

# ALL HANDS



JANUARY 1978



# ALL HANDS

THE BUREAU OF NAVAL PERSONNEL CAREER PUBLICATION

JANUARY 1970 Nav-Pers-O NUMBER 636

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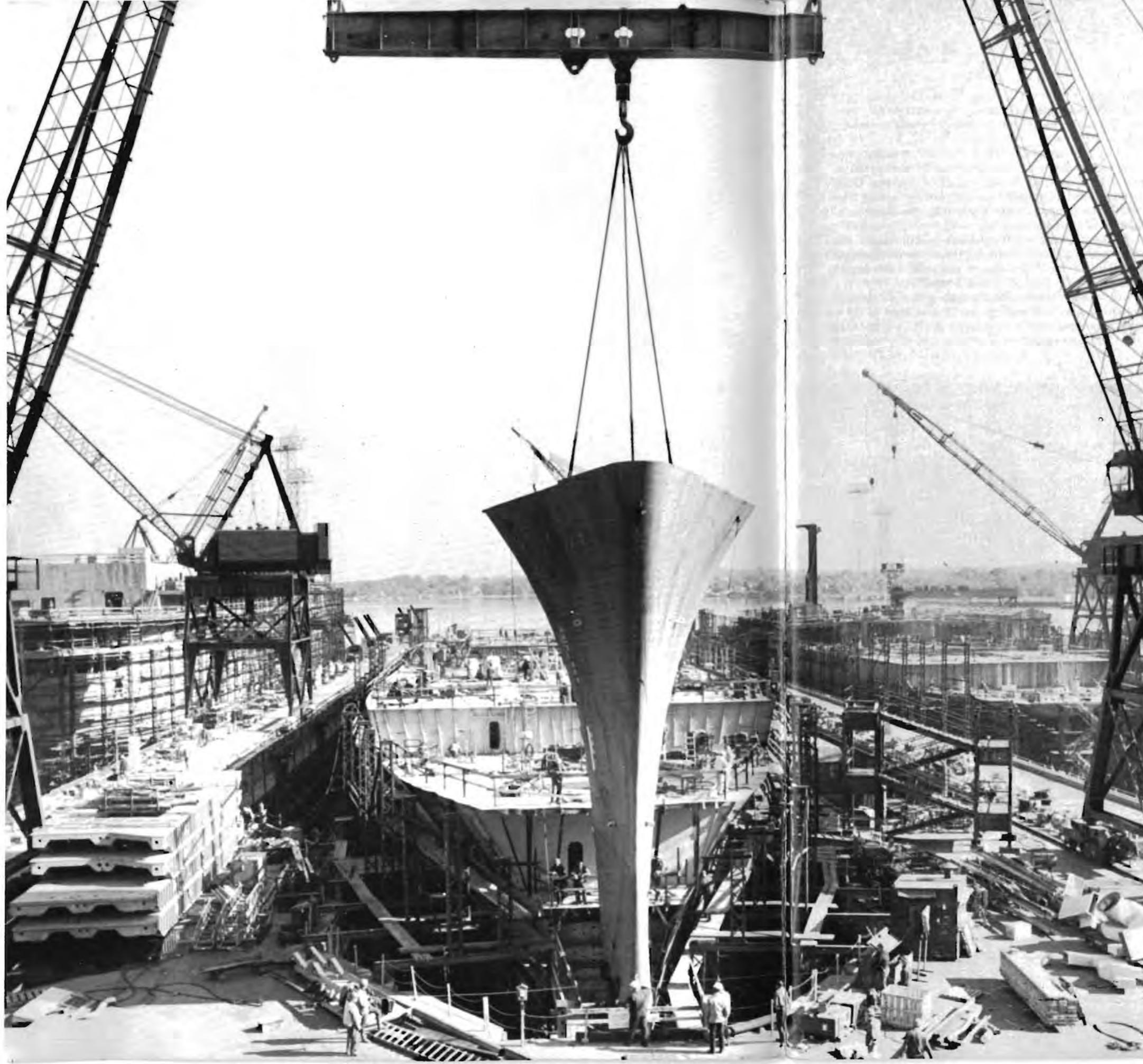
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• FRONT COVER: TOP SIDE—Nuclear-powered attack submarine USS Sunfish (SSN 649) cruises surface of Atlantic. This Sturgeon class sub is especially designed as an antisubmarine weapon.

• AT LEFT: GROWING UP—Taking her bow, one weighing 67 tons, is the U. S. Navy dock landing ship Portland (LSD 37), under construction at Quincy, Mass. Portland is named in honor of the cities of the same name in Maine and Oregon. The 555-foot vessel is the first of four sister ships, designed to support amphibious assaults, to be built at Quincy.

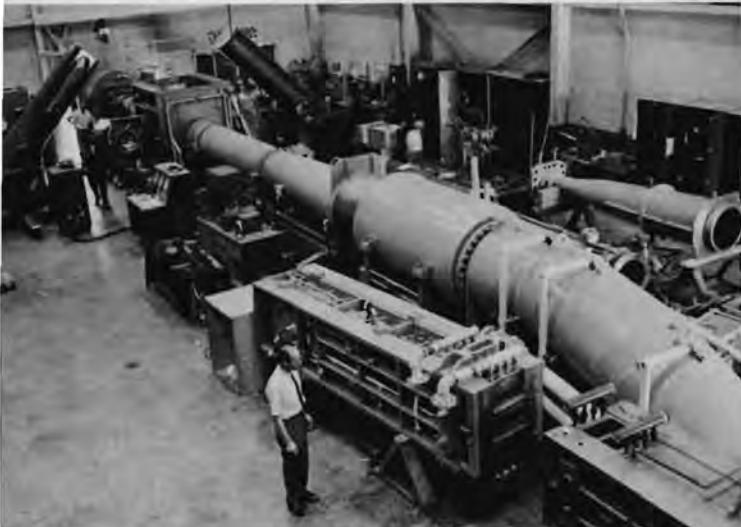


THE always forward looking Naval Ordnance Laboratory indulged itself in a little nostalgia last year—it looked backward to its founding half a century ago, in 1919.

NOL, as it is usually called, started out as the Mine Unit under the technical direction of the Bureau of Ordnance (now the Naval Ordnance Systems Command). Like many other naval activities it was born in the Washington Navy Yard, then the location of the Naval Gun Factory.

In those early days there were growing pains and other problems. For example, there are recollections of a budget for depth-charge research, back in the 20s, which was limited to \$25 a month.

But, despite financial difficulties and a shortage of personnel, the unit carried on. In one field alone of vital importance the lab managed to retain a cadre of mine and fuse experts who were to find ways to coun-



NOL hypersonic wind tunnel attains speeds up to Mach 10.



Lab Reps developed minipad for ATC.

# **NOL Soars Into The Future**

teract Germany's new magnetic mines and blockade Japanese shipping in the second World War.

But that's getting ahead of the story.

A building, dubbed appropriately enough the Mine Building, was constructed to house the newly born Mine Unit (in 1919), and later a sister group, the Experimental Ammunition Unit. Although they occupied the same building, the two units operated on a more or less independent basis. Both were under the administrative control of the Gun Factory and their work was performed under the technical direction of the Bureau of Ordnance.

A closer union came about in 1929, when the Bureau of Ordnance decided to consolidate the units, and to broaden the scope of their work.

To reflect the new mission, the organization was named the Naval Ordnance Laboratory, and that's the beginning of NOL as we know it.



Model of the NOL hydroballistics tank building.

DURING THE EARLY YEARS the Laboratory had been headed by a naval Officer in Charge, who was advised on technical matters by a chief physicist. The pattern was set for the system of dual management that has continued to this day.

The late 20s and early 30s were lean years financially, but the corps of scientists was hard at work. Developing mines to protect our coasts and shipping was one of its big missions.

In 1938 the Laboratory was big enough to be separated from Naval Gun Factory control, although it remained a tenant activity at the Navy Yard.

With the approach of World War II, the work of the Laboratory was accelerated, and turned from developing mines to countering the new magnetic mines being used by the Germans. This was a deadly new naval weapon against which the United States Navy had no defense.



Steel vacuum sphere, dedicated in 1949, set former speed record for wind tunnel research. Below: Explosive developed by NOL allowed lunar module to descend to and ascend from the moon, thereby aiding in the success of Apollo 11.



The Laboratory first concentrated on the study of ships' magnetic fields, and built its first magnetic field facility to permit the study of degaussing techniques by using scale models of real ships. In this manner more refined degaussing techniques were developed.

Degaussing consists of winding certain parts of a ship with coils of wire through which electric current is passed. This current is controlled and adjusted so that the magnetic field set up is opposite to the ship's normal field, and partially cancels it. This reduces the range at which a magnetic mine can detect a ship.

In addition to the completion of the degaussing program for both the Navy and Merchant Marine, NOL designed approximately half a hundred different types of mines.

The development of magnetic, acoustic, and pressure-firing mechanisms for mines was to make possible the effective blockade of Japanese waters in the spring and summer of 1945.

played an important role in destruction of the Japanese air arm.)

At the height of World War II, NOL was bursting its seams at the Navy Yard. In 1944 land was purchased for the Laboratory at White Oak, in the suburb of Silver Spring, Md.

The cornerstone of the main Laboratory and Administration Building was laid by Secretary of the Navy James Forrestal in 1945. During the next three years the major part of the Laboratory was constructed.

When World War II ended, two German wind tunnels were sent to NOL's White Oak home for research study. They were rebuilt and modernized. The "re-commissioned" tunnels were dedicated in 1949.

The wind tunnels were able to simulate air speeds of Mach five and were regarded as being among the more advanced aeroballistics research tools of their kind in the world.



The Mine Building at the Washington Navy Yard was NOL's first home. Rt: NOL today.



**I**N THIS BLOCKADE CAMPAIGN, U. S. planes laid over 13,000 mines which sank or seriously damaged two million tons of Japanese shipping, throttling almost completely seaborne commerce in Japanese home waters.

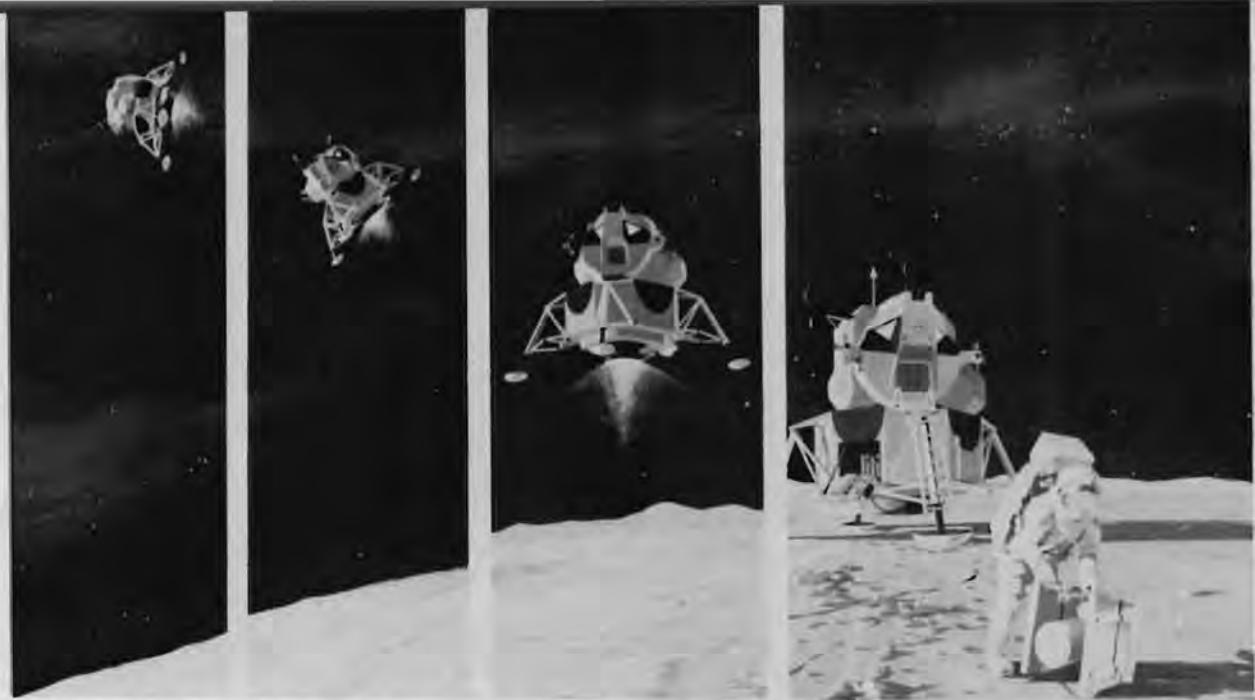
Another outstanding achievement of the Laboratory was in the field of fuzes. The fuze then being used presented production difficulties because it was complicated and expensive. The answer was a simpler fuze, but there was little time to work on a design—the deadline was a matter of days, not weeks or months.

At this point, an NOL scientist presented a sketch of a new fuze. Simple in design and ideally suited to mass production, it appeared to fulfill all functional requirements. It proved to be 99.9 per cent efficient, and it is estimated that the savings effected by the adoption of this fuze totaled approximately 250 million dollars. (It was used against the kamikazes and

**N**OL'S SCORE in the field of ordnance devices and equipment is indeed impressive. Included among its developments are 22 mines for which NOL is the Navy's sole developing agency. It did pioneering work in the field of antisubmarine depth charges and produced numerous types of fuzes for rockets and a variety of ordnance equipment. It supplied warheads for missiles. Its range of work extended to pyrotechnic devices, and the arming and fuzing mechanisms for *Polaris*.

NOL was responsible for the concept of *Subroc*, a submarine-launched, rocket-propelled, inertially-guided, depth charge for long-range destruction of hostile submarines. NOL conducted feasibility studies, and provided technical direction during its development under contract.

Over the years NOL has found it necessary to expand its facilities and add new ones.



NOL developed an explosive to release LM landing gear uplock, sever the umbilical bundle, permit the LM to ascend, and finally set the LM and ascent stage adrift after the astronauts' return to the command module.



A parachute-laid mine is tested. Rt: Supersonic wind tunnel, dedicated in 1949, shows behavior of projectiles fired into it.

A larger magnetic field facility has been constructed, this time entirely of nonmagnetic materials, even to the nails that hold the building together. Used primarily to design degaussing coils for Navy ships, the facility is capable of simulating the magnetic conditions peculiar to any part of the earth or moon. It is frequently used to make prelaunch magnetic measurement tests of space satellites.

WHEN THE NASA astronauts made the *Apollo 11* moon landing, an explosive developed by NOL was used to permit the descent and ascent of the astronauts in the LM (lunar module). This was done by three cutting operations which: first, released the landing gear uplock; next, severed the umbilical bundle, thus separating the ascent and descent stage of the LM to permit the ascent stage to return to the command module; and finally, after the astronauts were back aboard the command module, set the LM and



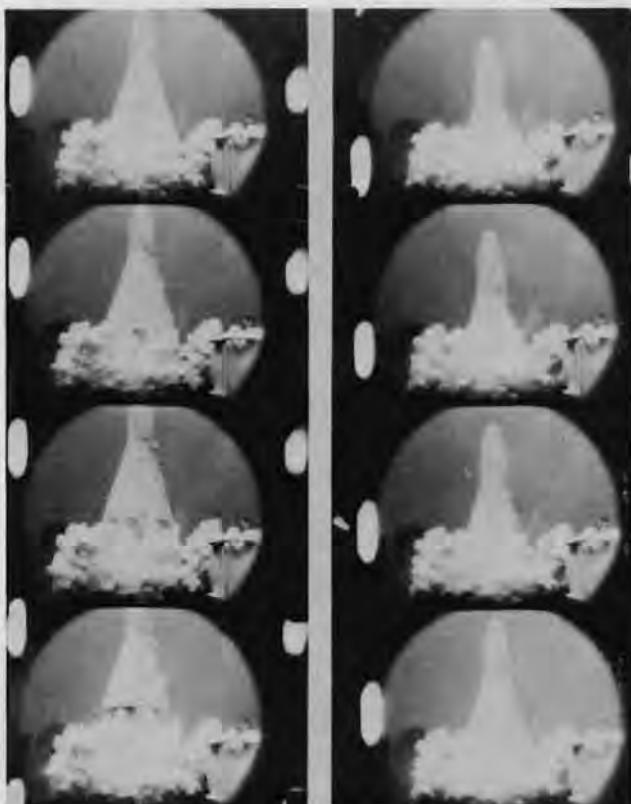
the ascent stage adrift in space after separating them from the command module.

NOL has aeroballistics facilities which make it a modern center for research and development in the sciences of aerodynamics, hydrodynamics and ballistics. The wind tunnels and ranges are capable of measuring aerodynamic drag, stability and heating effects at speeds up to and beyond Mach 10.

A hypervelocity tunnel, due for completion in 1971, is expected to be able to reach speeds of Mach 20.

With its 1,750,000-gallon hydroballistics tank, studies can be made of powered, scale models of submarines and torpedoes.

In its program to develop improved materials for ordnance applications, NOL has created several new magnetic materials that have been made available to industry for both civilian and military applications. Use of these materials has greatly improved the characteristics of such devices as magnetic amplifiers,



NOL supplied arming and fusing mechanisms for Polaris.



The 100-foot underwater weapons test tank at NOL holds some 1½ million gallons of water.

magnetometers and electromagnetic transducers.

A new metal with a memory which returns it to its original shape after being heated also came from the Naval Ordnance Laboratory. If distorted, it "remembers" its shape, and returns to it when heated. This alloy has potential for use in erectable structures for outer space and hydrospace. Another form, which has hardening qualities comparable to steel, is being used to make nonmagnetic handtools and related items for underwater ordnance applications.

**N**OL HAS PIONEERED in the use of "massive glass" for deep submergence vehicles. (See *ALL HANDS*, February 1965.) It is continuing to research and test glass materials for underwater applications.

In NOL's glassblowing lab, glass tubing is fashioned into one-of-a-kind scientific devices. The result may be a very simple chemical apparatus, or an intricate gas laser, or diffusion pump for producing high vacuum.

NOL is the East Coast Coordinator for Naval Laboratories in the Vietnam Laboratory Assistance Program, and has sent many of its personnel to Vietnam as Laboratory Representatives—better known as Lab Reps—to provide liaison and act as technical experts.

Lab Reps have even come up with solutions to problems with a twist of the wrist and a bit of baling wire.

One example is the development of a minipad for a medevac helicopter.

Alerted to the desire for a way to land a copter on an armored troop carrier, NOL's Lab Rep came up with the makings of pipe and steel mat, (which were at hand) and within two weeks had a trial pad.

On the next mission, after debarkation of troops, the helo pad was readied for the copter. The wounded were ferried from the battle zone to the boat. After unloading, the copter took off, and the boat rushed the troops to the base hospital. The minipad was an immediate success, and has served as a model for the construction of others.

Stemming from its early days as the "Mine Unit," NOL today is headed by a naval officer, entitled Commander, and a civilian Technical Director.

For the most part a civilian-staffed organization, NOL has a working corps of scientists and engineers carrying out basic research and engineering support missions for the Fleet.

Ordnance Application Officers are assigned in a staff capacity to the offices of the appropriate technical directorate. These naval officers, having considerable Fleet experience and being specialists in the field of ordnance engineering, advise and assist in the practical applications of ordnance under laboratory development to meet the needs of the Fleet.

In addition to the 730-acre reservation at White Oak which the laboratory occupies, it operates an acoustics research facility at Triadelphia Lake, Md., and three subsidiary "test and evaluation" facilities.

This—in a nutshell—sums up half a century of NOL. The past 50 years have set the pace, and the Laboratory expects to make even more progress in its next half-century.



USS *Samuel Gompers* (AD 37) tends brood in Southeast Asia.

# Floating Foundry



Molten bronze is poured from furnace.

Induction furnace is readied for activation



**I**N A BRIGHTLY GLOWING stream, molten bronze pours from the furnace into a ladle. Two sweat-dripping men carry the ladle to a mold. They tip it, and the amber liquid splashes into the crevices of the mold, then settles to cool.

The scene is the foundry on board the destroyer tender *USS Samuel Gompers* (AD 37), where the ancient art of casting metals is used to make repair parts for ships of the modern Navy.

The foundry, one of 55 specialized shops on the ship, is capable of producing parts of steel, aluminum, bronze, monel alloy, or virtually any other metal.

Metal casting requires skills not often found in an age of automation. Molders must construct their patterns and molds with careful, tedious handwork to bring them to specifications; then they must know how to handle the hot metal to achieve the desired results.

Molder 2nd Class Jerry Clark of the *Gompers* foundry sums it up: "It's hard, dirty and hot, but it's something that has to be done."

Molders pour bronze into mold.





U. S. Navy Signalman 3rd Class Allen Hovik checks his Spanish language guide during UNITAS X during lull in communications. Below: A U. S. and Colombian destroyerman apply destroyerman's talent during a civic action project. Right: Members of UNITAS X get underway from San Juan, Puerto Rico. Far right: Colombian sailor sends message to USS Leahy.



# UNITAS

## Ten Years of Cooperation

FOR THE 10TH STRAIGHT YEAR, U. S. and South American navies cooperated in the recently completed UNITAS.

All of the participants engaged in learning and refining tactics of ocean control and antisubmarine warfare. And meanwhile, the United States gained goodwill with the people—sailors and civilians—of the Latin nations involved.

While the U. S. ships maneuvered with their South American counterparts off the coast, a Navy band toured the interior of various countries. And when the ships pulled into port, North and South Americans continued to combine their efforts in civic action projects, sports and recreation.

Last year's exercise, UNITAS X, began in July when four U. S. ships left San Juan to begin a 19,000-mile counterclockwise cruise around South America. Ships of eight South American countries joined them for various parts of the cruise, scheduled to end in December.

The U. S. ships are *USS Leahy* (DLG 16), *USS Sarsfield* (DD 837), *USS J. K. Taussig* (DF 1030) and *USS Grampus* (SS 523).

The combined task force was directed by Rear Admiral James A. Dare, Commander South Atlantic Force, U. S. Atlantic Fleet. Operational command of exercises was rotated among senior officers of the participating navies.

ALTOGETHER, some 50 ships, 70 aircraft and 15,000 men of the nine navies of North and South America took part in various UNITAS exercises. In some phases, 20 ships from four countries have operated together at the same time.

Typically, an American destroyer may have detected a submarine (*Grampus* or a sub from one of the other navies), reported to a Uruguayan captain, and then joined Brazilian and Argentine destroyers in tracking it down. Men speaking three languages were



involved; but the exercise went smoothly and efficiently.

Sometimes submarines joined the surface ships in hunting their own kind with simulated rocket, depth-charge and torpedo attacks.

In other training evolutions some of the UNITAS ships played the role of a merchant convoy while others protected them—by avoiding submarines if possible, or by keeping them at bay or attacking if they appeared.

Ocean control was another facet of ASW practice. The task force patrolled an ocean area so that friendly ships could pass but hostile vessels could not.

Convoy defense and ocean control often included antiaircraft warfare. UNITAS ships practice confrontations with airplanes, and had to "down" the attackers without help from friendly aircraft.

**F**OR SOME OF THE COUNTRIES, participation in UNITAS is the high point of their annual training schedules. U. S. know-how and their own practice combine to provide the best in-depth training in ASW and ocean control available.

And sometimes the training is put to use in unexpected ways. In 1962, when President Kennedy imposed a quarantine on communist Cuba against the importation of offensive weapons, some nations participating in UNITAS offered ships to help the U. S. blockaders in a demonstration of inter-American solidarity.

However, no treaties or alliances affect the operations. Each year's program is decided at a conference among the participating navies according to their own convenience. All friendly nations are free to participate or not, as it suits them.

**T**HE SOUTH AMERICAN COUNTRIES participating in UNITAS X last year were Argentina, Brazil, Chile, Colombia, Ecuador, Peru, Uruguay and Venezuela.

Navies taking part had four stated objectives:

- To test the effectiveness of the elements, individually and together, in ASW and ocean control tactics;
- To exercise the multinational force to gain experience in joint operations;
- To plan for possible future situations that would require combined efforts, such as threats by forces from outside the Western Hemisphere;
- To generate goodwill and friendship between the participants.

That last objective is evidently present among the men of the navies involved. They gain respect for each other as they work together at sea—and then learn to like each other on liberty in the task force's ports of call.

The U. S. Navy show band exemplified inter-navy cooperation as it performed in official ceremonies and parades. But the greater part of the mission of the band was in its contact with the civilian people.

The band toured countries while the ships were at sea, performing in inland towns, many of which had never had contact with North Americans before. In town squares and bullrings, the troupe presented programs of local popular songs, show tunes, singing, dancing and comedy skits.

The music ambassadors made it a point of pride to play their host country's national anthem at each performance. (Usually the audience—often led by high government officials—sang along.)

**A**ND THE NAVYMEN from the ships did their part for good relations.

First they made friends by their good behavior ashore. Open house on board U. S. and other ships gave local people a look at the navies. The children, naturally, loved the ships—and their parents were impressed.

The North Americans formed sports teams to compete with citizens of their host countries. Predictably,

the basketball and baseball teams did well—and the soccer teams were overwhelmingly defeated. But they all added to the developing friendship between neighbors from north and south.

Project Handclasp helped too. Navymen distributed everything from candy to vitamins to school supplies for the benefit of children of the South American countries.

And Navymen with experience as carpenters, plumbers, or painters helped build or refurbish schools, clinics, and other badly needed service institutions.

#### WHY IS UNITAS necessary?

All the nations of the Americas except two border on the sea. They all need to keep the sealanes free and to defend their coastlines.

The prime purpose of all navies was defined by a former South American naval minister: "The defense of maritime traffic is our greatest concern."

Maintaining a high standard of living requires any nation to import products it needs and to export those which are in demand elsewhere—which means free passage of merchant ships.

It is in all countries' interests for the sealanes to be kept open. The vast areas of sea and the long coastline

—12,000 miles—of the eight South American countries participating in UNITAS make combined defense essential.

Antisubmarine warfare training is part of this defense—but not only because submarines can threaten shipping. Equipped with missiles, modern submarines can also imperil cities from hundreds of miles at sea.

It is of common interest to the U. S. and its southern neighbors to defend this hemisphere against threats to shipping, which unites the hemisphere by trade, and against threats to the land and people.

The forces of the Americas must be coordinated and integrated to guarantee free trade and sovereignty throughout both continents. UNITAS helps to do so.

And beyond the military advantages, UNITAS also helps people of the two continents to get to know and like each other.

For ten years, it has been discouraging enemies—and at the same time winning friends.

UNITAS TOOK AMERICAN NAVYMEN to more than a dozen ports, from the swinging metropolis of Rio de Janeiro to the remote Galapagos Islands.

As an example of the friendly reception UNITAS men received the Galapagos are typical.

Very few people ever visit the islands, 500 to 700



Photos clockwise from above left: (1) A Galapagos seal is amused by U. S. Navymen in whaleboat during UNITAS X off coast of Ecuador. (2) ASW officer of the destroyer ARC Almirante Tono discusses UNITAS X operations with USS Leahy ASW officer. (3) USS J. K. Taussig is seen going through Panama Canal; smiling Colombian sailor is Federico Imitola. (4) USS Grampus surfaces during UNITAS X. (5) FT1 Robert Selfridge, of USS Leahy, entertains two girls from Cartagena, Colombia, orphanage.



miles from the coast of South America and just north of the equator. Twice a month a ship brings supplies and a few tourists from Ecuador, and takes away the produce the islanders have to sell.

The islands came to worldwide notice only once—after a young naturalist named Charles Darwin landed there in 1835 and made studies of their wildlife which led him to consider the possibility of organic evolution.

So the arrival of four U. S. Navy ships, an Ecuadorian destroyer and a Chilean fleet oiler was an event of note. The men of the six ships far outnumbered the 800 inhabitants of San Cristobal Island.

Task force sailors went ashore and invited boatloads of people to come out to the anchorage and tour *Leahy*, the UNITAS flagship. The people returned the Navymen's hospitality.

The sailors enjoyed the island's seafood, the broad, clean beaches—and the friendly people.

They delivered donations of medical supplies from U. S. industry to an island hospital, held a party for all 300 children of the island, and presented two band performances—the first concerts the people of San Cristobal had ever had.

The penguins, seals, giant turtles, and iguanas of the Galapagos were memorable. But the men of UNITAS will remember the islands for their hospitable

people. And the people will long remember them.

**I**NTER-AMERICAN FRIENDSHIP means more than just military cooperation; it means people liking people. UNITAS is both.

RADM Dare put it this way in a letter to visitors aboard United States ships during UNITAS X exercises:

"It is with a great pride that we observe this anniversary. It has been a decade noted for substantial progress and cooperation between all the navies of the Americas. Our Navy has been proud to participate in the annual UNITAS exercises and looks forward to another decade of continued cooperation.

"During these operations which began in 1960, your navy has worked with ours and the other navies of South America for the perfection of technical and professional capabilities so necessary for protection of our vast coastlines and defense of maritime routes on the high seas.

"At the same time the great variety of social activities and goodwill which result from the port visits of UNITAS, offer us the opportunity to make new friends, to renew old acquaintances, and better understand the many bonds of friendship which unite our countries."

In a nutshell, that's what UNITAS is all about.

—JO2 Frank Silvey, USN



Photo above left: Ships maneuver in the Caribbean during UNITAS VII. Above: Venezuelan ships in foreground participating in UNITAS VI maneuver into position. USS Norfolk (DL 1) follows U. S. ship into harbor during UNITAS VIII exercises, at left. Below: U. S. and Ecuadorian sailors get acquainted.



**An Inside Look at**

# THE NAVAL WAR COLLEGE

**N**AVY FLEET ADMIRAL Chester W. Nimitz once said that none of the naval battles fought against the Japanese in World War II were unforeseen because they had all been fought in theory with war games at the Naval War College at Newport.

He spoke from experience, for he was both the commander in chief of the U. S. Pacific naval forces during that war and was also one of the more distinguished graduates of the college.



**Luce Hall, the main building of the U. S. Naval War College.**  
**Below: A portion of the Mahan Hall Library.**



The Naval War College from which Admiral Nimitz graduated is, perhaps, the oldest institution of its kind in the world, and is still going strong. Established in 1884, with eight officers in its first class, the college began operations in an old house on Coasters Harbor Island in Newport, R. I.

Today, more than 350 senior officers, with representation from all services besides the Navy, attend a 10-month resident course doing graduate level work in several academic areas.

Navy captains and colonels of other services attend the School of Naval Warfare, doing work that will better qualify them to make high-level decisions. Lieutenant commanders and majors attend the School of Naval Command and Staff, tailored to help them perform as staff officers.

Senior naval officers from 30 foreign countries also attend a special Naval Command Course.

Until the end of World War II, courses at the college were oriented primarily toward naval strategy, tactics and doctrine. Now, such nonmilitary subjects as geopolitics, physical sciences, economics, management and industrial relations are equally stressed.

**W**HILE THE WAR COLLEGE is a military school, there are no by-the-numbers teaching methods used. Students are encouraged to foster original thought in any area they are studying; the use of reasoning powers is considered to be an important by-product of the student's year at Newport.

In addition to a heavy load of regular college work, many students also participate in a cooperative program with one of several universities to earn advanced degrees.

The majority of these officers elect to work toward a master of science degree in international affairs from George Washington University, which maintains a center with a small staff at the War College.

War gaming is still an important study method.

The early war games conducted at the turn of the century used small models moved about on a checkered board-like playing area.

With warfare becoming ever more complicated and ranging over vast areas of the world, this comparatively crude method became obsolete some years ago.

In 1959, the War College installed a multimillion-dollar Naval Electronics Warfare Simulator (NEWS) which allows wartime strategy to be simulated with war games.

Students are assigned to opposing sides and given a description of a realistic military situation. They develop plans, write an operational directive for the plans and then test out their work in a war game.

**A**N IMPORTANT ELEMENT of any battle is, of course, the exercise of command decision. The NEWS is set up so that spot decisions, such as those that might be required in actual combat, can be introduced into the game.

The games may be played to duplicate tactical situations covering small areas or a strategic action involving an area of several thousand square miles.

The NEWS is considered so effective in testing the validity of operational plans that the Chief of Naval Operations uses the facility each year to evaluate one of the major studies under consideration.

The highlight of the academic year is the five-day Global Strategy Discussions conducted in June.

A cross section of U. S. military and civilian executives, about 30 regular flag and general officers, plus the U. S. student body, attend the discussions.

The purpose of the discussions is to deepen the understanding of the participants with regard to the problems facing the United States in the formulation of policies affecting national objectives.

As time passes and the need for officers with higher education in the Navy increases, the Naval War College is expanding.

The present development plan calls for five new buildings which will be needed to accommodate a student body expected to total 700 by 1980.

In addition to the regular officers of the armed forces, there are also two women officers and a Navy chaplain attending the College. This is the first year that women have studied at the College, and the second that a chaplain has attended.

A small group of career civilians from the State, Commerce and other departments of government are also attending the College, and receive the same type of education as do the military officers.

—PHC William M. Powers.



During the Naval War College "Global Strategy Discussions," CNO ADM Moorer speaks before the 700 participants.

Discussing Army operations in Vietnam, Chief of Staff Gen. Westmoreland speaks to the students of the Naval Command Course.



Below: A staff officer at the War College does research in the Mahan Library.

Below left: Navymen hold war games on the Navy Electronic Warfare Simulator.





Film from an RF-8 is rushed to lab for processing.



Chief Richard Smith waits to move over the target area in order to complete mission.



Above: "A" School students use the Naval Schools of Photography building for a subject. Below: "Lights, camera, action," and a story unfolds.



Photo above: Experienced students in Photographer's Mate "B" School are instructed in color processing. Photo below: Small camera parts are repaired in Camera Repair "C" School.



Aerial reconnaissance photos provide vital data.

## NATTU Photo School

**I**N THE HANDS of a skilled photographer, the camera becomes an instrument of unparalleled value. It is a recorder of history, capturing moments no artist's brush could register. With good photographs the reconnaissance pilot will have flown a successful mission, cause of a flight deck accident can be determined, and the accomplishments of the day may be recorded.

The realization of the camera's importance to the Naval Service came in 1915 when W. L. Richardson took pictures of the various activities connected with the Flight School located in Pensacola.

The pictures proved to be so useful that a school to teach photographers was established in 1918 in Miami. The school later moved to Washington, D.C., then in 1923 moved to Pensacola where it is currently located. Today, the Naval Air Technical Training Unit, under the command of Captain John P. Cullen, turns out some of the best-trained photographers in the world.

Training begins in Photographer's Mate School, Class A. There, Sailors, Marines and Waves, for the most part inexperienced in the field of photography, receive 15.6 weeks of basic instruction, encompassing

aviation fundamentals, basic photography and specialized photography (which includes photojournalism, aerial and motion picture photography). Convening every four weeks, the classes consist of approximately 50 students with an average ratio of one instructor for every six students.

During the first eight weeks, instruction is given in photographic theory, training with various types of cameras and equipment, and indoctrination in laboratory procedures. The photojournalism phase of PH(A) School is a three-week block of instruction that introduces the student to the basic techniques of photojournalism and public information photography.

Aerial and motion picture phases, each eight days long, deal with fundamentals of aerial photographic reconnaissance and mapping, and with the techniques of motion picture photography.

**F**OR THE NAVYMAN or Marine, already experienced in naval photography, there is Photographer's Mate School, Class B, a 23.4-week course of advanced study. While in PH (B) School, the student learns about still, color, motion picture, public information, and aerial

photography. With only about 10 students in each class, much individual attention is provided the students in each of the phases of study.

Closely related to the aerial phase of PH(B) School is the 2.6-week Photographic Reconnaissance Officers Course. Selected Naval Aviators and Naval Flight Officers are trained to take aerial reconnaissance photographs, vital to military intelligence. The students are instructed with the use of mockups that involve actual planning, plotting, and flying of photo missions.

Also in connection with PH (B) School, NATTU offers a four-week block of instruction in Applied Sensitometry and Laboratory Techniques. The course, open to officer and enlisted personnel, teaches quality control of photographic processing and printing.

**N**ATTU also has three Class "C" Schools or Courses, which unlike the fundamentals taught in PH (A) School and the advanced techniques taught in PH (B) School, are highly specialized courses.

Motion Picture "C" School, an 11.6 week course, trains personnel from all branches of the service in techniques of operating motion picture equipment.

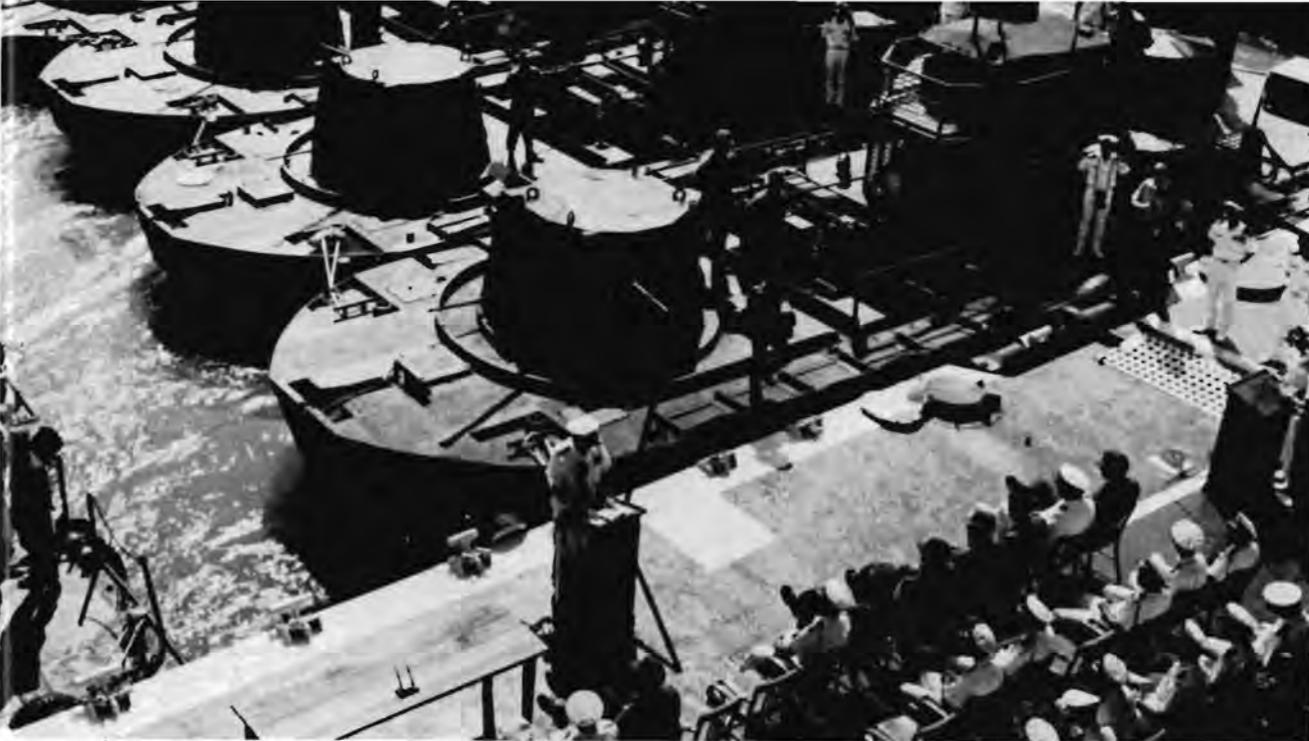
Through expert instructors, the student gains practical experience as director, cameraman, sound technician, electrician and actor, while photographing all types of motion picture coverage, both sound and silent. Combat cameramen, so vital to the Navy's mission in the Atlantic and Pacific, receive their training in the Motion Picture "C" School.

The two Camera Repair "C" Schools are: A 14-week Mechanical Equipment Repair Course (PHER) and a 12-week Photographic Electronics Systems Course (PHES). In mechanical equipment repair, the student is taught to repair shutters, aerial cameras, motion picture cameras, still picture cameras, and basic laboratory and specialized aerial processing equipment. In PHES Course the student is instructed in basic electronics, circuit theory, and vacuum tubes.

The courses at the naval schools of photography are indeed difficult. However, with the many skilled instructors and the finest training aids and equipment, NATTU turns out highly trained photographers fully capable of meeting the heavy demands awaiting them in the Fleet.

-JO3 E. M. Aaron, USN.

*"The Mobile Riverine Force saved the Delta . . ."*



U. S. gunboats are turned over to the Vietnamese Navy during ceremonies aboard MRF flagship USS Benewah.

# RVN Takes Over MRF



U. S. crewmen remove their flag from a riverine craft during the ceremony in which the craft was turned over to the Republic of Vietnam.

THE 11 HUGE, DARK GREEN mother ships and their brood of 180 river assault gunboats which churned the rivers and canals of the Mekong Delta became familiar sights to the area's inhabitants. They were the ships of the Army-Navy Mobile Riverine Force.

Now, only one of the ships remains—the barracks ship USS *Benewah* (APB 35) which served as the MRF flagship. Nestled nearby are a number of small craft representing the Navy's Riverine Strike Force while numerous others, since turned over to the Republic of Vietnam Navy, are scattered throughout the III and IV Corps Tactical Zones.

The MRF, as many U.S. soldiers and sailors remember it, no longer exists. It has been disbanded.

The staff of the MRF, part of 1200 Navymen included in the President's decision to redeploy 25,000 troops from the Republic, flew to the United States late in August. The First and Second Brigades of the 9th Infantry Division were also airlifted to the States and to other duty stations.

The RVN takeover of MRF hardware began in

earnest in February when the first group of 25 assault craft was turned over to the Vietnamese Navy. This was followed in June by an additional turnover of 64 gunboats.

It was in 1967 when the ships and boats began carrying U.S. 9th Infantry Division and Republic of Vietnam soldiers to and from battles to engage enemy units and wrench them from their stronghold in the Delta.

During its 30 months in the Republic of Vietnam, the MRF set impressive records. In the aftermath of the 1968 Tet offensive, General Westmoreland, then CinC, Allied Forces, Vietnam, credited the MRF with having "saved the Delta." This year the joint force received the Presidential Unit Citation and the Navy Unit Commendation for its heroism and remarkable achievement during that campaign.

On typical operations, the Army troops were carried into combat aboard 56-foot armored troop carriers (ATCs), the mainstay of the force. Each could land a fully equipped platoon of infantrymen almost any-



Top right: Vietnamese crewmen man a River Assault Boat and an Armored Troop Carrier en route to Nha Be. Below, right: U. S. men salute as the Republic of Vietnam flag is raised on their riverine craft.

## STEPS TOWARD VIETNAMEZATION

### Barracks Ships Are Back

Painted olive drab instead of the traditional battleship gray, two ships stood out among the numerous Seventh Fleet ships in port at the U. S. Naval Base, Subic Bay, Republic of the Philippines.

The self-propelled barracks ships *USS Nueces* (APB 40) and *Mercer* (APB 39) had completed the first leg of their journey back to the United States for decommissioning.

These two ships, which supported the Army-Navy Mobile Riverine Force in the Mekong Delta, were named among the ships to be decommissioned in connection with the recent budget cut of the Defense Department.

The Mobile Riverine Force was one of the units included in the announcement that 25,000 troops would be redeployed from Vietnam by the end of August.



Five mother ships and their broods of gunboats anchor in the My Tho River waiting for nightfall.

### Modernizing the RVN Navy

Since 1 Jan 1968 (through 31 Jul 1969) the following ships, boats and craft have been turned over to the Vietnamese Navy as part of the U. S. effort to improve and modernize the RVN sea service:

- 1 LST
- 3 82-foot Coast Guard cutters
- 109 River Assault Craft
- 33 Fast Patrol Craft (*Swifts*)
- 80 River Patrol Boats
- 4 100-foot utility boats
- 1 floating workshop barge

These figures constitute about 26 per cent of the planned modernization program for the Vietnamese Navy.



Republic of Vietnam Navymen move out after taking over the river assault craft from the U. S. Navy.

where in the Delta and assist accompanying monitors and assault patrol boats (APBs) in providing gunfire support for the ground troops.

The large ships were divided into two groups, which gave the gunboats and their infantrymen extended staying power in areas where continuing operations would have been otherwise impossible.

The mobile riverine bases not only carried supplies and ammunition for their small craft, but provided air-conditioned berthing and messing, as well as laundry and health services for the soldier and sailor.

In addition to carrying their own weapons, these support craft were equipped with helicopter landing pads which permitted command and control, medevac and gunship helos to land, refuel and rearm when necessary.

When the MRF first moved into the Delta, Army and Navy commanders studied the riverine operations of the American Civil War. In the future, if riverine forces are again needed, perhaps the history of the Mobile Riverine Force operations in the Mekong Delta will provide the textbook for a new generation of military leaders.

U. S. and Vietnamese crewmen stand in formation during the ceremony in which riverine craft were turned over to the Republic of Vietnam.



Eighty U. S. NAVY river patrol boats (PBRs) were transferred to the Republic of Vietnam Navy last October. It was the largest single turnover of naval material thus far, bringing to 242 the number of U. S. Navy craft transferred since June 1968, approximating 40 per cent of the original force of some 550 U. S. Navy craft in-country.

The 80 PBRs were equally divided into four River Patrol Groups (RPGs) which are part of Task Force 212. This task force, commissioned at the time of the turnover, is the Vietnamese Navy equivalent to the USN River Patrol Force (CTF 116) which has the mission of conducting patrols, visits, searches and inshore surveillance on the rivers and waterways of the Delta and in other waterways of the Republic of Vietnam designated by COMNAVFORV.

The PBRs are operating in generally the same areas, using the same tactics, formerly assigned to U. S. Navy craft.

Most of the Vietnamese Navy sailors manning the PBRs received a 12-week course of instruction at the U. S. Navy Small Boat School in Saigon. There they were taught elements of gunnery, engines, first aid, marlinspike seamanship, map and chart reading, tac-

ties and boat-oriented items. They also received a short course in basic conversational English.

After this basic training, each Vietnamese sailor reported aboard a PBR in the field as a relief for a U. S. Navymen and subsequently received more training under actual combat conditions.

By next summer, many of the remaining craft in-country will have been transferred to the Vietnamese Navy under the program called Accelerated Turnover to the Vietnamese (ACTOV). Each turnover results in the release of U. S. Navymen for other assignments in Vietnam and in some instances early rotation, especially for personnel nearing completion of their tours.

Since June 1968, the U. S. Navy has turned over to the Vietnamese Navy the following classes of boats, craft and ships: armored troop carriers (ATC), assault support patrol boats (ASPB), monitors (MON), command and communications boats (CCB), river patrol boats (PBR), *Swift* boats (PCF), minesweepers (MSM), fuel carriers (REF), Coast Guard patrol boats (WPB), mechanized landing craft (LCM-8), tugboats (YTL), tank landing ship (LST), utility landing craft (LCU) and oilers (YOG).

The Navy has plans to turn over additional craft.

## Concrete Junk? Why Not?

The idea of making boats out of concrete isn't as farfetched as you might imagine. In fact, the idea is said to go back some time to the mid-19th century in Europe and ever since has grown in popularity around the world.

The idea has even reached Vietnam where the Republic's Navy recently introduced its 1970 model—a 60-foot patrol craft in the form of a *Yabuta* junk.

It took only three months to construct the new junk, stronger in comparison to the standard *Sau* wood type junk, and cost only one-third as much—\$17,000 as opposed to about \$51,000. What is more, the builders claim their concrete craft is designed for easier handling, will produce less engine vibration and, if damaged, will be less of a problem to repair.

Furthermore, its life expectancy is greater than junks made of *Sau* wood which is subject to warping, rotting and insect deterioration, elements that do not affect the concrete craft, they say.

Construction was relatively simple.

Vietnamese shipfitters first pour-

pozzolan (a substance of siliceous (quartz) and aluminum particles), sand, and water through a mesh of interwoven chicken-wire anchored to a water-pipe framework. The cement was then smoothed over the inside and outside of the hull and damp cured for three weeks. Afterward, the hull was finished with two coats of epoxy resin, the

interior was outfitted, and the entire craft painted complete with facial feature in preparation for its launching ceremony.

Now, in addition to the junk, a ferro-cement *Swift* boat (PCF) is being constructed in the Saigon shipyard, but there appears to be no truth in the rumor that plans for a submarine . . .

**SEEING IS BELIEVING**  
—Concrete junks being built by the Republic of Vietnam's navy are cheaper and stronger than the standard *Sau* wood type.



# Newport Sports The New Look



UPHILL CLIMB—Truck tests traction of bow ramp of new LST. Below: Tank landing ship USS Newport (LST 1179) lies at anchor off coast of Virginia. Rt: Landing craft emerges from stern during evaluation tests on underway launching.



THE IMAGE of the LST has remained much the same over the years. That is until *uss Newport* (LST 1179) slid down the ways.

Product of a revolutionary idea in tank landing ships, she looks anything but an *LST*. She's longer by nearly 200 feet, wider by about 10 feet, and displaces 500 more square feet than any of her predecessors. However, the most conspicuous innovations are her clipper bow and unique 112-foot, over-the-bow ramp.

The elongated bow enables her to slice through seas at about 20 knots, or speeds relative to those of troop transports and task force command ships. Earlier "Ts" were restricted to little more than eight to 14 knots speed, (depending on type of LST) mainly because of their blunt bows.

The newly designed ramp, constructed of 35 tons of aluminum, replaces the gate-type bow doors familiar to LST sailors since the North Africa landings in 1942.

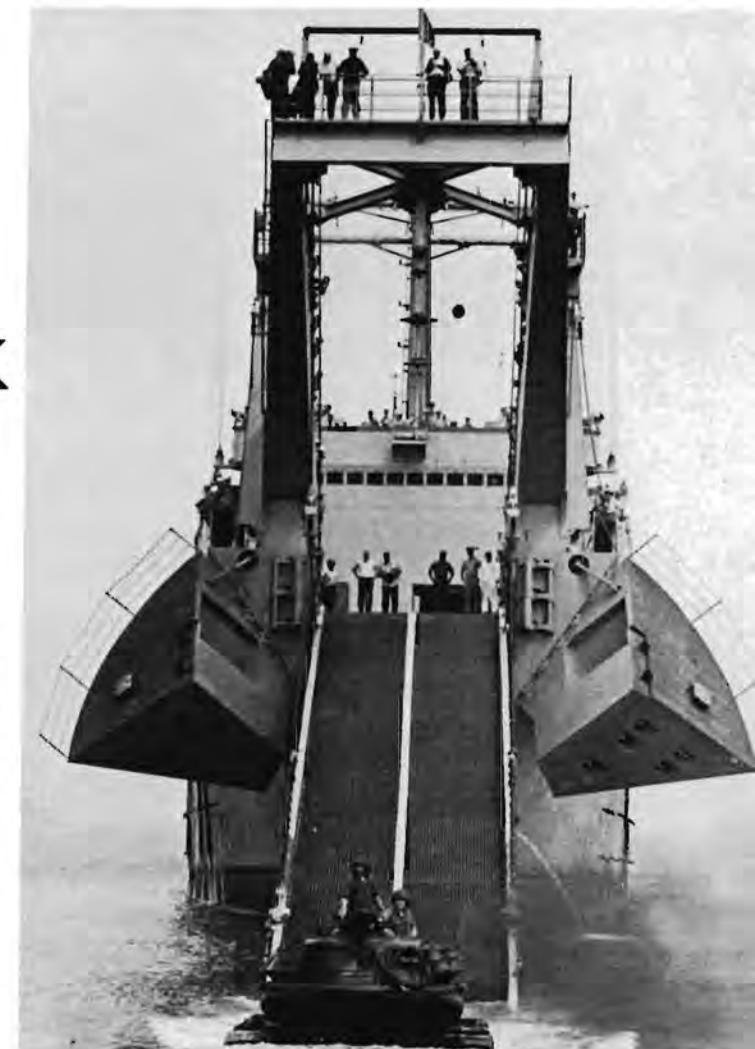
It was then that the Landing Ship, Tank, actually came into being, brought about by a wartime logistics problem: French harbors were in the hands of the

Axis. Therefore, a ship was needed to land tanks, vehicles and troops on coastal beaches, not just in France, but wherever the Germans happened to have control.

CREDIT FOR SOLVING the problem initially goes to the British. They came up with the idea of converting shallow draft shoal tankers, of the type then in use on Lake Maracaibo, Venezuela, into the tank delivery business. These "Maracaibos" (six altogether) ranged in length from 365 to 385 feet with beams of about 60 feet. They could carry either 22 25-ton tanks or 40 five-ton vehicles, trucks and the like, and still draw a reasonably shallow draft.

Baptism of the LST into combat came in November 1942 when *HMS Miosa* and *Tasajera* (Britain named her first LSTs) worked their way ashore during the Arzeu landings in Algeria. Their performance was recorded as "highly satisfactory," thus leading the way for almost 1000 U. S.-built LSTs that saw service during World War II.

During and after the war, LSTs performed vari-



OVER THE BOW—Tank leaves the bow ramp of *USS Newport* during amphibious operations. *Newport* waits with lowered bow ramp as a tank leaves the beach and heads for home.



TEST RUN—USS *Newport* prepares to make marriage with a causeway assisted by members of Beachmaster Unit Two.

STERN LOOK—An amphibious landing craft prepares to enter well deck of the new style LST.



ously, some as casualty evacuation ships (LST(H)s), some as repair ships or motor torpedo boat tenders, others as service and storage craft, and many other peacetime functions.

When a ship-to-shore invasion was called for to halt communist aggression in Korea, once again the LST led the way as a frontline combat ship, landing troops and equipment at Inchon, Wonsan and other Korean waterways.

**A** DECADE LATER, the U. S. became involved in the Vietnam hostilities and the LST assumed a role as mothership to rivercraft and gunship helicopters, operating as part of the joint Army-Navy Riverine Force. It has played and is playing a major role in supplying Marine and Army personnel because of the lack or inadequacy of Vietnamese ports. The LST has been the only ship capable of entering many of the ports, because of shallow draft and beaching capability, to deliver much needed ammunition and other logistical items.

As of this writing, *Newport* was operating out of her home port at Little Creek. This past summer, her crew of 10 officers and 160 enlisted men moved from Philadelphia where they helped to complete her construction in the Naval Shipyard in time to haul up her commissioning pennant on 7 June.

It was the first such ceremony scheduled for 20 new-image LSTs planned for delivery to the Fleet's amphibious forces within the next few years.

## TWO WAYS TO LOOK AT IT

# By and For Warrant Officers

"In your article on warrant officer pay in the September 1969 issue, ALL HANDS said:

"Based on the 1 Jul 1969 pay scale, an individual can expect to receive approximately \$38,000 more income from the time of his appointment as a WO1 until retirement as a CWO4 with 30 years of service, than he would if he were to remain in the enlisted ranks and advance to E-9 in due course."

"I haven't been able to determine your criteria for this statement. Using my own career as an example, I've figured that the difference in pay between WOs and senior enlisted men is closer to \$13,000 — and the gap closes to a mere \$1200 when lost pro pay is figured in.

"It is obvious that the ALL HANDS figure of \$38,000 is a bit inflated and misleading, at least in my case. Furthermore, the figures readily explain why there is a reluctance for senior personnel to enter the WO program."

So writes a Chief Warrant Officer (W-2) concerning the ALL HANDS recent roundup on WOs. Here's our reply, authenticated by our BuPers expert.

OUR FIGURES aren't far off, considering the limited premises you used. But we believe ours gave a better picture of the benefits a chief can expect when he goes warrant.

ALL HANDS' example was based on the careers of two hypothetical E-7s, each with 10 years' service. One remains in the enlisted ranks, advancing to SCPO at 17 years and MCPO at 20. The other goes warrant at 10 and makes CWO2 at 12, CWO3 at 16 and CWO4 at 20. Both men complete 30 years of service, drawing normal pays and allowances, each has a wife and two children.

According to our source in the Policy Division of BuPers, these rates of advancement are close to the average for each career path.

However, your example made enlisted advancement faster, and warrant promotion slower, than the average. (The CWO's letter included a year-by-year computation of pay earned by an enlisted man and a warrant officer, which we won't print for space reasons. Our references to his example are taken from this table.)

You started with two E-7s — but the second man didn't enter the WO program until the 13-year mark, and then advanced to CWO2 at 15 years, CWO3 at 20 and CWO4 at 24. The chief who remained in the enlisted path, on the other hand, advanced rather quickly: to SCPO at the 15-year point and to MCPO a short two years later.

The difference between the advancement rates in the two examples — along with our WO's three-year head start on yours — caused some of the disparity between our career totals.

Additionally, your example left out a couple of

important items — allowances and tax advantages. You figured only basic pay. We included subsistence and quarters allowances, and the tax advantages that come to a Navymen because these allowances are nontaxable.

Unless rations in kind are not available at all, an enlisted man's Basic Allowance for Subsistence is less than an officer's; and the Basic Allowance for Quarters for the two top warrant grades is higher than the BAQ for any enlisted man.

And, since an officer receives more in these allowances, he receives an added bonus in higher tax advantages. It all adds up. To \$38,638 more pay in a 30-year career, to be exact.

We didn't include pro pay because it applies to relatively few Navymen, and we were trying to depict the average situation. The man in your example, who is eligible for \$75 pro pay a month, would certainly consider his career decision carefully.

If there's a moral to be drawn from the difference between your figures and ours, it is that a Navymen should decide on his career early — and then work hard at it. The warrant officer in our example started earlier and advanced faster than the one in yours, and therefore he made more money.

*Lest we forget the real point of choosing a career path, note the attitude of the following writer.*

*"I read your article on warrant officer pay with great interest. I was very pleased with it except where you called the situation of the E-9 over 14 who goes warrant a 'total disaster.' I disagree.*

*"I went warrant about 14 months ago with more than 20 years in — and I still don't regret it, even though I've lost \$105 sub pay, \$42 difference between CWO2 and MCPO pay, and about \$30 mess bill a month — about \$2100 a year.*

*"Of course, some people only stay in the Navy for early retirement and because they aren't able to make it on the outside.*

*"I happen to love it.*

*"My only problem is the fact that I'm really going to miss it when I retire.*

*"Since making warrant I've had two really good billets: MPA of uss San Pablo (ACS 30) and engineering officer of uss Cohoes (ANL 78). Both billets were "cut-and-dried;" no E-8 or E-9 can say this.*

*"My rotation is three years at sea for two ashore. As an MMCM I would have six years at sea for two ashore — another reason for my going warrant.*

*"I've received other benefits: the prestige of being a naval officer, and the experience of working in other fields (such as JOOD) on the ship.*

*"All this adds up to almost a new career. I'm a very satisfied warrant."*

*"There's not much that can be added, or is needed, to the comments of the Chief Warrant Officer.*



Family services center personnel are shown on these two pages giving advice, counsel and general help to new arrivals in their respective Navy communities.



# Family Services Center

**A**LITTLE MORE THAN THREE years ago, the Bureau of Naval Personnel opened 15 Family Services Centers at various locations to serve the Fleet.

So successful were they in providing information and aid related to relocating Navy families that the Bureau has since expanded the program. Today, 50 FSCs have been established on bases in the United States and overseas. Others are being planned.

Family Service Centers here and abroad are fashioned after a standard format. They provide essentially the same general services, furnishing any number of solutions to problems or answers to questions regarding nearly any subject.

Therefore, the Family Services Center would be the most logical place to visit after receiving notice of your next assignment.

At NAS Corpus Christi, Tex., for example, in a one-month period, more than 160 Navymen enroute to new duty visited the Center there to obtain information on other activities.

Like all Navy-operated FSCs, Corpus Christi's maintains a library of Welcome Aboard kits which describe more than 250 Navy and Marine Corps stations and bases located worldwide. Some Centers have similar information on Army and Air Force activities. Each activity kit contains brochures, maps and other information about the command and its surroundings. This usually includes information on housing, commissary and exchange service, schools, recreation facilities and civic activities (for a more

complete account of what may be included in a Welcome Aboard kit, see page 31, this issue).

**T**HE DATA on housing usually consists of how to obtain information on base housing in advance of your arrival at a new duty station, or how to be placed on a waiting list. Temporary lodgings and guest-houses, motels and hotels with special rates, and mobile home parks are among other housing referrals contained in the kit.

Many of the Family Services Centers have a check-out system similar to that of a library. That is, you can check out a command Welcome Aboard kit, take it home and take your time to read the material thoroughly.

Meanwhile, you may send a request for a personal Welcome Aboard kit from your new command, either by letter, postcard or through use of a government-prepared and postage free paid request card available at any Family Services Center or, where no FSC exists, at your personnel office. Ask for an Activity Information Card (NavPers 1740/2 (Rev. 5-69)). Activities may obtain them through official supply channels, citing Stock Number 0106-095-4021.

It is better to submit a request directly to your new commanding officer for a Welcome Aboard kit. Don't assume that one will be forwarded to you automatically, except when you have been ordered overseas. In such cases, welcome aboard information is generally furnished at the same time you receive your entry

authorization into the overseas area.

In any event, requests for activity kits should not be submitted to the Bureau of Naval Personnel since the Bureau serves only as a clearing house and point for central coordination and does not maintain welcome aboard kits on the grand scale.

**D**EPENDENTS of Navymen assigned unaccompanied tours overseas will find FSC housing referral service especially helpful. Each Center maintains an up-to-date list of military public housing located in the United States that may be occupied by the man's family during his absence. The list is contained in NavFac Notice 11101.

To provide you with information on where you are going and, perhaps, how best to get there touches only the surface of the FSC service. The in-depth service stems from personal visits to the Centers.

Here, again, NAS Corpus Christi is singled out as an example. More than 300 persons visited the center during one month to receive either brochures or information on local activities. Among this number were 103 individuals who received hospitality kits to aid them in getting settled into their new surroundings.

These kits usually consist of bedding — sometimes beds and cots are available — linens, kitchen equipment, dining items, ironing equipment and baby furniture. They are provided to you on a loan basis, saving considerable wear and tear on your bank balance, particularly if your express shipment is late in arriving.



FSC personnel have correct answers to a variety of questions about your new home. Below right, dependents get ID cards.



New arrival gets directions from FSC officer.



Family services assistant discusses available services with new arrival.



Hospitality items are selected for new arrivals, above.

Many Centers have a policy whereby hospitality kit items may be checked out if available in the event you should have a limited need for additional kitchenware, linens or bedding, or a baby crib to get you through a family reunion, for instance.

**N**EW ARRIVALS at the Great Lakes complex are in for a pleasant treat. At the time they are greeted in their new home by a hostess from the area's Family Services Center, they are given a Welcome Wagon basket containing introductory gifts from merchants in the North Chicago and Waukegan, Ill., area.

Some FSCs are operated by regular salaried staffs. However, many Centers are staffed by and owe their success to volunteer Navy and Marine Corps wives. Where commands seek volunteer help, Navy wives



Nicknamed "survival kit", these items supplied by FSC will help the new arrivals start housekeeping.

Below, hospitality kit headquarters. Below right, well-stocked shelves provide wide variety of items for hospitality kits.



and dependents are encouraged to participate. Who knows better the problems of a Navy wife than a Navy wife who knows how to solve them?

The Family Services Centers are not meant for use only by newcomers. In fact, once you have become acquainted with the FSC serving your specific command, you'll no doubt use its reference guides several times during your tour ashore.

One of the major objectives of the Family Services program is to provide current information to dependents. Periodically, the Centers conduct orientation courses for wives. These lectures help explain the rights and benefits of which Navy dependents should be aware.

Topics may include survivors' benefits, emergency aid, educational opportunities. A medical officer, for



An efficient Family Services Center is a big help to incoming Navymen and their dependents.

example, might speak on CHAMPUS, a medical assistance program provided to dependents. Or, a chaplain might discuss various children's activities in the area. On the other hand, a legal officer's talk on preparing legal documents, such as wills, may be another example of the type information that is made available to the Navy wife through orientation courses.

**I**N THE THREE YEARS that the Centers have been operating, they have proven to be reliable sources for obtaining information and extra services. The extra services available at any given Center, however, depend primarily on the enthusiasm and support between the local command and the Navy family. Co-operation on the part of both leads to success, and a more pleasing Navy life. —JOC Mark Whetstone

# Family Services Center Directory

Here's a directory of installations which have established Family Services Centers, complete with telephone and building numbers, and hours of operations. Note that the letters AC indicate Area Code, and AV stands for Autovon.

**NAS Alameda, Calif. 94501**  
AC 415-869-2065/AV 686-2065  
Bldg 137/0800-1630 Mon-Fri.

**NAS Albany, Ga. 31703**  
AC 912-432-4583/AV 860-4583 or 860-4581  
Bldg 7001/0800-1630 Mon-Fri.

**NTC Bainbridge, Md. 21905**  
AC 301-378-2121 Ext 400/AV 578-3450  
Bldg 710/0800-1630 Mon-Fri. Eves. by appt.

**NAS Barber's Point (Hawaii), FPO San Francisco, Calif. 96611**  
AC 808-66166  
Bldg 1/0730-1600 Mon-Fri.

**NavSta, 495 Summer St., Boston, Mass. 02210**  
AC 617-L12-5100 Ext 289/AV 7451-289  
Fargo Bldg/0800-1630 Mon-Fri.

**NavSta, 136 Flushing Ave., Brooklyn, N. Y. 11251**  
AC 212-625-4500 Ext 537/AV 552-1104  
Station Bldg/0800-1630 Mon-Fri.

**NAS Brunswick, Maine 04011**  
AC 207-921-2231/AV 476-2231  
Bldg 585/0800-1200 and 1300-1630 Mon-Fri.

**NAS Cecil Field, Fla. 32215**  
AC 904-771-3211 Ext 8155 and 340/AV 434-1730  
Bldg 24/0730-1600 Mon-Fri.

**NavSta (NavBase) Charleston, S. C. 29408**  
AC 803-743-5425/AV 466-5425  
Bldg 180/0800-1630 Mon-Fri.

**NAS Chase Field, Beeville, Tex. 78102**  
AC 713-FL8-1120 Ext 251/AV 733-1750  
Bldg 1037/0800-1630 Mon-Fri.

**NavWeapSta Concord, Calif. 94520**  
AC 415-671-2753 Ext 2297/AV 730-1550  
Ext 2297  
Bldg E-98/0800-1645 Mon-Fri.

**NAS Corpus Christi, Tex. 78419**  
AC 512—WE7-2811 Ext 2134 and 2135/AV 861-2134  
Bldg 142/0730-1600 Mon-Fri.

**NAS Cubi Point (R. P.), FPO San Francisco, Calif. 96654**  
55-3961 Ext 3713  
Rec Bldg/0800-1700 Mon-Fri and 0800-1300 Sat.

**NavConstBattCtr Davisville, R. I. 02854**  
AC 401-294-3311 Ext 646 and 565/AV 881-3370  
Bldg 108/0730-1600 Mon-Fri.

**NAS Glynco, Ga. 31520**  
AC 912-265-6610 Ext 670 and 661/AV 434-3721  
Bldg 14/0800-1630 Mon-Fri.

**AdminCom, NTC Great Lakes, Ill. 60088**  
AC 312-688-2181 and 3327/AV 551-1500  
Bldg 43/0745-1615 Mon-Fri.

**NavConstBattCtr Code 350, Gulfport, Miss. 39501**  
AC 601-864-6220 Ext 481 and 482/AV 899-1630  
Bldg 54/0700-1530 Mon-Fri.

**NAS Jacksonville, Fla. 32212**  
AC 904-772-2845/AV 942-2845  
Bldg 955/0800-1630 Mon-Fri.

**NavSta Key West, Fla. 33040**  
AC 305-296-3511 Ext 207 and 530/AV 899-3400  
Bldg 135/0800-1630 Mon-Fri.

**NAS Lakehurst, N. J. 08733**  
AC 201-323-2570 Ext 2570 and 2680/AV 624-2570  
Bldg 4/0800-1700 Mon-Fri and 0900-1200 Sat.

**NAS Lemoore, Calif. 93245**  
AC 209-998-3039 and 3225/AV 949-3039 and 3225  
Bldg 944/0800-1630 Mon-Fri.

**NavPhibBase Little Creek, Norfolk, Va. 23521**  
AC 703-464-1091 Ext 7537 or 464-7459/AV 236-464-7459  
Bldg 3151/24 hrs 7 days a week

**NavSta Long Beach, Calif. 90801**  
AC 213-547-6805/AV 360-6805  
Bldg 44/0730-1600 Mon-Fri.

**NAS Las Alamitos, Calif. 90721**  
AC 213-431-1331 Ext 481/AV 898-3470  
Bldg 3/0800-1630 Wed-Sun.

**NavSta Mayport, Fla. 32228**  
AC 904-246-5344 and 246-5570/AV 677-5344  
Bldg 210/0800-1530 Mon-Fri.

NAS Memphis, Millington, Tenn. 38054  
AC 901-872-1711 Ext 467 and 468/AV  
882-1480  
Bldg North 24/0800-1630 Mon-Fri.

NAS Miramar, Calif. 92145  
AC 714-271-3614/AV 959-3614  
Bldg 254/0730-1600 Mon-Fri.

NAS Moffett Field, Calif. 94035  
AC 415-966-5334/AV 838-5334  
Bldg 25/0800-1630 Mon-Fri.

U. S. NavSupAct (Naples), FPO New York,  
N. Y. 09521  
302047 Ext. 553  
Agnano Admin Bldg Rm. G-22/0800-1630  
Mon-Fri.

NavSubBase, New London, Box 38 Groton,  
Conn. 06340  
AC 203-449-3874/AV 746-3874  
Bldg 137/0800-1630 Mon-Fri.

NavSta (NavBase) Newport, R. I. 02840  
AC 401-841-4285/AV 948-4285  
Bldg 85/0800-1630 Mon-Fri.

NavSta, 8903 Hampton Blvd., Norfolk, Va.  
23505  
AC 703-444-3182 Ext 2479/AV 244-2479  
Bldg CEP-26/0745-1615 Mon-Fri.

NAS North Island, San Diego, Calif. 92135  
AC 714-437-6693 Ext 5940/AV 951-5940  
Bldg 650/0800-1630 Mon-Fri.

NAS Oceana, Virginia Beach, Va. 23460  
AC 703-428-2222 Ext 925/AV 555-1650  
Bldg 420/0730-1600 Mon-Fri.

NTC Orlando, Fla. 32813  
AC 305-841-5611 Ext 2163 and 2203/AV  
431-3470  
Bldg 2046/0745-1615 Mon-Fri.

NAS Patuxent River, Md. 20670  
AC 301-863-3260/AV 961-3260  
Bldg 409/0800-1630 Mon-Fri.

NavSta (Pearl Harbor) Box 9, FPO San  
Francisco, Calif. 96610  
AC 808-432-8240 and 432-6193  
Bldg 93/0800-1600 Mon-Fri.

NAS Pensacola, Fla. 32508  
AC 904-452-2311/AV 899-3350  
Bldg 635/0730-1600 Mon-Fri.

NavSta Philadelphia, Pa. 19112  
AC 215-755-4125 and 3095/AV 243-3050  
Bldg 500/0800-1600 Mon-Fri.

NAS (Code 660-1) Point Mugu, Calif. 93041  
AC 805-982-7898/AV 898-1750 Ext 7898  
Bldg 1/0800-1630 Mon-Fri.

NavConstBattCtr, Port Hueneme, Calif.  
93041  
AC 805-982-4451 and 4885/AV 898-3300  
Bldg 90/0800-1630 Mon-Fri.

Naval Hospital, Portsmouth, Va. 23708  
AC 703-397-6581 Ext 607  
Bldg 206/0800-1630 Mon-Fri (telephone  
service anytime).

NAS Quonset Point, R. I. 02819  
AC 401-267-3647/AV 795-3647  
Bldg 523/0800-1630 Mon-Fri.

U. S. NavSta (Rota, Spain), FPO New York,  
N. Y. 09540

NavSta, Box 105, San Diego, Calif. 92136  
AC 714-235-1358 and 1359/AV 958-1358  
Bldg 225/0800-1630 Mon-Fri.

NavSta, Treasure Island, San Francisco,  
Calif. 94130  
AC 415-765-5130/AV 869-5130  
Bldg 217/0745-1615 Mon-Fri.

NavSta Washington, D. C. 20390  
AC 202-0X3-2028 and 2029/AV 22-32028  
Bldg 150/0800-1630 Mon-Fri.

NAS Whidbey Island, Oak Harbor, Wash.  
98277  
AC 206-257-4350/AV 368-4350 and 2388  
Bldg 10 Main Gate Seaplane Base/0800-  
1630 Mon-Fri.

NAS Whiting Field, Milton, Fla. 32570  
AC 904-623-3643 Ext 538/AV 899-1850  
Bldg 1415/0730-1600 Mon-Fri.

U. S. FitAct Code 520 (Yokosuka, Japan),  
FPO Seattle, Wash. 98762  
234-7394 thru 7398 or 7688 or 7392  
Bldg J-200/0800-1200 and 1300-1630  
Mon-Fri.

All correspondence regarding Family Services Programs which should be brought to the attention of BuPers may be addressed to: Bureau of Naval Personnel (Pers-G2d), Navy Department, Washington, D. C. 20370; phone: AC 202-0X4-2672/AV 22-42672. The FSC office is located in the Navy Annex, Room 2811, and is open 0800-1630 Mon-Fri. Personnel visiting the Washington, D. C., area are invited to include the BuPers FSC office in their visit.