Office; and other NOTS personnel with special background. BuWeps, BuShips, Fleet and contractor personnel are also called on for information and resource purposes as necessary.

Examples of problems posed to the Committee for recommendation include the proposed design changes to the ASROC training system, evaluated in terms of effect on training of fleet operating personnel as well as cost and simplicity of installation; storage of the missile aboard ship; and airframe design as it affected shipboard handling.

In addition to the efforts of the Ship's Characteristics Committee, the military personnel of the Operations Division, headed by LCdr. J. D. Schnepp, contributed significantly to the ASROC development program through fleet liaison. This responsibility included obtaining the assignments of ships for the evaluation.

The small boat crews at Long Beach, headed by Lt. J. Palmer, provided the logistic support for sea operations.

The diving personnel under Bosn. W. C. Haney recovered units fired during development tests at Morris Dam, San Clemente Island, and Walker Lake, Nevada.

Douglas J. Wilcox

Captain Charles J. Beers

Project Leaders Say Job Well Done To Military-Civilian-Contractor Team

Development of ASROC marks the culmination of an integrated team at work—military, civilian, contractor. Working together, a hard-hitting anti-submarine weapon has been developed. Congratulations for a job well done are extended to all who participated in the program.

Carrying out technical direction of the development program were personnel of the Naval Ordnance Test Station, with Minneapolis-Honeywell as prime contractor. Involved were personnel of NOTS Pasadena and China Lake activities and M-H people both at their Duarte, California, and Hopkins, Minnesota, locations.

Principal subcontractors included Librascope Division, General Precision, Inc., working on the fire-control and attack console, and Universal Match Corporation on the launcher. The Naval Ordnance Laboratory, White Oak, Silver Springs, Maryland, provided analysis of the depth charge fuze function, and the Naval Weapons Laboratory, Dahlgren, Virginia did work on ballistic tables. Many other government laboratories participated in the program.

Efforts of this Navy-Contractor team have resulted in ASROC, a vital weapon in the defense of our country.

D. J. Wilcox
NOTS Pasadena

Capt. Charles J. Beers
Officer in Charge

The anti-submarine rocket, developed at NOTS, is a supersonic missile that can be launched from surface ships either individually or in salvos of two to four at a time. The major components of the integrated weapon system include an underwater sonar detection device, an electronic digital fire-control computer, an eight-cell launcher, as well as the ASROC missiles. Rocket motor, airframe, parapack, and acoustic torpedo or, alternately, a depth charge, comprise the 15-foot 1,000-pound missile.

Giving surface ships a new advantage in anti-submarine warfare, ASROC is directed to its target by the shipboard electronic fire-control system seconds after sonar detection. The solid-propellant rocket motor quickly propels the missile through the air, where the airframe separates, releasing the payload. Either a depth charge quickly enters the water and detonates at a pre-determined target depth or an acoustic-homing torpedo is slowed down by a parachute for water entry and pursues the target to destruction.

Using either payload or firing both simultaneously, the ship can locate the enemy submarine and attack without leaving a convoy or maneuvering.

Disclosure of the system marks the successful completion of a two-month evaluation program by the Bureau of Naval Weapons aboard the USS NORFOLK. Participating in the shipboard tests in waters off Key West were Fleet naval officers, NOTS technical personnel, and contracting firms.

Who Developed ASROC

This major development at NOTS started as the result of a study by the Naval Ordnance Laboratory, White Oak, Maryland. Investigation of various methods of delivering missile payloads from surface ships indicated advantages of rocket delivery. Thereupon, NOTS proposed to the Bureau of Naval Weapons that a specific missile system—ASROC—be developed.

NOTS received approval to initiate the development program and Douglas J. Wilcox, Head of the Underwater Ordnance Department at Pasadena, was appointed Project Manager.

Task teams were organized, drawing technical assistance from most departments at China Lake and Pasadena. Following competition between industrial firms, Minneapolis-Honeywell Regulator Company of Hopkins, Minnesota, and Duarte, California, was chosen as prime contractor. Mr. William Owens is director of the Duarte plant. This is the first major program at NOTS Pasadena where the contractor was brought in early in the development stage.

Development of the digital fire-control computer—first of its kind aboard a ship—was sub-contracted to General Precision's Librascope Division, Glendale, California. Mr. Lewis Imm is president of the firm.

The Universal Match Corporation, Armament Division of St. Louis, Missouri, designed and developed the eight-cell, fully automatic, pepper-box type launcher. Mr. Earl Biermann was project engineer. The detection system was designed by Sangamo Electric Company under separate contract to the Bureau of Ships.

NOTS technical direction of the program covered initial design through development stages, including testing the prototype of the system aboard ship. To do this, the NOTS-contractor team coordinated documentation, procured hardware, and assisted the Norfolk Naval Shipyard in the weapon system installation aboard the USS NORFOLK. The successful completion of the program is due to the effective cooperation of all naval activities and contractors involved.

UOD Leads Station Program

Systems Development Division

Assistant Projects Manager for the ASROC Program is Donald Cozen who heads the Systems Development Division. The organization is composed of five branches—Analysis, Engineering, Systems, Fire Control, and Airborne ASW.

The Analysis Branch, under the direction first of Lothrop Mitchenthal and later Paul L. Warnshuis, played a key role in the development of the ASROC system. Steve Gaspar made numerous system studies which guided development of an effective system. Aerodynamic design, weight, and balance were supervised by Robert Bickel. Alice Mae Anderson's analysis of data from more than 175 missile firings guided assessment of weapon effectiveness as well as contributing toward correction of development troubles.

Use of the IBM 709 Computer by Cal Sweat afforded duplication of missile trajectories by computation within one percent accuracy. Planning of instrumentation and data handling for the Key West evaluation by Beatrice M. Humason and Ken Fishel and warhead effectiveness studies by Fred L. Bellomy were significant contributions.

The Engineering Branch, headed by Paul F. Reichert, led the project of integrating the major components of the missile into a simple reliable assembly.

John D. Bascom provided the basis for airframe design through missile flight dynamics studies. Robert Beresford provided considerable aid in establishing adequate electrical integration between missile electrical system and test site wiring, as well as developing missile explosive actuators. Integration included designing jointly, with the major component engineers, those component features which were interfaced with other components, such as the motor-airframe juncture.

Among the innovations in the missile were permanent incorporation of explosive units into electronic subassemblies for increased reliability, and thrust cut-off of the solid fuel motor for range control. Missile handling and assembly equipment were initially developed by Frank P. O'Rourke, while missile and missile component compatibility problems were handled by Allen Blaemire.

The Systems Branch, headed by E. B. Osuch, directed the ASROC launcher development. The direction and coordination of the development of the ASROC launching group and fleet missile handling systems were provided by the Systems Branch.

The launcher and weapon control concepts and the design guidance schematics for the function of various control components, and for integration and coordination of the shipboard electrical systems interfaces, were established by Bob Hudson working jointly with the

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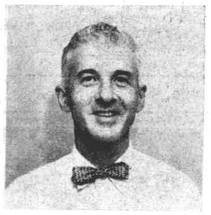
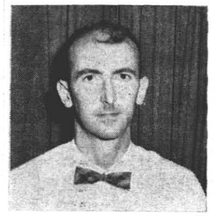


Bernard Smith



Jack A. Crawford

Donald Cozen

Leonard Freinkel

Douglas J. Wilcox

James A. Smith

Wallace E. Hicks

Devirl A. Kunz

Original ASROC Task Team Leaders Provide Foundation For Successful Engineering Achievement of Weapon System

Modern weaponry development, to be successful, requires large-scale organization of human effort from government, industry, and academic institutions, diverse in background and skills, dispersed throughout the nation. The ASROC program is an outstanding example of managerial and technical leadership by a government laboratory, providing the foundation for engineering achievement.

ASROC is a product of the Navy, NOTS, and the contractors, but the story of its development revolves around one man, his beliefs, and methods of operation. NOTS directed by the Bureau of Naval Weapons to exercise design cognizance and technical direction over the ASROC system development, assigned the program to Douglas J. Wilcox, Head of the Underwater Ordnance Department.

Wilcox, born in 1921, a graduate of Cornell University with a degree in Mechanical Engineering, has made his career entirely within the Underwater Ordnance Department. During this period he has developed a firm belief in the effectiveness of a government laboratory, working closely with fleet officers who provide insight on needs and use and with a prime contractor who must ultimately produce the weapon.

The success of the ASROC program has proven the soundness of this philosophy, for Wilcox, as project manager, assumed responsibility to integrate all the units into an effective whole, to insure that the system would meet an ordnance requirement, and to work with the prime contractor from the early phases of the program.

To accomplish this monumental task which involved virtually every major technical element on the Station, Wilcox organized an ASROC task team, with major component development assigned to five technical task team leaders. As Assistant Project Manager, D. Cozen, Head, Systems Development Division, directed the task team responsible for the missile, airframe, launcher and fire-control. J. Crawford, Head, Missile Development Branch, Aviation Ordnance Department, assumed responsibility for the Range and Airframe Separation Programmer. The present head of Weapons Development Department B. Smith directed rocket motor and depth charge fuze development.

From the Underwater Ordnance Department came the other two task team leaders. J. A. Smith, Associate Head, Torpedo Development Division, directed work on the torpedo payload and associated accessories. D. A. Kunz, Systems Operations Division Head, assumed responsibility for the depth charge design and the many environmental and field tests, culminating in the BuWeps-OpTEvFor evaluation.

It still remained for the Project Manager to integrate the whole and in this area the Underwater Ordnance Department office had the lead. W. E. Hicks, Associate Department Head, assumed responsibility for systems analysis. In the early phases, this involved a study of each proposed major component to establish capability of the system against the target and to formulate general description of the characteristics and operation of the components. Throughout the design phase, Hicks' analyses were utilized in making decisions to maximize system capability.

The other major contributor was L. Freinkel, Head of the Technical Planning Staff. A mechanical and electrical engineer by training, Freinkel performed outstandingly by developing the master schedule

(Continued on Page B-4)

Systems Operations Division

The Systems Operations Division developed the depth-charge payload for ASROC and tested not only the complete missile but the missile components, the accessories, and the fire control system—in the laboratory and in the field.

After the early stages of development, most of the flight testing was transferred from China Lake to San Clemente Island. The test range at SCI was developed and instrumented by the Range and Field Branches—a major job in itself. This job had to be repeated again and again as the development progressed and the requirements for test facilities changed: a new test site at SCI, a special-purpose test range at Walker Lake, Nevada, then the Bureau of Ordnance (now Bureau of Naval Weapons) Technical Evaluation on the West Coast. Finally, the concurrent evaluation by the Bureau of Naval Weapons and the Operational Test and Evaluation Force was planned, equipped, organized, and instrumented.

It is difficult for someone who was not a member of the team to imagine the amount of work involved in the preparation and execution of even a single test series. It all begins with logistics: missiles and associated instrumentation, ships, aircraft, spare parts and the men who must fly, sail, plot, calculate, fire . . . Before and during the tests scores of engineers and technicians from Pasadena, China Lake and various cooperating activities had to be coordinated.

And then the tests themselves—highly complex operations requiring missile assembly, equipment checkout, firing at a target, data recording, and subsequent data analysis. The real results of a test series are the problems uncovered, and the most valuable contribution of the men who do the testing is to identify these problems.

The ASROC tests revealed many problems. One of the biggest gave the Systems Operations Division an opportunity to make a particularly valuable contribution. After the ASROC Weapon System had been installed aboard the USS NORFOLK and the evaluation had started at San Clemente Island, the attack console in the fire-control system developed weaknesses which could be corrected only by a major design modification. In this critical situation the Electronics and Instrumentation Branch mobilized its resources. After many weeks of hard, persistent effort in cooperation with General Precision's Librascope Division, the computer was redesigned and satisfactorily tested.

The Laboratory Branch, too, played a major part in testing the critical components under simulated land and sea conditions associated with transportation, handling, and storage. The tests included shock, vibration, high and low temperatures, humidity, salt spray, fungus and high-energy radiation. These tests furnished indispensable information for the writing of procurement and acceptance-test specifications.

SYSTEMS DEVELOPMENT DIVISION—Major roles in ASROC development wre played (l. to r.) by Ed Perry, Head, Fire Control Branch; Paul Warnshuis, Head, Analysis Branch; E. B. Osuch, Head, Systems Branch; Paul Reichert, Head, Engineering Branch; Don Cozen, Division Head; and Jesse Rowe, Head, Airborne ASW Branch.

Propulsion Division

Propulsion Division contributions to ASROC development were in the field of aerodynamics. Studies to determine the aerodynamic configuration of ASROC and to obtain its performance from theoretical considerations were made.

The basic aerodynamic design was determined to meet specific requirements of range, dispersion, and cross-wind sensitivity. Computations concerning the effect of thrust and fin malalignment during motor thrust phase were made. The effect of slow roll in reducing dispersion, together with the design of canted fins for developing this roll, was studied. Full trajectories from motor ignition to water impact as a function of quadrant elevation angle and parachute deployment time were determined.

Henry Yerby began preliminary studies while with the Systems Development Division and continued them after joining the Propulsion Division as Head of the Hydrodynamics Branch.

SYSTEMS OPERATIONS DIVISION—Viewing a scale model of ASROC (l. to r., front row) are: Milt Blatt, Head, Laboratory Branch; D. A. Kunz, Division Head; and Frank White, Associate Division Head. Back row (l. to r.): Joe Taber, Head, Range Branch; John McCool, Head, Electronics and Instrumentation Branch; and John Phillips, Head, Field Branch.

Torpedo Development Division

The torpedo payload for the ASROC system is the Torpedo Mk 44 Mod 0. NOTS has had technical direction of the torpedo since 1957 with the General Electric Company as prime contractor with design cognizance.

The group exercising this technical direction for the Bureau of Naval Weapons is in the Torpedo Development Division, headed by C. G. Beatty. Jim Smith, Associate Head of the Division, was Project Manager at NOTS for the effort at the General Electric Company. He has spent, and is continuing to spend, many hours "on the road" providing the vital direction and communicating and coordinating links so necessary for the effective progress of widely scattered activities.

Morton Heinrich, Head, Torpedo Operations Branch, was the focal point for the development work carried out at NOTS and was the technical expert for the torpedo. Md. Heinrich and the branch were actively involved in the development program. Many torpedoes were prepared and launched and the run records analyzed to establish the reliability and performance necessary for the ASROC system. Jack Kindred spent many weeks away from NOTS providing on-the-spot guidance and review of the proofing program at Keyport, Washington, and the evaluation at Key West, Florida.

John Sandy, Head, Analysis Branch, carried out performance analysis in order to provide data to accurately predict the ASROC system performance with the torpedo.

The torpedo group of the Bureau of Naval Weapons provided very effective over-all program management. Most directly involved in the early stages of the program management at BuWeps were Capt. R. C. Gillette and LCdr. F. C. Watson. C. S. Sandler was the senior civilian concerned directly with the program, providing the necessary management background carryover when Capt. Gillette and LCdr. Watson left the Bureau for other assignments. Cdr. L. Keator took over and saw the weapon successfully evaluated at Key West. John Lynch was Project Engineer at BuWeps for the torpedo and essentially has seen the project through from the time at was an idea until it was in production. This team and the very competent technical group of the General Electric Company, Pittsfield, Massachusetts deserve the credit for the effectiveness of the torpedo payload of this ASW system.

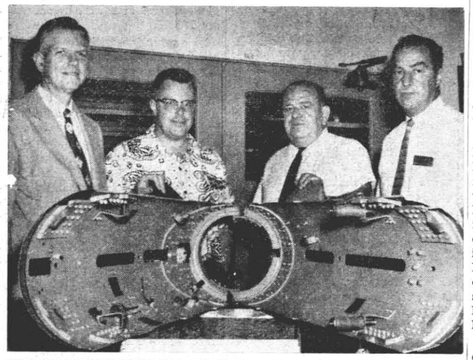
Taking the torpedo and depth charge from high in the air after the airframe has done its job and putting them in the water with varying degrees of gentleness, depending upon the payload, is the work of the accessories. The accessories had a rather varied history with a number of contributors. However, the final designs were the responsibility of a branch in the Torpedo Development Division headed by Ray Karp. Ed Donoghue helped plan the tests and review the designs and Riley White traveled wherever the tests were being carried out to be sure the accessories were on hand at the proper time and were installed correctly.

Guidance and Control Division

Providing design assistance involved six extensive simulation analysis programs on the ASROC payload. Analysis of over 6,000 simulation homing runs were made, disclosing significant technical changes needed. Simulation runs in conjunction with sea runs provided a means of establishing required performance criteria.

In addition, valuable technical data were obtained from simulated launching of two torpedoes against the same target and evaluation of analysis that gave the torpedo hit probability for water entry points relative to specific submarine depths, speeds, and maneuvers.

The task of analyzing and predicting the underwater trajectory of the ASROC depth charge was assigned to the Guidance and Control Division. A preliminary hydrodynamic analysis predicted a desirable underwater path. However, when dummy vehicles were launched, the underwater trajectories hooked sharply. Results from a model study showed that no lift was produced by the tail until the angle of attack became large. A computer study verified that this "deadband" would account for the unstable behavior of the missile. This was eliminated by changing the cross-sectional shape of the tail fin.



PRODUCT ENGINEERING DIVISION—(above) A finished ASROC airframe is viewed (l. to r.) by J. H. Jennison, Division Head; H. Humason, Engineer; F. A. Anderson, Head, Manufacturing Branch; and D. Veronda, Head, Materials and Process Branch. (below) Some personnel responsible for documentation, illustration, and packaging (l. to r.) are J. H. Wolf, Head, Editorial Section; C. C. Campbell, Head, Publications and Photography Branch; N. Horn, Head, Packaging Section; D. W. Anderson, Head, Product Engineering Branch, with a typical multicolored visual aid in the background and a set of ASROC technical documents in foreground. Absent is T. F. Gautschi, Associate Division Head.

Product Engineering Division

Product engineering is often teamed with development engineering here at NOTS, and never more effectively than in the ASROC program. Early in the development stage, the proposed designs were critically examined for producibility, economy, and ease of manufacture. Engineers and production specialists succeeded in designing an airframe that could be produced at half the cost of the original development model. In major parts, a 60 per cent cost reduction was realized; other savings were achieved through simplification of components and assembly processes.

The Product Engineering Division's involvement in ASROC was diverse; coordination of contractor-NOTS relationships, selection of materials and processes, development of containers and handling equipment, final production-model design, documentation, and quality control during development. Engineering the ASROC missile for production was accomplished through teamwork with the Station's Engineering Department, development groups, and the contractors. Savings were achieved in the production cost of the airframe, the motor chamber, the torpedo and depth-charge air stabilizers and nose caps, and in the many containers necessary for storing and shipping the complete missile and its various components.

Concurrent with all this, the Division coordinated the technical direction of the prime and subcontractors, and the liaison so important for team effort.

Aviation Ordnance Department

Development of the Range and Airframe Separation Programmer (RASP) for ASROC is the story of what can happen to an idea with a six months' deadline and handled by a well-directed engineering team effort.

Dr. Wm. B. McLean, Technical Director of NOTS, first foresaw the possibility of the magnetic integrator, a saturable magnetic core device developed by Aviation Ordnance Department, when ASROC critically needed an accurate control unit.

At Dr. McLean's request, Dr. N. E. Ward of the Aviation Ordnance Department assigned to J. A. Crawford, G. R. Lewis, and W. H. Woodworth of the Missile Development Branch the crash task of developing breadboard circuitry for this control unit, based on the magnetic integrator, and thereafter called RASP. At the same time, the mechanical design of RASP was assigned to W. O. Worth and E. J. Roth of AOD's Engineering Design Branch.

Within two weeks the breadboard circuitry for RASP was developed and successfully demonstrated before a Control Unit Committee, who accepted it at once over a competing model.

The men who developed RASP in this whirlwind fortnight admit fairly that they had help to begin with from previous work on the Bomb Director System Mk 10. The RASP is the "brain" of the ASROC. For instance, just before firing, the shipboard equipment sets into the RASP the desired missile speed and airframe separation time (AFS), then fires the missile. After the launching, the RASP integrates missile acceleration until the set-in speed has been reached, then explodes the detonator that separates the motor from the airframe. When the present AFS time is reached, the RASP blows another set of detonators that separates the payload from the airframe.

ASROC missile firings incorporating RASP began at China Lake in July 1956, on G-2 and K-3 ranges, and on the SNORT track. Seventy-seven firings, from both stationary and moving launchers that simulated shipboard wind conditions, gave ballistic data results that showed better accuracy than specified requirements. Meanwhile, AOD personnel assisted in RASP installation, missile assembly, and checkout at the San Clemente Island RASP firings in the fall of 1957.

The first firing of contractor-produced RASP units on the SNORT track at China Lake occurred in 1957. The units were recovered, checked out, and successfully fired in ASROC missiles.

While RASP was proving out in a manner exceeding expectations, the men in the Missile Branch were already designing and developing circuitry for RASP shipboard and test equipment, which resulted in two units, the Relay Transmitter Mk 43, and the RASP Test Set Mk 361. The relay transmitter automatically tests RASP operability when a missile is selected for firing and prevents ASROC from firing if the RASP is defective.

In 1958, Messrs. Crawford, Woodworth, Lewis, Cunningham, and Seibold of the Missile Development Branch developed two prototype models of the transmitter for experimental use on G-2 and K-3 ranges while the contractor fabricated the production model for shipboard installation. The hardy prototype models fired more than 100 ASROC missiles.

After completing all circuit development on the RASP and test set, responsibility for further work was transferred to the Engineering Department.

The same men who comprised the main assault wave on the development of circuitry for the three units also maintained liaison with contractors engaged in the configuration and production of these units.

Adding substantially to AOD's contribution were personnel in Development Division 3 and the Aircraft Projects Division who assisted UOD in a program of ASROC payload airdrops. The over-all goal of this program was to determine the flight stability of the ASROC payload after its release from the missile.

To check out the ASROC payload retarding system as a phase of the program, the Naval Air Facility at China Lake furnished the AD-5 aircraft and pilots, and personnel of the Aircraft Instrumentation Branch, under the direction of Dick Chatterton, instrumented and checked out the plane.

Lyn Barker, of what is now the Aircraft Weapons Branch, and his assistants furnished technical direction in all program test flights from China Lake. Flights were made on China Lake ground ranges and C-range, and from the Long Beach and San Clemente sea ranges.

Other Support Areas

In this Station development program most support areas have contributed to the project in providing support services.

Central Staff supported the ASROC program in the preparation of the budget estimates, the disbursing of funds for payroll and project costs, the accounting of project and task costs, and in the periodic reporting requirements of the BuWeps Research and Development Management System Reports calling for technical briefs and technical life plans for all tasks assigned to the Station.

Personnel and Community Relations Department directly supported the technical effort by providing advice and assistance on employment, position classification, and utilization of personnel.

The program required much travel and communication which was serviced by groups in Command Administration Department at China Lake and Administration Division at Pasadena. The Naval Air Facility provided services in supporting tests.

Research Department

Initial dynamic analyses of ASROC were performed for the Surface Weapons Division by the Dynamics Branch (now Code 4065). Studies, utilizing analog and digital computations, were made of missile trajectories and dynamic characteristics by A. A. Fojt and J. C. Smith.

Range tests, physical characteristics of the missile, and metric photographic data were monitored and the data analyzed and prepared for later use by the Naval Weapons Laboratory, Dahlgren, in computing required firing tables.

Participating in the original ballistic firings were W. B. Porter, John Tretheway, Roger Hilleary, E. F. Winkel, and W. R. Haseltine.

Weapons Development Department

The Weapons Development Department played an important role in the development of the ASROC concept and prosecution of the development of two major component systems for the ASROC missile. The Surface Weapons Division headed by B. Smith, with James Bartling and George Cleary as managers of Task Team 1, initially directed the total China Lake effort.

The rocket motor development team, consisting of Charles Bernard, Norman Osborne, Richard Tolkmitt, Edward Creer, Anthony Simshauser, and Orville Saholt, was under the direction of Branch Head Donald Stoehr.

The rocket motor, although state-of-the-art in the majority of its features, contained the largest rocket motor grain ever made at the NOTS propellant processing facilities. It incorporated for the first time a new and novel method of range control which was a key factor in the development of a simple ordance quality ASW weapon system.

The major milestone in the development of the rocket motor was the production of a field-firing quality rocket motor for initial system tests and the final design of the range control method within a period of six months after the program was initiated.

The Weapons Development Department feels that the excellent cooperation between the China Lake Pilot Plant and the rocket motor designers provided a propulsion system of outstanding quality and that the meeting of these time scales was jointly the results of both departments' maximum efforts. This excellent cooperation has persisted through efficient and well-coordinated introduction of the rocket motor to production by the Naval Propellant Plant, Indian Head, Maryland.

In late 1958, the Department's motor evaluation program was turned over to the Engineering Department. Willingness and cooperation of the Engineering Department for several preceding months in the program resulted in a minimum dual department effort and well-coordinated continuation of the ASROC program.

The depth-charge fuze was the other major ASROC missile component developed by another WDD team experienced in fuzing design, consisting of Charles Dye, Roy Compton, Robert Chew, Nick Kleinschmidt, Jack Billups, Paul Rainsberger, Bob Dudley, Louie Alpert, and Bob Mammano.

The requirements for handling safety and operation reliability, although severe, were thoroughly evaluated in 30 months. This necessitated several system and subsystem tests that were conducted in conjunction with UOD and utilized the facilities at NOL, White Oak, San Clemente Island, Morris Dam, Walker Lake, and the China Lake K ranges.

These systems required the design of instrumentation consisting of FM/FM telemetry, magnetic recorders, and explosive caps to determine the accuracy and operability of components and their interactions within the system. The high percentage of data recovered from these tests was instrumental in keeping the number of firing to a minimum.

In addition to the subsystem tests conducted in the field, an extensive environmental test program was conducted to qualify each fuze component. Analysis of test data indicated that the original design goals of high reliability, handling ease, operational safety and simplified test procedures, were adequately met.