

NAVAL AVIATION news

SEPTEMBER 1979





COVERS — Front cover composite, for our feature on fuels beginning on page 8, is the work of JOCS Bill Bearden. For the background he used a transparency, filmed by McDonnell Douglas' Harry Gann, of a Skyhawk firing a rocket. Bearden then photographed the five vials of various refinements of shale oil resting on a piece of shale rock (notice the oil veins in the raw rock) and the printer combined the two. Gann also photographed the Phantom on pages 18 and 19. The back cover picture of a VF-41 Tomcat banking towards Nimitz in the Mediterranean was taken by squadron member Lt. Bill Lindner. This 1969 photo of an HS-4 SH-3D approaching Hornet at Pearl Harbor was taken by Bob Lawson.



naval aviation news

SIXTY-FIRST YEAR OF PUBLICATION

Vice Admiral W. L. McDonald
Deputy Chief of Naval Operations (Air Warfare)
Vice Admiral F. S. Petersen
Commander, Naval Air Systems Command

STAFF

Captain Ted Wilbur	Head, Aviation Periodicals and History	JOCS Bill Bearden Helen F. Collins	Associate Editors
Cdr. Rosario Rausa	Editor	Sandy Nye	Assistant Editor
Dorothy L. Bennefeld	Managing Editor	Cdr. Chuck Sammons	Contributing Editor
Charles C. Cooney	Art Director	Harold Andrews	Technical Advisor

EDITOR'S CORNER

They are quiet, creative men who let their pictures and paintings talk for them. And those pictures and paintings speak in a forceful but pleasing voice.

R. G. Smith is one of the flying community's best known and most accomplished artists. He is master of palette and canvas. Harry Gann's creations bloom from a practical eye and camera. His aerial photography has been first-rate for years. Each man, in his respective vocation, is in a class by himself. "R. G." is a configuration engineer who just happens to be a superb artist. He was instrumental in the design of many aircraft including the *Skyhawk* depicted here. In addition to his talent with a lens, Harry Gann is a respected author and aviation historian.

For many years it has been *Naval Aviation News*' good fortune to feature the matchless productions of Smith and Gann. The A-4 in this issue's composite cover and the *Phantom* photo on pages 18 and 19 are two examples of Harry's expertise. His aerials have been featured in countless books and periodicals. R. G.'s works delight viewers at the National Air and Space Museum, the Pentagon, squadron ready rooms and in ships throughout the fleet. Both individuals work for the McDonnell Douglas Corporation at its Long Beach, Calif., plant - R. G. having signed on in 1936 and Harry in 1954.

Earlier this year, R. G. flew in a *Skyhawk* for the first time. He rode in *Blue Angel* #7, no less, the U.S. Navy Flight Demonstration Squadron's two-seater. Lt. Jack Ekl was at the controls and AEI Joe Berry helped strap him in.

Afterwards R. G. remarked, "I just don't see how the *Blues* fly in tight formation with so little stick movement. I'm more-used to SBDs or the OV-10s where the control column really moved around." He added, "I was also

impressed with the quiet. Quite a change from prop airplanes."

Harry flies as often as he can with Navy and Marine Corps units. Some of the most eye-catching *Blue Angel* views were snapped by him. R. G.'s *Blue Angel* #7 on this page pays a special tribute to Harry who is in the rear seat appropriately posed with camera at the ready.

Both gentlemen are modest and unassuming and share a boundless love of airplanes. That devotion is graphically portrayed each time they go to work - Harry with film, R. G. with a brush. It would be hard to imagine the world of aviation without them to visually record it for us. Happily, both are going strong, illuminating the beauty and drama of flying machines with unparalleled skill.



DID YOU KNOW?

Space Shuttle



Photo shows space shuttle orbiter *Enterprise* rolling out of the vehicle assembly building at the Kennedy Space Center for a three-and-one-half mile journey to pad A at launch complex 39. It was the first time the complete space shuttle configuration was at the pad, where it was to undergo five weeks of fit-and-function checks.

Football Award

Rear Admiral William P. Lawrence, Superintendent of the U.S. Naval Academy, has been named the 23rd recipient of the National Football Foundation and Hall of Fame's Gold Medal. A graduate of the Naval Academy, RAdm. Lawrence was on the varsity football team while a midshipman, as well as on the basketball and baseball teams.

While serving as commanding officer of VF-143, RAdm. Lawrence was shot down over North Vietnam in June 1967 and remained a POW until March 1973. He received many decorations for his courage and leadership while a prisoner.

RAdm. Lawrence will receive the Gold Medal at the annual Hall of Fame Awards Banquet at The Waldorf Astoria in New York on December 4.

DID YOU KNOW?

Trim Test System

A programmable automatic trim test system (PATTS) has been developed for trimming and testing uninstalled and installed engines. PATTS consists of a central processor, floppy disc input unit, input/output printer with keyboard and cathode ray tube display. It is connected to the engine being tested and displays engine trimming procedures, step by step. It also displays the desired operating parameters and observed readings, and will provide up to six printouts of the observed and corrected engine operating parameters. PATTS will reduce the time required to trim and test engines, eliminate human effort in data acquisition, decrease fuel and manpower costs, ensure standardization of trim and test procedures, and provide an accurate permanent record of all data.

The Naval Air Test Center is conducting a technical evaluation of PATTS at NAS Miramar, using an F-14A engine, but the application of automatic acquisition of uninstalled and installed engine data could be expanded to all turbine engines.

ASW Concept

The Naval Air Engineering Center at Lakehurst, N.J., has been tasked with demonstrating a concept (*NAVNews*, June 1976, page 30) which may allow helicopters to conduct ASW operations from merchant container ships at sea. The concept, Project *Arapaho*, calls for the use of modular containers 8 feet wide, 8 feet tall and either 20 or 40 feet long. They would serve, when assembled, as an aviation type facility to support the sea-based air platform. In the event of war the containers could be quickly loaded aboard merchant ships to augment antisubmarine defense of convoys with fewer additional escort ships.

Each container's interior would be configured to serve a specific function, such as living accommodations, fire and crash equipment, command and control center, limited aircraft maintenance, aviation fuel storage, etc. A flight deck 65 feet wide and 200 feet long could also be quickly attached to the decks of the container ships, from which jets and VSTOL aircraft would operate.

Planners want to be able to move an *Arapaho* package, including sectionalized flight deck and modular containers, from a pre-embarkation site to pierside quickly, using conventional means of transportation (air, truck or rail). Once dockside, it should be easily loaded onto the ship within 24 hours, using standard dockside loading equipment. On board, the *Arapaho* package should be easily hooked up to the ship's existing utilities.

Some work on *Arapaho* was done previously, according to William Cox, NAEC's technical director, but was terminated in 1976 when funds ran out. Nearly all of the equipment, finished or partially finished, was stored at a naval air reserve facility in New York. Funds recently appropriated will be used to complete the original suite of container modules and conduct land-based dockside and at-sea flight feasibility tests. "NAEC's job is to demonstrate the concept, not to do the job," says Captain John H. Hoganson, NAEC's commanding officer. "Whatever configuration we may develop for this modular container package will be only a model for demonstration purposes. It will not be a prototype."

News from Patuxent River

NATC Patuxent River is evaluating parachute-retarded sonobuoys for use with SH-3s and SH-2s. A special time-delay parachute deployment device on the buoy provides safe aircraft-to-weapon separation when the sonobuoys are deployed. Previously, there were problems releasing parachute-retarded sonobuoys from these helicopters. Tests to date have identified a need for shroud lines shorter than those employed in fixed-wing aircraft operations, to ensure safe clearance

for helicopter use. In addition, procedures are being developed to safely deploy sonobuoys by hand in those helicopters not equipped with sonobuoy chutes. If successful, the test program will provide new launch envelopes for fleet use with the parachute-retarded sonobuoy.

The Naval Air Test Center is also conducting a program for the Naval Air Systems Command to update F-14A/TF30 mission profiles by installing engine low cycle fatigue (LCF) monitors in 30 fleet F-14As. The systems will remain installed for two years in order to collect data in both the carrier-based and shore-based environment. The information gathered will enable the Navy to update the mission profiles and assign more realistic LCF life limits to engine components. The overall effort should lead to more realistic engine test cycles, more accurate definition of the F-14A fleet operating mission, and an improved maintenance cycle for the TF30-P-414 engine.

Two recently evaluated drive shaft coupling designs are reducing operating costs by cutting down on engine accessory drive shaft wear. Conditions such as misalignment, torsional oscillation, vibration and inadequate lubrication frequently wear out the couplings which connect accessories such as hydraulic pumps and electrical generators to engine/gearbox power takeoff shafts. The basic technique recognizes that wear can be retarded by incorporating a high-strength, self-lubricating, non-metallic adapter between the power takeoff spline and the accessory drive shaft. The new designs use high strength, non-metallic bushings with special external and internal splines. These spline adapters are installed in the power takeoff cavity in a way that provides maximum coupling strength. These couplings have been evaluated on 11 different accessory drive-shaft applications during more than 52,000 hours of flight and 10,000 hours of laboratory tests. Information regarding design data and material identification can be found in NATC technical memorandum TM-76-1 SY, which may be obtained from Mr. Aleck Loker, Code SY64, NATC Patuxent River, Md. 20670, telephone: 301-863-4701; autovon 356-4701.

AD-1 Research Plane



This triple exposure of NASA's AD-1 research plane shows 0, 30 and 60 degrees of wing swing. The aircraft will be flown at NASA's Dryden Flight Research Center later this year to evaluate the oblique wing concept for better fuel economy.

Since the pivoting oblique wing concept is a significant departure from conventional design, NASA has begun an exploratory program to study the fundamental operations of an oblique wing aircraft, using a small, lightweight, manned test plane. The AD-1 is about 40 feet long with a wingspan of 32 feet. Powered by two small 220-pound thrust turbo engines, it has a gross weight of about 2,000 pounds, with speed in the 150 to 200-mph range.



GRAMPAW PETTIBONE

An Eye Out for Birds

A flight of two A-7Es from an East Coast training squadron was executing the old Jax 80 portion of the VR-1005 low-level VFR military training route across central Florida.

Having passed the Fort Myers checkpoint, the section proceeded east across the Florida marshlands toward Lake Okeechobee. Up to this point, everything was on track. Navigation, elapsed time and fuel states at each checkpoint were right on. The flight leader was a student replacement pilot (RP) and was established on course, 360 kias, at 200 feet above ground level. The instructor pilot (IP), flying chase, was in trail and stepped-up slightly at the four o'clock position. Visibility along the route was good and everything was going as briefed. Occasionally the flight had to jink to avoid gatherings of large birds.

The flight leader momentarily scanned his instruments and, as he looked back out of the cockpit, the first thing he saw was a large bird filling the entire view of his front windscreen. Impact followed at the left forward canopy panel. Glass, entrails, feathers and the like were driven directly into the pilot's face through his visor.

Noting the lead plane beginning a left-wing-down descent toward the trees, the instructor instantly broadcast, "Level your wings!" Totally blinded, the RP was unable to respond, not knowing which way to move the control column. The instructor, detecting no response, quickly transmitted, "Pull up! Pull nose up! Put your right wing down!" to which the RP instantly reacted. The IP joined close aboard and coached the RP into a positive climb attitude. During the climbout to 15,000 feet, the instructor

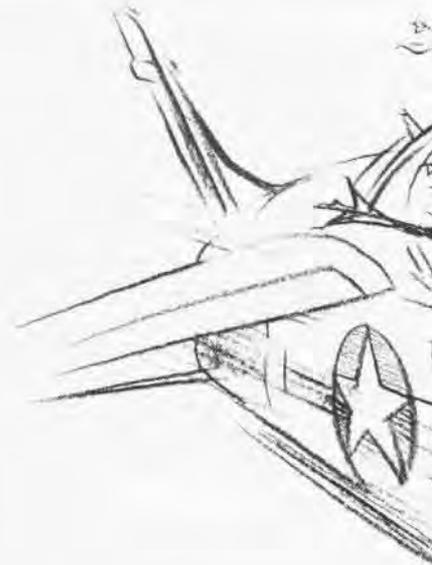


noted the broken canopy and the injured, bloody face of the student pilot which was visible through the shattered helmet visor. The RP informed the IP of his injuries, stating he had no vision from either eye.

The IP then directed a turn toward home base, a distance of approximately 125 miles. Leveling the flight at 15,000 feet, the IP informed Miami Center of his flight's dilemma. After assessing the options, the IP concluded that the most expeditious medical attention available would be at NAS Cecil Field. He relayed his intentions to center and requested assistance in alerting Cecil Field crash and rescue services. During the 15 to 20-minute transit back to Cecil, the RP regained some vision in his right eye, to the point that he was able to detect shadows.

When they arrived at Cecil Field, emergency personnel and equipment were standing by. The squadron LSO, already on station, had been communi-

cating with the IP as to the recovery alternatives available. These were ejection in a nearby unpopulated area (with possible further injuries) or execution of a blind talk-down, straight-in approach to a short field arrested landing. In view of the limited vision now available, the decision was made and concurred in by the RP to try the latter course of action. The IP talked his wingman through the pre-landing procedures en route and descended to pattern altitude. The IP, flying close wing, and the LSO were able to direct the injured pilot safely through the approach and to a successful landing using the short field arresting gear. Crash and rescue personnel quickly removed the pilot from the aircraft and evacuated him to the Jacksonville Regional Medical Center. Medical diagnosis showed a severely



ILLUSTRATED BY *Osborn*

damaged left eye with crushed retina and loss of fluid. The right eye showed minor damage.



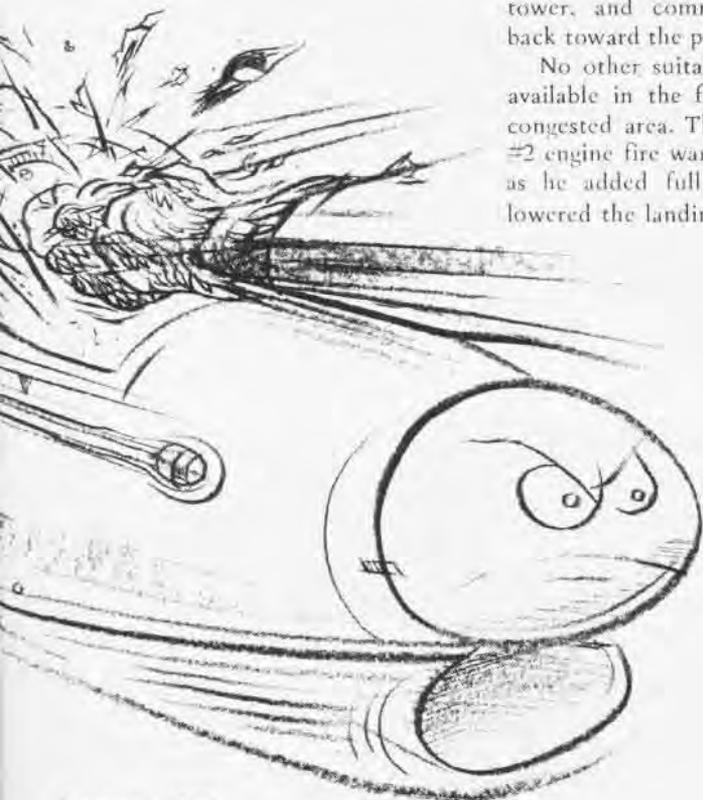
Grampaw Pettibone says:

Holy low-level braille! This young man nearly bought the farm! A bird in the hand sure beats one in the eyes. Thanks to the alert actions of a most professional instructor, Lt. Ross Fisher, and the courage and skill of this young lad, a tragedy was avoided. Our "blinded" pilot, Ens. Burt Thorpe, is, in fact, seeing again. After about six months of surgery and treatment, his sight has been fully restored and he has returned to full flight status.

Gramps is proud as can be of these two who richly deserved the air medals they were awarded.

Holy Roastin' Helos

Following a one-hour-and-15-minute early morning passenger flight from NAS Tidewater in mid-September, the crew in its shiny VH-3A VIP helo put down at the Puzzle Palace Pad (PPP) promptly at 0850. Clearance for takeoff on the second leg of flight was received following a two-minute stopover during which



passengers were discharged and a passenger embarked.

At 0852, Helo 34 made a liftoff and established a 15-foot hover in order to check engine instruments and power gauges. All indications were normal. Upon completion of the post-takeoff checklist the pilot transitioned to forward flight.

Approximately 40 seconds later a loud explosion was heard. It was accompanied by an immediate lurch-to-port and shudder of the aircraft. A ball of orange flame was observed rolling down the starboard side of the aircraft. The second aircrewman immediately reported "Fire in #2 engine." The pilot reduced collective, transmitted an emergency to the PPP tower, and commenced a left turn back toward the pad.

No other suitable landing area was available in the freeway-and-building-congested area. The copilot noted the #2 engine fire warning light illuminate as he added full power to #1 and lowered the landing gear. No. 2 engine



turbine rpm needle was at zero with #1 needle at maximum. Rotor rpm had dropped to 90 percent. Within seconds, the #1 engine fire warning light also illuminated. Engine fire was confirmed by PPP tower personnel. By this time the pilot had maneuvered the aircraft to a short-final position and executed a highly professional, no hover landing on the lawn, approximately 75 feet short of the pad. Upon landing, the pilot secured speed selectors (#2 would not secure), pulled both T handles, ignited both fire bottles, secured fuel switches and engaged rotor brake (which failed).

The crew and passenger made an orderly but mighty hasty retreat from the craft as 25 to 30-foot flames engulfed the engine compartment and fuselage. The PPP crash crew arrived at the scene approximately two minutes later and suppressed the aircraft fire with foam.



Grampaw Pettibone says:

Holy roastin' helos! The professional excellence demonstrated by this team prevented the incident from becoming a hovering inferno. Internal failure of the #2 engine combustion chamber fuel manifold resulted in subsequent turbine blade destruction and damage to a high pressure fuel line. This led to a rupture and atomized hydraulic fluid fed the fire in the transmission compartment. You can bet your singed whiskers these young lads had quite a scare — just as did old Gramps, who happened to witness this one personally! The cool thinkin' and professional action of this crew got the roastin' rotor back on terra firma; and in this case, the more firma, the less terror! This team gets top billing on old Gramps' list of Super Pros.

The Saga of Ferp, Farp and Fip

The next time you decide to engage in America's latest and most popular craze, the Bumper-to-Bumper Pump Crawl, practiced by enthusiasts at least once a week, consider the following fable:

There once were 10 men from Somewhere. Each owned a different kind of Getmethere vehicle. Some could fly, others were used on land or water. All were designed to run on Ferp, a natural fossil fuel. Mr. Hasitall, who lived in Aroundabout, owned all the Ferp, which he discovered quite accidentally in his yard.

By and by Hasitall was approached by other men from Otherplaces. They too had designed many types of vehicles to operate on Ferp. Hasitall was happy to supply them with Ferp. Eventually, Hasitall realized his Ferp supply was dwindling and his number of customers was increasing. He looked high and low for more Ferp.

There just wasn't any. He did find Farp and Fip, but decided it would cost him too much money to convert these into Ferp. So Hasitall decided he would charge all of his customers more money for the use of his Ferp.

This he reasoned would cause his customers to conserve and use less, thereby extending his supply of Ferp. And why shouldn't he reap great profits; after all he had the only supply of Ferp.

Well, the gang from Somewhere didn't like the situation, but agreed to pay the higher prices. At the same time, they realized something had to be done or one day they would be stranded along with the men from Otherplaces.

They had a choice. They could experiment with Farp and Fip, which were more abundant in their yards in Somewhere than in all of Aroundabout and Otherplaces combined, and

refine these to power their Getmetheres. Or, they could design new Getmetheres to run on Farp and Fip.

Since they already owned their Getmetheres and had many more of the same coming off the assembly lines, along with the many necessary spare parts, they decided to keep them until they wore out or were used up. This they estimated would occur in the next 25 to 50 years. They would continue to pay the higher prices demanded by Hasitall but would, in the meantime, start refining Farp and Fip to replace Ferp. They would accomplish this even if the new Ferp cost them the same or more than Hasitall was charging. At least this way they would own the new Ferp and could draw from that supply until they could develop new Getmetheres to run more economically on their abundant supply of Farp and Fip.



Alternate FUEL

By JOCS Bill Bearden

Think about it the next time you're practicing the Bumper-to-Bumper Pump Crawl . . . That once-upon-a-time is now.

This fable is a brief summation of how the Departments of Energy and Defense view the energy problem. Their long-range plan is to find alternate fuel sources to replace petroleum. It is the big picture in a nutshell, written in a light vein, because the specifics of the energy problem can be very technical and mind boggling. It gets more so when you begin looking at petroleum refinements between gasoline for automobiles and JP-5 for military jet aircraft. Both are derivatives of crude oil.

In explanation of the fable, Somewhere is the United States. All the various means of transportation using petroleum or hydrocarbon fuels are Getmetheres. Ferp translates into petroleum; Farp and Fip into oil shale

and coal, respectively. (Oil shale refers to the rock; shale oil to the liquid crude.) These are two abundant domestic alternative fuel sources currently being explored. Hasitall represents primarily the OPEC nations, who at current prices spend less than one dollar to produce the same barrel of crude oil that is imported into the United States for \$20 or more.

It matters little that imported crude oil is later refined into heavy fuel oil; diesel fuel for land or marine use; gasoline for aviation or automobiles; or jet fuel for the military such as JP-5 or 8. What matters is that this country, at its current rate of consumption, imports nearly one half of its petroleum. Domestic wells supply the other half. It takes little imagination to realize that in the years ahead, as these domestic wells trickle out, this country will be importing more and paying more. Even



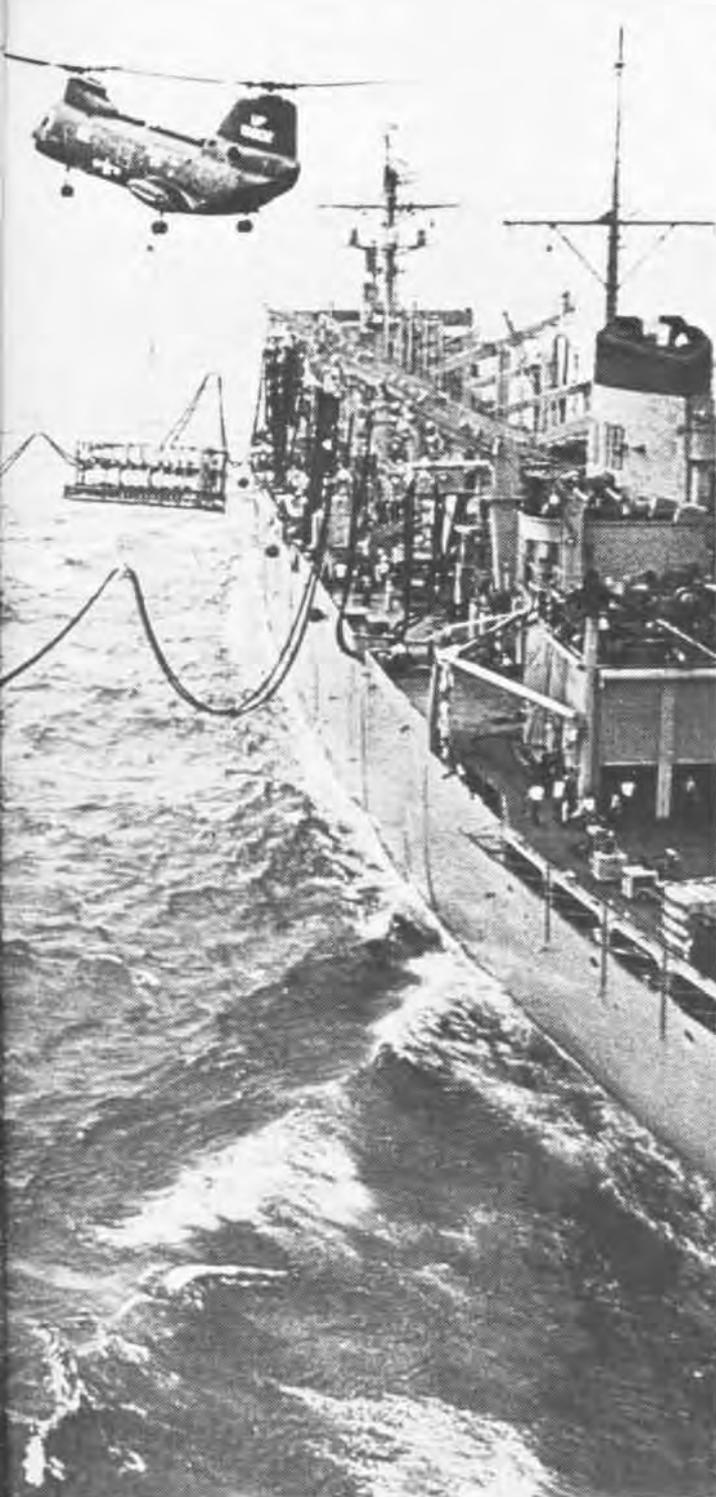


today, the quality of crude which is used to produce the middle distillates — that refined portion used for jet and marine fuels — is causing problems. Additional refinery measures are required to bring these up to necessary standards. You can imagine the consequences to the civilian community, but more so to our national defense, if this import flow were suddenly severed.

For most of us there have been automobiles and planes and the fuel to make them go all our lives. Now we are informed the supply of fuel is getting low. We must pay more for what we get and in many cases wait in long lines to get it. We've received so much conflicting information lately that we have become skeptical about energy information. Newspaper headlines tell us who's at fault on a given day; how many assaults took place in service station lines. And on the lighter side, Dicky Goodman cuts another one of his numerous records, poking fun at politicians and their part in the energy scenario. For a few moments he makes us forget the gravity of the situation.

Television, through its network polls, declares the majority of Americans feel the shortage is just so much hogwash, brought on by the major oil companies to get gas prices higher. Once escalated, there will be all the gas everyone needs. We won't debate this issue. It is not the intent of this article to point the finger of blame at anyone.





It is intended, however, to emphasize there is no endless supply of petroleum. It is foolhardy to think we can continue to draw forever from a supply that cannot be replenished. It took Mother Nature 600 million years to create the earth's supply of petroleum wells. In just over 100 years, or since the beginning of the modern petroleum industry in 1859, man is seeing how rapidly he can use up that natural supply. It *will* give out someday.

So where do we go from here? The logical approach, and the one being taken by DOE and DOD, is to plan for the future by finding alternate fuel sources that are abundant in the United States. That way we are less dependent on other nations for our energy.

Why has the Navy taken the lead in the search for alternate fuels? Because the Navy is highly dependent on a readily available fuel supply. From marine diesel fuel for its ships and motor gas and diesel fuel for ground transport and equipment, to jet fuel for its aircraft, this supply must be available at widely scattered land and sea locations throughout the world. A highly efficient system of procurement, distribution, storage and delivery has evolved to meet this need.

In recent years, changes in crude sources, product distribution and



refining techniques have resulted in troublesome new fuel properties and in local shortages of fuel. The effects of this on aircraft can be especially acute because of the sensitivity of aircraft systems to certain critical properties of the fuel. The Navy feels these problems will only get worse in the future.

In the past, fuel has been a rather constant factor in aircraft development. This may not be the case a few years from now. The current properties of JP-5 are defined primarily by a series of empirical physical tests that have evolved over a period of years. These are based on aircraft and mission needs and the properties of the kerosene available from petroleum crude oils.

For many years the Navy has had active programs in research and development of aviation fuels. These mainly involved studies for improvement of the basic JP-5 to meet more stringent aircraft demands. Now it is necessary to explore alternate fuels using existing technology and to find ways of adapting to these new fuels. In the meantime, operations must continue as usual using the lower quality petroleum crudes.

In regard to safety, a significant effort is under way to decrease fuel flammability through the use of anti-misting additives. These additives, which are detrimental to the fluidity of fuels, will require changes to aircraft and engine fuel systems.

Navy aircraft normally have a 20 to 30-year life span. Therefore, aircraft which are currently being designed or are in the early stages of development will undoubtedly require fuel and combustion system changes if there is a significant change to JP-5 properties during the 1980s or 1990s. With existing pollution controls, current aircraft combustion systems will assuredly have to be redesigned.

NASA, with its clean combustor program, has shown that significant combustor redesign will be required to meet the EPA limits using current-day fuels. This will most likely hold true for future fuels. Any way we

look at it, the future for the aircraft-fuel relationship appears very complicated.

LCdr. Larry Lukens of the Navy Energy Office says, "It is highly unlikely, if not virtually impossible, that the Navy will be able to sever its dependence on liquid hydrocarbon fuels for ships and aircraft in the next quarter to half century." This is the same time frame predicted for conventional petroleum sources to be virtually exhausted. "We must find alternatives," he says, "which are domestically controllable, technically feasible, and economically, environmentally and socially acceptable."

He says the problem, of course, will be converting lower available forms — coal and oil shale — into the higher forms required of present-day systems, particularly those required for the transportation industry and mobile defense systems.

These fossil energy sources pose certain advantages and disadvantages. While coal has the greatest potential as a substitute for imported oil, American technology for producing liquid fuels from coal is lagging behind that of other alternatives, particularly shale oil.

The hydro-treating required to bring coal liquids into the middle distillate fuels range is very costly. Because of this, liquid products derived from coal will most likely be used for gasoline, boiler heating oil and petrochemical feedstock markets. Accordingly, jet and marine fuels derived from coal will have to wait until commercial technology makes available the middle distillate fuels of primary interest to the military.

"Shale oil must be considered the most attractive near-term source of defense mobility fuels," Lukens explains. "Within the United States, several shale oil extraction technologies have been developed and tested in equipment ranging from one-tenth to one-fourth commercial size. Compared to other synthetic sources of liquid hydrocarbon fuels, shale oil appears to be more economically viable, however, not enough yet to

get the required private investor interest to commercially develop this important resource."

According to Dr. Robert N. Hazlett of the Naval Research Laboratory, "The number one choice as a replacement for petroleum is tar sands, followed by shale oil and then coal." Of these three, the latter two are more abundant in the United States (see charts).

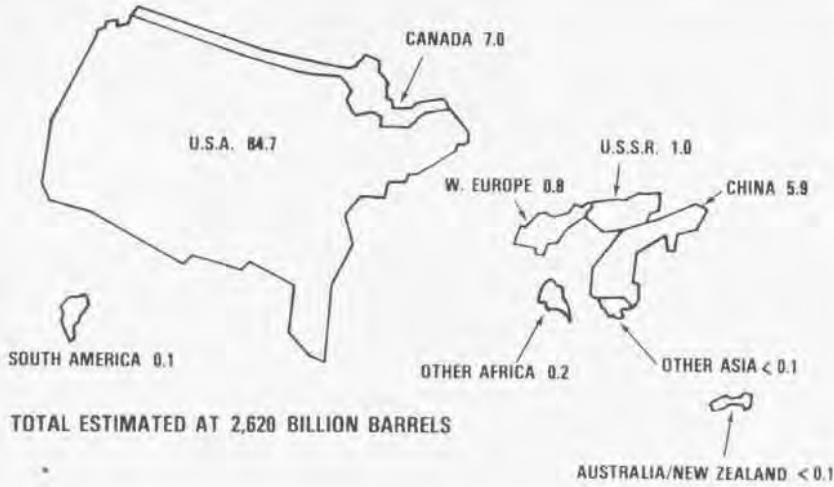
Tar sands, which more closely meet military specifications, would be the least difficult to adapt to current engine designs. However, the United States has only one percent of the total world's supply. Canada has 31.1 percent and South America, 67.8. On the other hand, the United States has 84.7 percent of the world's oil shale resources. While shale oil refinements present different problems, especially for military jet fuel specifications, scientists and researchers feel it is possible that this will be the Navy's fuel supply, or at least a supplement to petroleum, by the mid-1980s.

Located in the wide open West, a land of sagebrush and dust, the shale oil is deposited in the rock that makes up the steep sides of mesas in parts of Colorado, Wyoming and Utah (chart, page 13). These mesas contain a staggering amount of oil — an estimated 1.8 trillion barrels. Geologists believe that a third of this oil — 600 billion barrels — eventually can be recovered from high-grade oil shale that yields 25 gallons of oil or more from each ton of rock. That is a chunk about the size of an average office desk.

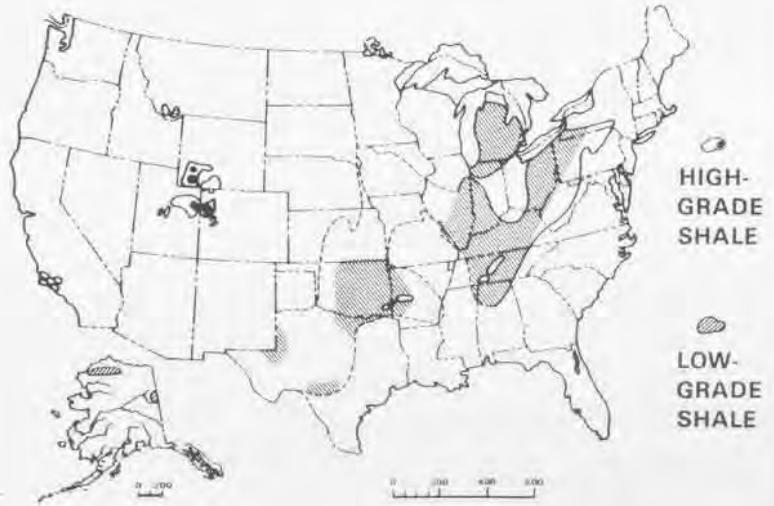
These enormous quantities are difficult to visualize. For comparison, 600 billion barrels is greater than the estimated present amount of the world's recoverable crude oil. This amount would last the United States a hundred years at its present rate of consumption.

This is hardly a solution to the energy problems for the next century, but it is a step in the right direction. There are a number of reasons why oil from shale does not offer the panacea everyone would like. There

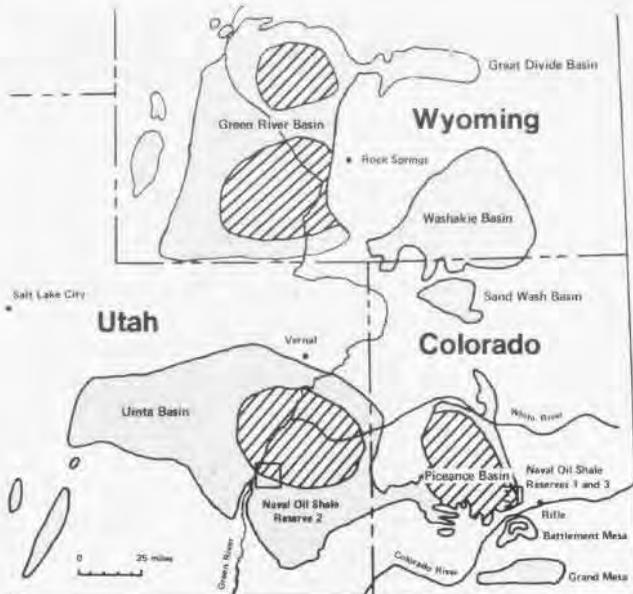
WORLD OIL SHALE RESOURCES (PERCENT)



PRINCIPAL REPORTED OIL-SHALE DEPOSITS OF THE UNITED STATES



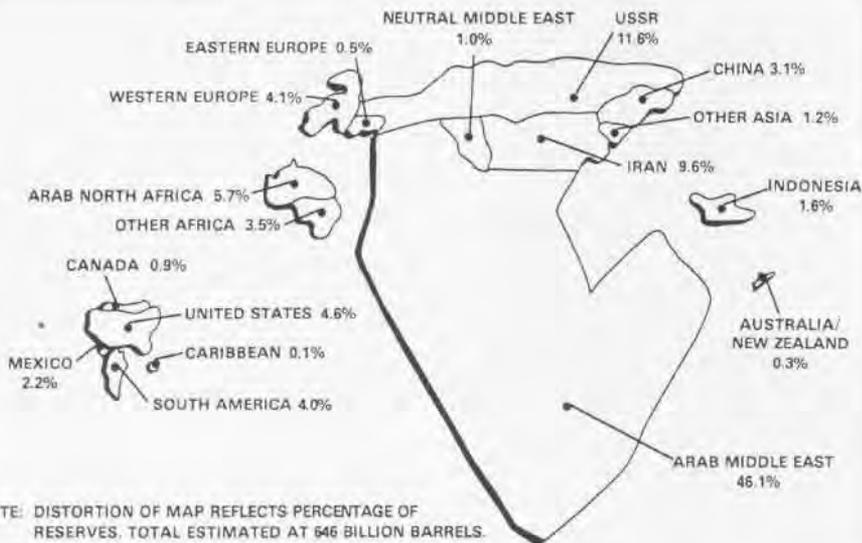
DISTRIBUTION OF OIL SHALE IN THE GREEN RIVER FORMATION



 Area underlain by the Green River formation in which the oil shale is unappraised or low grade.

 Area underlain by oil shale more than 10 feet thick, which yields 25 gallons or more oil per ton of shale.

WORLD PROVED RESERVES OF CRUDE OIL (PERCENT)



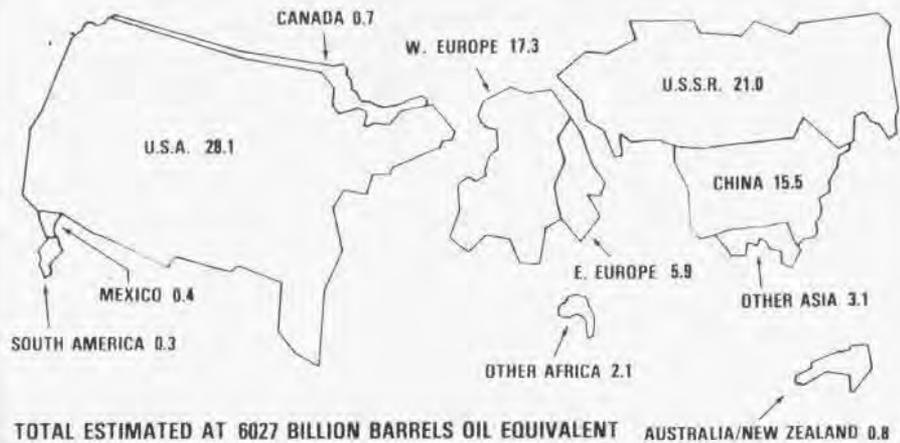
NOTE: DISTORTION OF MAP REFLECTS PERCENTAGE OF RESERVES. TOTAL ESTIMATED AT 646 BILLION BARRELS.
SOURCE: INTERNATIONAL PETROLEUM ENCYCLOPEDIA, 1978.

WORLD TAR SANDS RESOURCES (PERCENT)



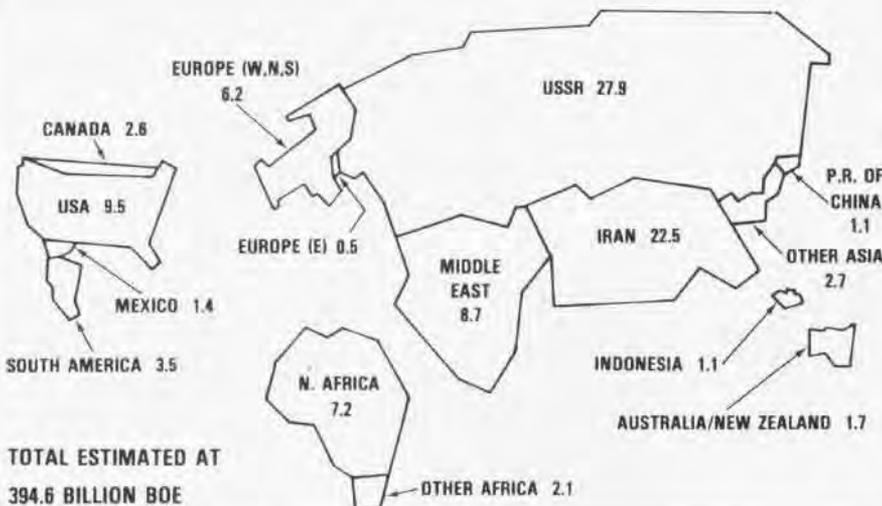
TOTAL ESTIMATED AT 2877 BILLION BARRELS

WORLD COAL RESERVES (PERCENT)



TOTAL ESTIMATED AT 6027 BILLION BARRELS OIL EQUIVALENT

WORLD NATURAL GAS RESERVES (PERCENT)



TOTAL ESTIMATED AT 394.6 BILLION BOE

Expanse of shale is evident at Parachute Creek Canyon, north of Grand Valley, Colo.



are environmental hurdles and technological problems to overcome, and there are enormous costs.

LCdr. Lukens estimates an oil shale industry would have to invest between \$20 and \$25 billion to produce a million barrels a day.

What exactly is shale? It's a fine-grained sedimentary rock, rich in organic matter, formed 30 to 60 million years ago in bodies of water, about the size of the Great Lakes, that once covered the area. Fish, shellfish and reptiles lived in the water. Animals, birds and insects visited the

shores. Algae, fungi and wind-blown pollen sank into the lake bottoms.

Gradually, this organic matter was pressed into rock, somewhat like the chocolate marbling in ice cream. Eventually the rock was uplifted to its present position in steep canyon walls and mesas. Today, vast deposits of oil shale extend over a 17,000-square-mile area of one of the most sparsely settled and most rugged parts of the United States.

Kerogen, the organic matter in shale, can be converted into a high-grade synthetic oil. It is synthetic because it

does not occur naturally in the rock as liquid petroleum, but rather as a material consisting of solid fauna and flora remains, algae, spores, pollens and resins.

Several methods are used to extract the oil from shale. Essentially, the shale must be mined, crushed and heated to temperatures around 900 degrees F. A number of companies are studying new techniques for extracting shale oil. Much engineering development, however, remains to be done before full-scale industrial operations can begin.



In 1974, the Navy served as the lead agency for a project to refine and test fuels derived from 10,000 barrels of crude oil mined from the Naval Oil Shale Reserves (NOSR) at Anvil Points, Colo. NOSR is located about 200 miles west of Denver near the town of Rifle. The Navy, DOD, Energy Research and Development Administration, National Aeronautics and Space Administration, Coast Guard and Maritime Administration sponsored the project.

Fuels from this refining project were then tested at various government and industry laboratories culminating in the following successful operations: the flight of a T-39 jet; cruise of the Great Lakes steamer *Edward B. Green*; and

operation of a jeep with an L-141 engine. This demonstrated the feasibility of using fuels derived from crude shale oil for military use, particularly for fuels in the middle distillate range — jet and marine fuels.

As a follow-on to the 10,000 barrel project, the Navy is currently serving as project manager for a joint DOD and DOE research and development program for acquiring, refining and testing of additional fuels derived from shale oil. From January 1977 through September 1978, a total of 88,225 barrels of crude oil were produced from the Colorado NOSR, now under DOE management.

In late October 1978, the shale





Crude shale oil pours from faucet at retort facilities, Anvil Points, Colo., far left, as former NOSR officer in charge, Cdr. Rick Wilson, below, inspects shale rock which is mined and loaded aboard truck, below left, for trip to refinery. An inspector, left, monitors efficiency tests of various shale oil refinements at Naval Air Propulsion Center, Trenton, N.J.



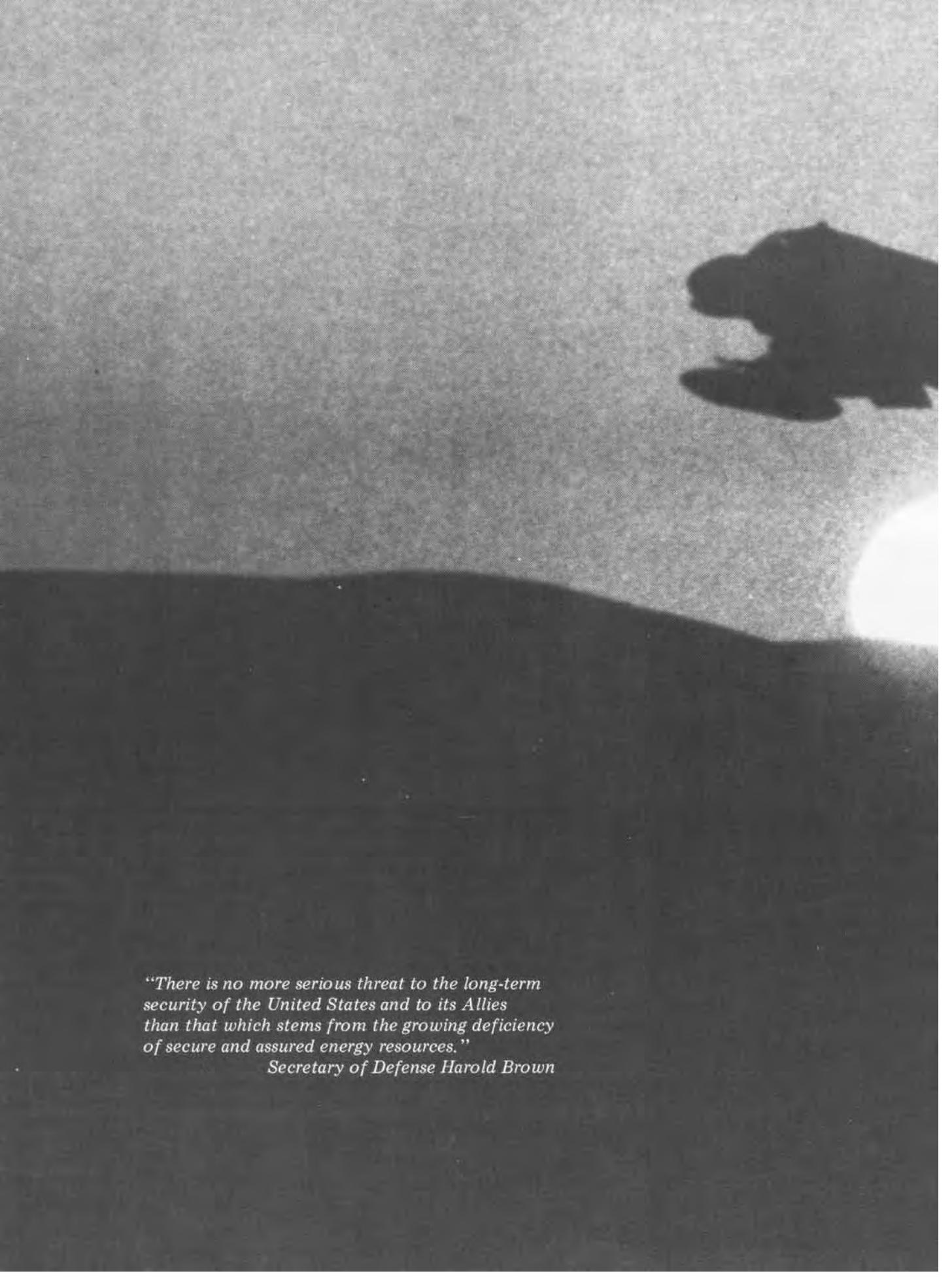
crude was delivered by rail to the SOHIO refinery at Toledo, Ohio. There it was refined into military specification fuels for testing by the military and other agencies. This fuel was distributed last January.

From this refining run, the Navy received JP-5 for aircraft engine systems testing, and marine diesel fuel for testing in marine boilers, gas turbines and diesels. The Air Force received JP-8, which is not used by the Navy because it does not meet shipboard safety handling requirements. EPA and the Electric Power Research Institute received residual fuel oil for testing in industrial gas turbine/boiler systems.

Small samples of each of these fuels mentioned, as well as various

intermediate refinery processing streams, were distributed to various DOD, DOE and EPA biological laboratories for health effects studies. In addition, EPA conducted various emission and industrial hygiene studies during production and refinement. EPA is still monitoring the end-use testing phases of this program. These performance characteristic tests are expected to take about a year to complete.

In the meantime, the Bumper-to-Bumper Pump Crawl craze hopefully won't last and everyone will do their share in continuing to conserve energy. It won't stop the wells from eventually drying up, but conserving may prolong the process until new fuel sources become available for vehicles on the ground as well as in the air.



“There is no more serious threat to the long-term security of the United States and to its Allies than that which stems from the growing deficiency of secure and assured energy resources.”

Secretary of Defense Harold Brown



NAVAL AIRCRAFT

Last of the *Helldiver* series of Curtiss dive bombers, the XBT2C-1 was a direct development of the WW II SB2Cs (*NA News*, January 1974) built as a competitor in the new basically single-place VBT (dive/torpedo bomber) category. It was outclassed by Douglas' totally new design to meet the requirements, the XBT2D-1, which went on to a long production life and service as the AD and A-1 series (*NA News*, January 1972).

Curtiss-Wright had begun proposing major changes to the SB2C design to overcome some of its shortcomings early in its production. However, wartime demands and decisions restrained changes to only those considered essential so that they would not interrupt production significantly. Two prototypes of a P&W R-2800-powered version, featuring a longer fuselage, were built in 1944. These modifications were intended to improve the performance and flight stability of the SB2C. The improvements were not considered sufficient for production changeover.

In August 1944, with the XBT2D-1 and two other competitors already under development, Curtiss proposed a single-place dive/torpedo bomber redesign of the SB2C, powered by the same engine as the XBT2D-1, the Wright R-3350. The proposal was not accepted on the basis of characteristics comparisons and SB2C production considerations. Six months later, a revised proposal was submitted containing many improvements, including an internal aft fuselage arrangement for carrying a radar operator — a feature later to become common in various "version" ADs. Completely redesigned high aspect ratio tail surfaces and a bubble canopy for the pilot, along with the lengthened fuselage, were featured. Many of the successful components of the SB2C were retained; the basic wing and fuselage structure were carried over, as was much of the armament installation. Minimum production changeover and service problems were anticipated from this approach.

A contract for 10 experimental airplanes was initiated in February 1945, with the first airplane making its initial flight prior to VJ day. This short six-month period from contract to first flight was an indication that the direct development approach from the SB2C did offer significant benefits. One item of note on the new prototype was the engine's fan cooling — the fan being mounted on the propeller shaft.

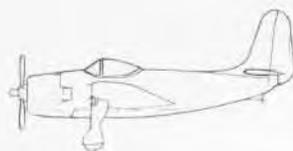
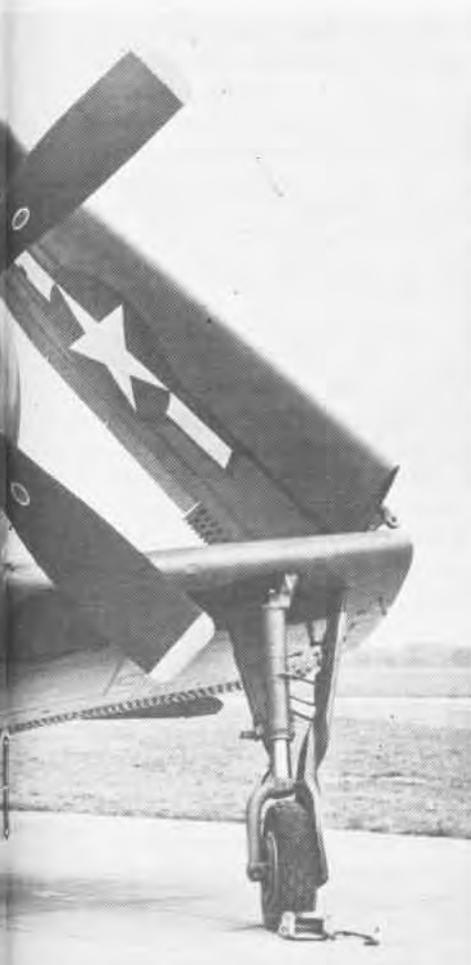
Flight testing of the prototypes, the next few appearing in monthly succession after the first, continued into 1946. However, production decisions had already been made in favor of the AD and Martin's AM *Mauler*. The XBT2C-1 did demonstrate that the restriction against clean terminal velocity dives and pullouts, which was necessary on the SB2Cs, had been overcome, though not without some further detailed fixes during the dive test program. Nine of the 10 aircraft built were delivered to the Navy and used for various R&D purposes before being scrapped in the late Forties.





XBT2C-1

Span	47'7"
Length	38'8"
Height	16'5½"
Engine	Wright R-3350-24 2,500 hp
Maximum speed	349 mph
Service ceiling	28,100'
Maximum range	2,220 miles
Crew	one or two
Armament	two 20mm guns
bomb bay	one, 2,000-lb. bomb, maximum
wing racks	two, 1,000-lb. bombs, maximum



PEOPLE · PLANES · PLACES

Awards

VS-38, North Island, and VS-31, Norfolk, have received the CNO Aircraft Maintenance Award for the second consecutive year. The Golden Wrench is presented annually to the VS squadron which has the most outstanding maintenance program. Both squadrons fly the S-3A.

SecNav awarded the Navy and Marine Corps Expeditionary Medals to *Midway* and CVW-5 along with other naval units which have been operating in the Indian Ocean, Iranian and Yemen waters since December 1978. Authorized in 1936, the medals have been awarded on only three other occasions: for the defense of Wake Island, December 7-22, 1941; for support activities involving



Cuba, January 3, 1961, to October 23, 1962; and Thailand, May 16 to August 10, 1962. *Midway*, commanded by Capt. Thomas F. Brown III, is the flagship of Commander, TF 77.4, RAdm. R. E. Kirksy.

Former Gray Eagle, LGen. Thomas H. Miller, USMC(Ret.), met the first Gray Owl at a ceremony during a Naval Aviators'



luncheon in the Washington, D. C. area last summer. The Gray Eagle award honors the Naval Aviator on active duty with the most longevity as a pilot. The new Grumman-sponsored Gray Owl Trophy was given to Capt. George Larocque, as the Naval Flight Officer who has held that designation for the longest period (*NA News*, July 1979, page 4). VAdm. Frederick C. Turner, USN(Ret.), former DCNO(Air Warfare), center, got the two together.

The *Boomerangers* of VP-48 were presented the Tactics Bowl Trophy for the second consecutive year. The award, conceived by ComPatWingsPac in 1975, offers an incentive to the patrol squadron community to evaluate ASW tactics and techniques to improve on-station effectiveness. Squadron C.O. is Cdr. Duval Woodford.

VAdm. G.E.R. Kinnear, ComNavAirLant, presented the 1978 Golden and Silver Anchor Awards for retention to VP-26, whose efforts ranked first among all East Coast deployable squadrons. *Trident* skipper, Cdr. R. J. Petrucci, accepted the award and promised a continued and increased effort to respond to individual needs.

The NARU Norfolk Sea Power Presentation Team was awarded its third CNO Golden Centurion Award in May. With 38 members, it is the largest single group of speakers in the program. The only team to receive three awards, it received its first in 1974; its second two years later. Officer and enlisted members from naval reserve surface and air units spread the Navy's message to parts of Pennsylvania, North Carolina, Georgia and Virginia. NARU C.O. was Capt. Ralph Smith.

CNO's Bronze Hammer Award for self-help programs went to VX-1, Patuxent River. VX-1 won for its extensive improvement projects within the squadron's hangar and barracks spaces. Over a five-year period, squadron personnel remodeled 95 percent of its office spaces; renovated the unused, unfinished basement of the BEQ; rebuilt the coffee mess; painted the outside of the hangar, including squadron emblems; and remodeled several maintenance department spaces.

AMH1 Stephen A. Murray and AD3s Michael K. Denney and Jon M. Newcomer were awarded the Navy Commendation Medal for their heroic and unselfish acts aboard *Eisenhower* last February. When a VF-142 *Tomcat* slid out of control on the flight deck, both crew members ejected, leaving the F-14 dangling over the side of the ship. The three men rushed to the aircraft and secured the engines, which were running at nearly full power. Their performance prevented injury to other personnel and saved a valuable aircraft.

Records

While HC-6 Det 7 was aboard *Sylvania* (AFS-2) in the Med, LCdr. W. C. Mattox, OinC, and his men flew over 500 accident-free hours in their two CH-46Ds. They vertrepped 6,142 tons of cargo and transported 608 passengers, 55,625 pounds of mail and 56,090 pounds of cargo.

Several squadrons attained records in accident-free flight hours: HML-267, 54,000; VF-301, 30,000; VMFAT-101, 20,000; and VF-21, 10,000.

Miramar was the scene of a possible first in Naval Aviation when a formation of five E-2B *Hawkeyes* from VAW-88 flew over their home base. This is believed to be the



first time that an E-2 squadron has flown and recorded a five-aircraft formation. (Any challengers?) Skipper is Cdr. James D. Ream. The photo was taken by the VF-302 *Stallions*.

Anniversary

The Naval Air Technical Services Facility, Philadelphia, celebrated its silver anniversary on May 18. NATSF is responsible for the planning, procurement, distribution and management of the technical documentation required to support Naval Aviation weapons systems and related equipment.

PEOPLE · PLANES · PLACES

Honing the Edge

A helicopter from HMM-764 resembles a vehicle from outer space as it waits on the helo pad for troops to be extracted during Operation *Lightning Bolt* at Camp Pendleton. Under the scenario prepared by MTU-7, El Toro, classified U.S. documents were being held at the airfield, awaiting transportation to an enemy country. The



problem was to recapture the documents before they could be moved out of the country. The entire raid was to take only 15 minutes. The actual time was 15 minutes, 30 seconds, according to Maj. Glenn Takabayashi, raid commander. The helos landed on schedule with offloading times of 20 seconds minimum, 40 seconds maximum. Extraction times ranged from 140 to 205 seconds.

The *Challengers* of VF-43, *Oceana*, commanded by Cdr. E. T. Smith, hosted three camouflaged AV-8As from VMA-542, Cherry Point. The *Harriers* were incorporated into VF-43's aerial combat scenarios to provide greater realism for Atlantic Fleet fighter aircrews by simulating the type of situation they might encounter in combat. The aircraft are used by the Marine Corps in their specialized close air-to-ground support role.

Et Cetera

It's a very exclusive club. But then, its members at Kingsville are a pretty special group of men. Each man is authorized to wear a silver Enlisted Surface Warfare Specialist device. Previously, only officers who had earned the designation through extensive schooling were authorized to wear gold devices.

It all started when OSC Don Claypool saw the OpNav instruction authorizing the new Enlisted Surface Warfare Specialists Qualification program. Chief Claypool, BTCM E. B. Gray, command master chief, and 26 others at the station qualified, including AO1 Andrew W. Pitts III, who is believed to be the only aviation-rated Navy man at Kingsville to hold the designation. Capt. C. N. Tanner is air station C.O.

Television and movie star James Farentino was aboard *Nimitz* recently preparing for his role as CAG-8 in *The Final Countdown*, a movie being filmed aboard



the carrier. Farentino, another actor and some technicians were shown films of carrier and F-14 operations by LCdr. "Fox" Farrell, VF-84. Kirk Douglas stars as *Nimitz's* C.O. Martin Sheen plays an overzealous CIA agent who thinks the military brass is hiding something when the modern carrier is thrust back into the early Forties by an electrical storm. The leading lady in the film is Katherine Ross. Michael Douglas is the producer.

Paint wore off their throttle controls a long time ago and the sun's rays discolored the soft, gray fabric of the pilots' seats. Vertical metal frames which once housed vital telemetry equipment now stand as silent monuments to these grand old ladies of the sky. On May 7, 1979, the last two Lockheed EC-121K *Super Constellations* on the West Coast ended their 22-year reign at PMTC and proceeded to Davis-Monthan AFB and retirement. Although the P-3 *Orion*, their successor, is 15 years younger, Willy Victor pilots and crews feel that these fine old planes will never really be replaced.

Despite the fact that the last A-4 *Skyhawk* rolled off the production line in February, credence was given to the "A-4s Forever" bumper stickers when a new version of the aircraft took to the skies over Pensacola. Known officially as the OA-4M, the TACA (tactical airborne control aircraft) *Skyhawk* is a modified version of the TA-4F presently in service with the Marine Corps.

In May, NARU North Island's C-131 was officially christened the *City of Las Vegas* by Jo Briare, wife of the mayor of Las Vegas, at McCarren International Airport, Las Vegas. Capt. E. Massa, NARU C.O., explained that since Las Vegas has now become part of the Naval Air Reserve community, it was fitting that the airplane that carries the Nevada reservists to their drill site in San Diego be named for the city.



In a display of strength and readiness, HMH-462 took all of its CH-53s to the sky on its sayonara tour of Okinawa after over 10 years in the Far East. The squadron departed in June for MCAS(H) Tustin.

Film star Hal Holbrook settles into the cockpit of an A-6E *Intruder* at Point Mugu during the shooting of a scene from the upcoming movie, *When Hell Was in Session*. The movie is based on a book by the same name written by former P.O.W., RAdm. Jeremiah



Denton. Lt. C. W. Baumann (right) of the Navy Information Office in Los Angeles was escort and liaison officer for the movie crew.

PEOPLE · PLANES · PLACES

Fifty-five cadets from Bayside High School NJROTC, Virginia Beach, visited VF-43 at Oceana recently for a day's field



trip. In photo, Lt. Chuck Scott, ACM instructor for the squadron, explains the mission and capabilities of the T-38 *Talon* to interested cadets (left to right) Jeff Hunter, Frank Toy and Dennis Easton.

ADC Michael Mulholland received a pleasant surprise at NAF Washington, D.C., while performing his weekend drill as a reservist. Sitting on the flight line



was an old Grumman HU-16 *Albatross*, flown in by the Coast Guard for the Smithsonian Institution. Chief Mulholland,

who spent over 13 years in the Coast Guard before joining the Naval Reserve, was once a crew chief on that *Albatross*.

A flying fire fighter who once saved forests and wildlife in Alaska is now a Navy helicopter aircrewman specializing in SAR and recovery of remotely controlled supersonic drones. AD1 Clarence A. Estes is a shop supervisor at VC-5, Cubi Point. "Estes deploys as a swimmer at sea in dangerous waters," said squadron skipper Cdr. William Nordeen, "sometimes hundreds of miles out. The hazards of the sea and the chance of injury from the jagged metal of drones are always present." For his achievements during medevacs and rescue missions, Estes was awarded the Air Medal with Bronze Star. The seasoned aviation machinist's mate has accumulated 2,000 flight hours during the past eight years and is a current nominee for the Navy's Helo Aviation Aircrewman of the Year.

Visitors to Smithsonian Institution's National Air and Space Museum, Washington, D.C., will get a chance to see the "evil eyes" of HMM-163, currently deployed at Futenma. Painted on the nose of the unit helicopters, the eyes are the symbol of the *Ridge Runner* squadron which got the idea from Vietnamese sampans while flying missions in the UH-34D *Sea Horse* over SEAsia. 1st Lt. Tim LaJeunesse (in photo) researched the origin of the evil eyes and found that the UH-34s became known as ugly angels for their medevac missions and hair-raising missions into places like Ashau Valley northeast of Da Nang. LCol. Charles S. House, former C.O., wanted his squadron to have a different type of identifying mark. He chose the evil eyes found on fishing sampans



because the Vietnamese believe that the demon stare of the eyes frightens away evil spirits and results in a plentiful catch. The *Sea Horse* has long been retired from HMM-163 which now flies CH-46 *Sea Knights*.

Change of Command

ASO: RAdm. Duncan P. McGillivray
relieved RAdm. Paul L. Foster.

CVW-5: Cdr. Steven R. Briggs
relieved Cdr. Stewart D. Langdon.

CVW-17: Cdr. R. E. Tucker, Jr.,
relieved Cdr. P. H. Lineberger.

FAirWestPac: RAdm. Jack F. O'Hara
relieved RAdm. Lowell F. Eggert.

H&HS Beaufort: Maj. J. D. Littlejohn
relieved LCol. D. M. Bassett.

H&HS Yuma: Maj. Frank K. Koccevar
relieved LCol. William A. Cohn.

HAMS-31: Maj. John C. Sease relieved
Maj. Patrick J. Jones.

MAD Point Mugu: Maj. Frederick T. Bryan
relieved Col. Henry C. Ivy.

MATSG-90: Col. Franklin H. Heins re-
lieved Col. G. F. Gallagher.

NARU Alameda: Capt. David J. Walrod
relieved Capt. Maurice W. Rumble.

NARU Norfolk: Capt. John G. Colgan
relieved Capt. Ralph W. Smith.

NAS Bermuda: Capt. Richard W. Weir
relieved Capt. Robert L. Sewell.

NAS Point Mugu: Capt. James E. Webb
relieved Capt. O. G. Elliott.

RVAW-110: Cdr. Charles E. Ward relieved
Cdr. William H. Reed, Jr.

Saratoga: Capt. James H. Flatley III
relieved Capt. Edward H. Martin.

VA-25: Cdr. D. J. Wright relieved
Cdr. W. L. Butler.

VA-72: Cdr. Howard E. Koss relieved
Cdr. Hugh A. Merrill.

VA-85: Cdr. Ronald J. Zlatoper re-
lieved Cdr. Bruce B. Bremner.

VA-105: Cdr. Robert M. Nutwell re-
lieved Cdr. Brent M. Bennett.

VA-176: Cdr. Frank Stauts relieved
Cdr. Manuel Ortega.

VAQ-135: Cdr. Peter T. Rodrick
relieved Cdr. Mark Oetinger.

VC-5: Cdr. Michael R. Boston re-
lieved Cdr. William E. Nordeen.

VF-41: Cdr. David J. Formo relieved
Cdr. David W. Hoffman.

VF-101: Cdr. Francis J. Dougherty
relieved Cdr. Tommy L. Sanders.

VF-213: Cdr. John M. Smith relieved
Cdr. Terry B. Appelgate.

VMFA-251: Maj. Patrick J. Jones
relieved LCol. Fred J. Schober.

VMFA-451: Maj. Charles R. Geiger
relieved LCol. Rabun N. Patrick, Jr.

VP-11: Cdr. Glenn T. Martinsen
relieved Cdr. Edward M. Brittingham.

VP-44: Cdr. Donald W. Avery, Jr.,
relieved Cdr. William L. Vincent.

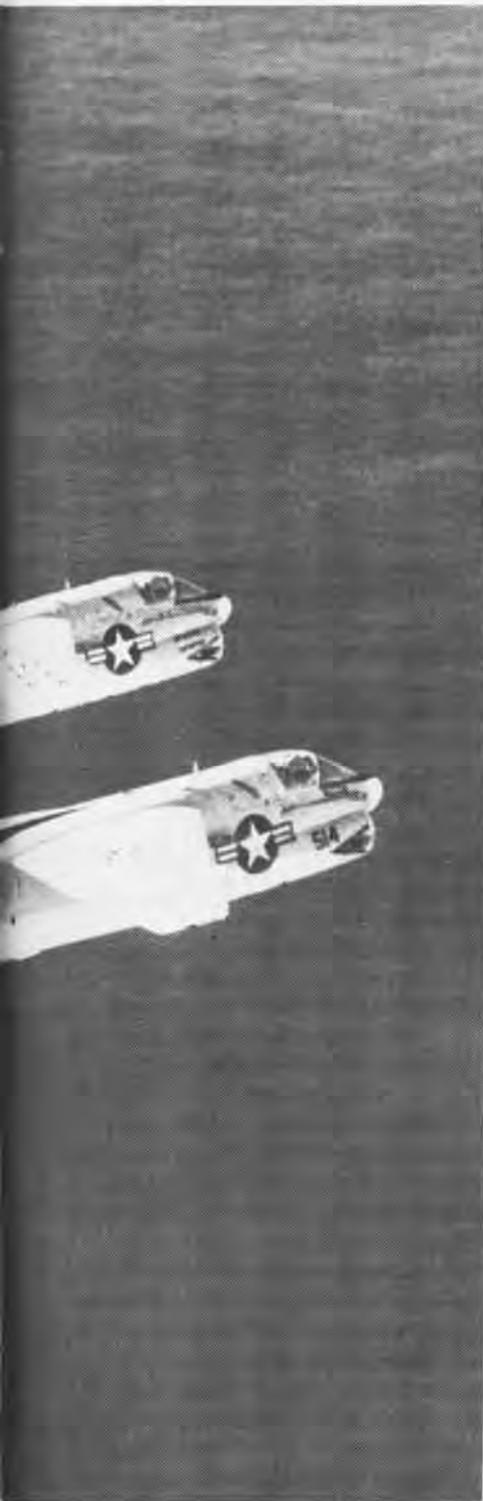
VP-45: Cdr. Robert F. Stephenson
relieved Cdr. William J. Rodriguez.

VP-94: Cdr. George B. Dresser
relieved Cdr. John J. Langan, Jr.

VS-33: Cdr. Raymond P. Miller re-
lieved Cdr. Terrence S. Todd.

VX-4: Capt. G. W. White, Jr.,
relieved Capt. Richard W. Burnett.





"It is essential that the Naval Air Reserve Force continue as a viable, visible and dynamic complement to our regular units. As former Commander of the Second Fleet I was able to observe and appreciate at firsthand the Air Reserve P-3 squadrons in action. Their contributions were instrumental to the accomplishment of our mission. And the P-3s are only one element of the Air Reserves.

"Capitalizing on the stockpile of experience which characterizes the Air Reserves is as necessary as it is wise. Indeed, it would be most difficult, if not impossible, to fulfill the overall Naval Aviation mission without them."

Vice Admiral W. L. McDonald

R+R=1

By LCdr. Arthur L. House

As our economy falters, unemployment goes higher and inflation continues to increase, government officials are continually trying to find areas in which to save an extra buck. Over the past several years the Naval Reserve has been singled out and scrutinized. For example, the FY 74 President's budget supported a Naval Reserve strength of 116,981, but by FY 80 the President's budget supported only 48,700 — nearly a 60 percent decrease.

Has the mission of the Naval Reserve changed drastically since 1974?

No! In fact, several studies have been undertaken in the recent past to validate the Naval Reserve mobilization strength requirement. Each study has concluded that the Reserve strength should be about 100,000. In order to maintain an effective Naval Reserve, the strength issue must be resolved in order to stabilize the Reserve program.

It must be realized by all echelons of the military and government that the Naval Reserve is *not* just an adjunct to the naval structure, but a *vital* part of it. The Reserves must be integrated with the Regulars to form

One Navy, i.e., R + R = 1. During mobilization, the Reservist must be able to effectively fill his billet or he will be of little use in time of need. Consequently, the Reservist must be accepted as a full partner during his drill weekend and his annual active duty for training (AcDuTra).

Admiral T. B. Hayward, Chief of Naval Operations, in his report on the Fiscal Year 1980 Military Posture, expressed his views concerning the Naval Reserve:

"Revitalizing the Naval Reserve is one of the principal objectives I have set for myself during the initial portion of my tenure as CNO. This attests to the importance I ascribe to that organization; but lest there be any doubt, let me make unequivocally

clear that I believe the Naval Reserve is an essential part of the Navy's wartime fighting capability. Its importance must continue to grow as the margin between the active Navy's capabilities and those of its Soviet competition narrows."

Organization

The Chief of Naval Reserve (CNavRes), located in New Orleans, La., has control over the entire Naval Reserve program. Rear Admiral Frederick F. Palmer, CNavRes, wears another hat as Commander, Naval Air Reserve Force. The mission of ComNavAirResFor is to command the Naval Air Reserve Force in peacetime and maintain the assigned personnel, aircraft and associ-

ated equipment in a state of operational readiness and availability that will permit rapid employment in the event of full or partial mobilization. The Naval Air Reserve Force consists of aviation squadrons, ASW operations centers and appropriate command staffs. The Reserve Force squadrons are organized to be fully equipped, priority manned and self-contained, and are designed to provide complete capability to meet wartime requirements upon mobilization. Each squadron reports to a Reserve wing. Each Reserve wing reports to ComNavAirResFor during peacetime, but reports to their type commanders during mobilization.

ComNavAirResFor controls eight percent of the Navy's aircraft — almost





400. In order to integrate the Naval Reserve into the active Navy during mobilization, the Reserve aviation force is split into wings – similar to the Regular Navy. The table on page 33 gives an overview of the Naval Air Reserve Force Squadron types by wings and the type aircraft flown by the squadrons. Although some of the aircraft flown by Reserves are relatively old, several are quite new and compatible with fleet aircraft. In order to ensure effective integration of Reserves during mobilization, Reserve aircraft must be as modern as possible.

Readiness

The readiness instructions the Reserve squadrons use are the same OpNav instructions that the active Navy uses, and the Reserve training syllabi are approved by the fleet type commanders. For example, Reserves are required to have regular flight physicals; swim, pressure chamber and night vision checks; Natops evaluations, instrument exams, OREs, bombing derbies, carrier qualifications; and so on – just like their USN counterparts. Reservists are Navy veterans and were trained while on active duty. Some Reservists have had 10 or 15 years of active duty. They know how the Regular Navy operates. Reservists have jobs just like active duty personnel – in operations, main-

tenance, safety, administration, etc. Since Selected Reserves drill one weekend a month and spend two weeks on AcDuTra each year, Reservists must be scheduled very effectively to meet these annual requirements. Although Reservists are being pulled in several directions at the same time, they have compiled an outstanding safety record. For example, during 1978, the squadrons in Carrier Air Wings Reserve 20 and 30, (CVWRs 20 and 30) despite demanding tactical missions, had a very low accident rate – 0.49 per 10,000 flight hours. Reserve squadrons place much emphasis on safety, retention and readiness.

Training/Active Duty Support

In addition to using aviation trainers, Naval Air Reservists participate in many naval exercises. In FYs 78 and 79 these included *Ocean Safari*, *Readi-Ex 1-78*, *NorPax*, *RimPac 78*, *Red Flag*, *Northern Wedding*, *FleetEx 1-79*, along with several refresher training and operational readiness exercises (OREs). The experiences gained through actual practice will be of immeasurable value during mobilization. The Naval Reserve accounts for 14 percent of Navy tactical combat assets, 35 percent of maritime air patrol, and 100 percent of U.S.-based logistics air capabilities. The Naval

Reserve *does* play an active role in the Navy.

A few active duty people are deeply aware that Reservists can perform active-duty missions. On many occasions the drilling Reservist has taken that active duty fleet services flight on Friday night, that 0-dark-30 sub-time (submarine exercise) on Saturday night, and that Sunday tanker flight. In addition, Reservists have relieved or augmented ASW active duty forces in places like Guam, Adak and Rota. This allows active duty personnel more time to train at their home base and more time to spend with their families between deployments.

For a 36-week period (February 10 through October 21, 1979), seven squadrons from Commander, Reserve Patrol Wing, Atlantic, augmented by two squadrons from Commander, Reserve Patrol Wing, Pacific, supported operations in the Lajes, Azores, ASW sector. Each Reserve squadron operated out of Lajes for a four-week period. Because of the good will generated between the Regular and Reserve units, they formed a new squadron (unofficially). For example, when VP-66 integrated its operations with VP-11, VP-77 (66+11) was formed. If one passed through Lajes while VP-66 was there, he would have seen VP-77 painted on the hangar.

Upon completion of its duty, VP-93 received a message of appreciation from VP-11 which said in part, "You have demonstrated that U.S. Naval Reserve Aviation is a ready, willing, able and equal partner of the Maritime Patrol Forces."

In July 1979, when VPs 69 and 91 ended their AcDuTra at Adak, Alaska, Rear Admiral C. O. Prindle, Commander, Patrol Wings, Pacific, sent a message which stated, "Your performance at Adak strongly confirms my belief that, should the need arise, ResPatRonsPac can readily support PatRonsPac in our area of interest. You can expect my direct support in all your endeavors. I look forward with pleasant anticipation to your next AcDuTra period with PacFlt."

Here are two concrete examples of how Reserves are supporting the Regular Navy to form One Navy.

Cost Benefits

The average operational cost (including personnel) to maintain a well trained Reserve squadron that is capable of performing its mission during mobilization is less than a comparable fleet unit's cost. A Reserve F-4N squadron, for example, costs about 67 percent of its active duty counterpart, a Reserve P-3B squadron about 43 percent. The saving is achieved because personnel are not on active duty 365 days a year. At the same time, although a Reservist is not on full-time active duty, he maintains suitable proficiency through his weekend training and AcDuTra periods.

In November 1976, the eight squadrons of CVWR-30 left San Diego aboard *Ranger* (CV-61) to conduct 10 days of operations which were billed as a first for the Naval Air Reserve — a Reserve Air Wing underway operational readiness evaluation. It was considered a success. In November 1978 CVWR-20 deployed aboard *Independence* (CV-62) for one week. The wing's purpose was to update the carrier qualifications of air wing personnel and to conduct cyclic operations to help work up the capability of the ship's air department personnel to control and work the aircraft on the

seagoing air station.

Dr. Bernard Rostker, Principal Deputy Assistant Secretary of the Navy (Manpower and Reserve Affairs), and Robert Connor, Deputy Assistant Secretary of the Navy (Reserve Affairs), were among the VIPs who watched CVWR-20 perform. Both had very favorable comments. Secretary Rostker commented, "The air wing looked great, but I wasn't surprised since I had read so many good things about it." In addition, Secretary Connor stated that, "While the whole air wing was not aboard during my visit,



it was my observation that not only did our Reservists do an outstanding job, but they were looked upon by the Regular Navy as thoroughly competent and top-notch in all respects." CVWR-20 operations aboard *Independence* illustrate the value of the Naval Reserve.

Each year the air wings go through an ORE. In June 1978, CVWR-20 received an overall grade of outstanding. Rear Admiral James D. Ramage, USN(Ret.), commented: "These Reserve squadrons demonstrate maximum readiness at minimum cost: the

name of the game. During my 37 years of naval experience, I have never seen an air wing receive the award of outstanding in an operational readiness evaluation. For those unaware, the grading is given by the same personnel who inspect the regular air wings. The same requirements prevail."

Since RAdm. Ramage's comments CVWR-20 has received a second outstanding during its ORE in June 1979 — a truly significant accomplishment.

Because the Navy does not have the resources to buy everything that it wants, it appears that the reduced cost

of Reserve squadrons is of great benefit to the Navy budget and to the taxpayers of America.

A Reservist has been described as "twice a citizen." He (or she) spends a minimum, and often more, than one weekend a month away from his family plus two weeks a year on AcDuTra. In civilian life, he may be president of a corporation, a service station mechanic, a college student, a fireman, what have you. Whatever the case, Reservists serve because they want to serve — and to contribute to the Naval Aviation mission.



Naval Air Reserve Force Squadrons

Two Carrier Air Wings

- 4 Fighter Squadrons (F-4N)
- 6 Attack Squadrons (A-7B)
- 2 Light Photographic Squadrons (RF-8G)
- 3 Tactical Electronic Warfare Squadrons (KA-3B, EA-6A)
- 2 Carrier Airborne Early Warning Squadrons (E-2B)

Two Reserve Patrol Wings

- 13 Patrol Squadrons (P-3A/B)

One Reserve Tactical Support Wing

- 8 Fleet Logistics Support Squadrons (C-118B, C-131H, C-9B)
- 2 Fleet Composite Squadrons (TA-4J)

One Reserve Helicopter Wing

- 4 Helicopter Antisubmarine Squadrons (SH-3A/D)
- 1 Helicopter Combat Support Squadron (HH-3A)
- 2 Helicopter Attack Squadrons Light (HH-1K)

A FAREWELL



We wish to express our appreciation to Commander T. Goetz, Royal Navy, a former commanding officer of 849 Squadron D Flight and HQ Squadron, for his assistance in providing background information and photos, some of which he borrowed from the Fleet Air Arm Museum. Commander Goetz is now on the British Navy Staff in Washington, D.C.

By Helen F. Collins

It was a mess dress, white tie affair — with buffet, bar, band and disco. Royal Navy 849 Naval Air Squadron was leaving the scene with a zing. It was the squadron's farewell ball, held at Royal Naval Air Station Yeovilton, England, February 3, 1979.

The squadron's passing was of particular interest to the many U.S. Navy units which over the years have participated in joint exercises and shared and exchanged ideas, experience, men and material with the British.

The decommissioning was one step in the reshaping of Britain's Navy and the updating of its antisubmarine force — the changeover from the large strike carrier to the smaller VSTOL-equipped aircraft carrier of the future. Last December the Royal Navy retired its last CVA, HMS *Ark Royal*, and turned over its last conventional fixed-wing aircraft to the Royal Air Force. So ended an era.

B Flight (squadron detachment) of

849 Squadron was aboard *Ark Royal* on her last deployment to the States in 1978, when the carrier took part in exercises on the Atlantic Fleet Weapons Range off Puerto Rico and with U.S. units off the Florida coast. 849's B Flight, with its *Gannet* A.E.W. MK.3s, disembarked at NS Mayport to continue operations during the carrier's seven-week contractor-assisted maintenance period. B Flight personnel were the guests of VP-16's *Eagles* at Jacksonville during July and August, sharing hangar, office and ramp spaces. They carried out day and night proficiency flights and coordinated vectoring exercises with aircraft from NAS Cecil Field and the Florida Air National Guard.

The British squadron's ties to the U.S. go back to the day it was commissioned — in the United States at Squantum, Mass., on August 1, 1943.

In the early days of WW II, the Royal Navy's Fleet Air Arm was short

TO 849



of planes because all priorities went to the Royal Air Force for fighting the German Luftwaffe. The Fleet Air Arm took whatever it could get in the way of planes already on hand, and also bought some from the U.S. The antiquated old planes it flew in the opening years were later replaced by faster, more deadly craft. Four of the latter were versions of the best the U.S. Navy had to offer – *Corsairs*, *Hellcats*, *Wildcats* and *Avengers*. Britain sent men to the U.S. to learn to fly the American planes, and large numbers of Royal Navy flyers trained alongside their American counterparts at U.S. naval air stations. When individual training was finished, fighter and dive-bomber squadrons completed their unit instruction (commonly known as working-up) at NAS Brunswick, while torpedo squadrons trained at Squantum. Following this period, the squadrons returned to England. 849 Squadron arrived home on November

25, 1943, equipped with 12 *Avengers*.

After antisubmarine training and further work-ups, 849 was fully operational on April 20, 1944, and began armed-reconnaissance antisubmarine patrols. The squadron sailed for Ceylon in September, when *Avengers* were scheduled to replace *Barracudas* in the Far East. In the months that followed, embarked in HMS *Victorious* as the ship's torpedo-bomber reconnaissance unit, 849 put oil refineries in Sumatra out of action, and destroyed other major targets before reaching Australia. In March 1945, the British Fleet joined the U.S. Pacific Fleet at Ulithi. The squadron participated in strikes on enemy airfields and installations on the Sakishima Islands and Formosa, and then went on to strikes on Japan, some in the Tokyo area. With the end of the war, the squadron returned home and disbanded.

Almost seven years later, on July 7,

From left: B Flight Gannet A.E.W. Mk. 3 launching from HMS Ark Royal; formation of Hq. and B Flight Mk. 3s and T.5s; B Flight Gannet on last visit to United States.





A sampling of 849 aircraft: Gannet Mk.4 above; Skyraider, below.
Opposite page: top, Avenger; bottom, Wildcat.

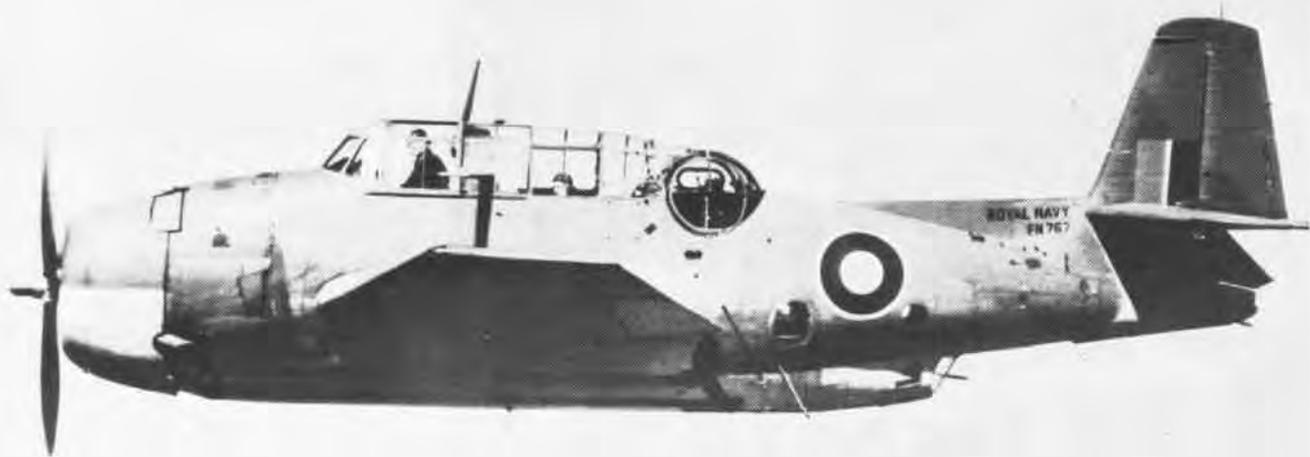


1952, 849 was reactivated as a front-line unit when 778 Squadron was redesignated 849. This time it had the new role of providing airborne early warning for the British Fleet, for which it was equipped with Douglas AD-4W *Skyraiders*. The squadron consisted of a shore-based Headquarters Flight and four operational Flights (A, B, C and D) which embarked, disembarked, disbanded and recommissioned to meet the requirements of the carriers.

During the 1950s and 1960s, 849 Squadron Flights were on the scene in a number of international incidents. In 1958, they stood by as a precaution during a crisis in Iraq. Later, they carried out reconnaissance during the suppression of a rebellion against the Sultan in Muscat, Oman. During the 1960s, they were on hand in an Indonesian confrontation and the Beira blockade, the Kuwait crisis in the Persian Gulf, and the mutiny of the Tanganyika army at Dar-es-Salaam. In November 1967, they helped during the evacuation of British personnel when the Federation of South Yemen became independent.

Their exercises and operations ranged along the north and south coasts of Africa, to the Indian Ocean, Singapore, Hong Kong, Okinawa and Subic Bay. Through the years, flights participated in joint exercises with U.S. Navy units, forging and strengthening links between the two armed forces. Also, a regular exchange of aircrews took place between 849 and its U.S. counterparts, a pilot and two observers/NCOs being exchanged with RVAW-110.

The squadron's aircraft inventory has included the *Avenger*, *Wildcat*, *Skyraider* and, finally, from 1960, the Fairey *Gannet* A.E.W.Mk.3, the only British aircraft built specifically for airborne early warning missions. It was a twin-engine monoplane powered by a Rolls-Royce Double Mamba turbo-prop engine. The plane achieved a unique pose when its wings were folded, the props were dressed and its hook was down. And its flight configuration was known to have raised an eyebrow or two. It could loiter on one



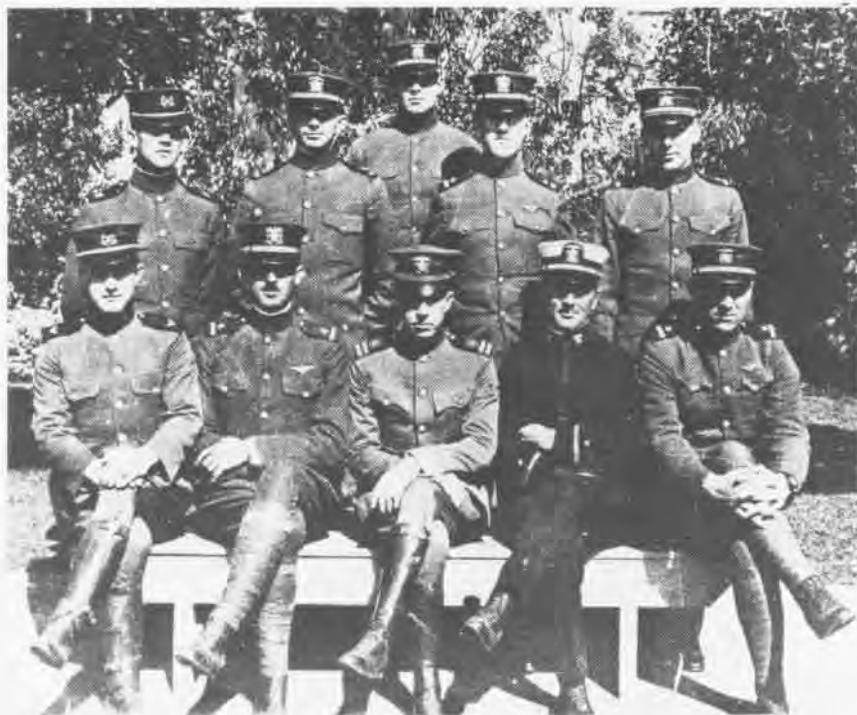
engine, giving the impression that it was flying on no engine. The *Gannets* flown by 849 Squadron were the last of their type when the squadron was decommissioned. While *Ark Royal's* *Buccaneers* and *Phantoms* were transferred to the Royal Air Force to continue carrying out their roles from shore bases, the AEW *Gannets* were gracefully retired after nearly 20 years' service. Their role is now carried out from ashore by the Shackleton AEW Mk.3 of the Royal Air Force

(equipped with radar sets from the *Gannets*) until the new AEW version of the *Nimrod* enters service in the 1980s.

When *Ark Royal* was withdrawn from service in December 1978, First Sea Lord Admiral Sir Terence Lewin said, "I have some cause for satisfaction in that the loss of the *Ark Royal* will, to some extent, be offset by the retention of the expertise of the men who sailed in her. In spite of modern technology and the associated benefits

in weapons system effectiveness, battles will continue to be won, or lost, not only by aircraft and ships but also by the men who fly and sail in them... In bidding farewell to the most powerful warship in the history of the Royal Navy, it is comforting to note that her power will remain, vested in the skill and dedication of the men who manned her." And so it is that as 849 and other Fleet Air Arm Squadrons have disbanded, dedicated men remain to serve in other areas.





The Way



By A. K. Warren, NA #183

This photograph of the first officer complement at NAS San Diego was taken in Balboa Park in January 1918. North Island was not operational at the time. Missing are Lt. Earl Winfield Spencer, Jr., C.O., and Amory L. Haskell, NA #180.

Until March of 1918 we used a couple of buildings in the park: one as a barracks for enlisted men and the other as a school for riggers and machinists.

One of my assignments sticks in my mind. I was to qualify four or five CPOs in permanent rating. Imagine me, a 20-year-old kid with only six months in the Navy, judging men with years and years of Navy life. All I could think of was "What could be their thoughts and feelings as they looked at me even though I had one stripe on my shoulders?" (The stripe was given me only because I proved I could fly an airplane.) Well, I broke out the Bluejackets' Manual, picked pages and questions at random which they answered verbatim. All I could do was give them passing marks.

While we were at the Park, there were three Burgess U-2s assembled and hangared in three small wooden

hangars which had been used by Glenn Curtiss while experimenting with flying boats and pontoon planes in 1911 or 12. Only one could fly — we had cannibalized the others for spare parts. The hangars were on the beach on the bay side of the island, above the high-water mark. There was a marine railway with a cradle the planes rested on to be rolled in and out of the water. The plane handlers wore hip-type rubber boots to service the aircraft in the water and to horse them on and off the cradles.

To qualify us for flight pay, the skipper consented to take us over to the island and, as planes were too valuable for any of us junior officers to be trusted with, he would take us up. So, on January 30, 1918, Spencer took me up in U-2 #381 for a short skidding circle to a landing. Total elapsed time was four minutes, which got me a 50 percent increase in my January pay. Next month, on February 28, he took me up again. He may have had more confidence, because that flight lasted 10 minutes. The dates and times are verified by my log book.

It wasn't until the latter part of

March that we started more or less regular flight operations. Lt. Frank Simpson, NA #53, was in charge of the flight school with Ens. Charles B. Ames, NA #193, and me the only ones regularly assigned as instructors. By that time I had a total of 45 hours in the air, including dual instruction. On March 26 I amazed myself and surprised the others by taking up a passenger who weighed 230 pounds. There must have been quite a breeze blowing because, in those underpowered planes, it was almost impossible to get off the water if the pilot weighed over 150 and was the only one in the plane — unless there was a bit of wind. All takeoffs and landings had to be made directly into the wind because any drift would wipe out the landing gear.

All during this time, temporary wooden barracks, a mess hall, and machine shops were under construction. I was asked to be an assistant supply officer (I think because I was the youngest officer aboard, with the least knowledge of what I should do, and therefore the least loss to the station). All I did was sign receipts for materials coming aboard, among them

It Was

eggs and bacon. (I had the best second breakfasts in California.) During this time, the cook, who had been a boxer in the fleet, had a scabag full of sand hanging from a rafter. His punching and shadow boxing added a little color to a routine job.

I was also in command of all communications components between the planes and shore – about 60 pigeons. Fortunately there was a CPO who had trained carrier pigeons in civilian life, so he and I trained certain groups of them . . . so they would be familiar with the quickest way back to the loft. They learned to ring a bell when they landed. Also, every day they exercised by flying around and around the loft until called in by a promise of food – a can containing dried peas or beans which we rattled.

The one real thing I learned in the Navy was that the Navy could not get from here to there, eat, sleep or shoot a gun if it weren't for the CPOs.

The N-9 was the main training plane used in 1917 and 1918. The motor on the plane in the picture is the 150-hp Hispano-Suiza which gave enough power to get the N-9 off the water when there was no breeze. For those of us who trained in and used the 90-hp Curtiss OX and the later OX-5, it seemed the hottest plane around. It could climb, maybe, about 300 feet a minute. Wow! The better motor was not available until about June or July 1918, at least for those of us in San Diego.

The latter part of November 1917, a student from our flight group, after a few hours of solo, thumbed his nose at the brass by looping right in front of the station for all to see. Boy, oh boy, he was beached for about a month as punishment. Up until that time there were strict orders against trying to loop.



Around December 1, the brass broke down and had one N-9 with an OX-5 motor set aside for stunting by any of the newly qualified Naval Aviators who were foolish enough to volunteer. This plane was specially tuned, its wires were tightened and, believe it or not, it had an airspeed meter which could register up to 100 miles per hour.

When my turn came, I talked to the instructors. They thought that the plane was so under-powered that you would have to dive to get up enough speed to get around the top. On December 2, 1917, after making sure

there were no holes in the fabric covering of good old #109, I took it up to 5,000 feet, nosed over and, when I saw the hand on the meter banging the 100 mark, I thought I must have enough speed and pulled up. When upside down at the top, I hung there and knew I did not have enough speed. When the plane fell off on the nose, I held it longer in a dive for more speed – and had the thrill of a good loop. After that I had learned enough to pull off three consecutive loops. Whether it is true or not, I was told that that was the first time consecutive loops had been made.

Golden Eagles Update

The Early and Pioneer Naval Aviators (Golden Eagles) held their annual reunion on both coasts this year. In order to allow as many of the 200 members as possible to attend, one mini-reunion was held at NAS North Island in April, the other at NAS Oceana in May. Vice Admiral M. F. Weisner, CinCPac and a member, was the principal speaker at San Diego; Vice Admiral F. H. Michaelis, USN (Ret.), also a member, was guest speaker at Oceana.

The new slate (Flight Deck) elected for the coming year is:

Chief Pilot: Vice Admiral B. M. Stream, USN(Ret.)

Pilot: Captain D. W. Tomlinson, USNR(Ret.)

Copilot: Vice Admiral William V. Davis, USN(Ret.)

Navigator: LCol. Thomas H. Wagner, USA(Ret.)

Radio Officer: Paul E. Burbank

Engineer Officer: Vice Admiral Howard E. Greer, USN(Ret.)

Orderly East: Colonel Stephen A.

Freeman, USAR(Ret.)

Orderly West: Rear Admiral Sherman E. Burroughs, USN(Ret.)

Historian: Henry P. Lewis

Captain Carl G. Olson, USNR (Ret.); R. Livingston Ireland; Rear Admiral Jesse Johnson, USN(Ret.); Rear Admiral John Jay Schieffelin, USNR(Ret.); and Commander Charles R. Wood are the Board of Governors.

The Oceana reunion included a meeting of the member selection committee at which prospective new members were selected to fill vacancies as they occur in the coming year. The time period covered in the membership selection was, generally, between WW I and WW II. The criteria for selection was: "Pioneer in some aspect of Naval Aviation or contributed greatly to Naval Aviation as a pilot."

About 54 percent of the members received their wings prior to the end of WW I. The rest, generally, received their wings between WW I and WW II. The bylaws also allow for 10 active-duty members.

LETTERS

All in a Name

I like your magazine but not its title. How about a name like *Navyation News* to show that the first word in aviation is Fly Navy.

Walter J. Abbott, ATAN
VP-94
NAS New Orleans, La. 70146

Ed's Note: We are always open to new ideas.

Leader

I am a Norwegian Air Force pilot, deeply involved in local WW II history. For several years I have been researching a joint RN/USN allied operation, *Leader*, which took place on the coast of Northern Norway on October 4, 1943. Its main target was German shipping from the town of Bodo and 90 miles south of there.

My research is nearly completed, but I would like to get in touch with any USN personnel (or their next of kin) aboard USS *Ranger* in September 1943. I would also like to get in touch with personnel from VF-4, VB-4 and VT-4 who were aboard *Ranger* in October 1943.

Knut Store, Lt., RNoAF
P.O. Box 171
8014 Hinnstadmoen
Norway

That's an-Oops

On page 26 of the November 1978 issue of *NANews*, you made a comment on the decommissioning of HAL 3 and VAL 3. It should have been VAL 4 instead of VAL 3.

Roger S. Nestegard A01
Ex HAL 3 member
VA 165

Touche'

In the "Trojan Training" article in the April edition, the commanding officer of VT-27 inferred, "We can outdo anybody at anything - a fact that has been proven time and again."

This may be true of *Trojan* training in Texas, but is certainly not true of *Trojan* training throughout the training command.

One need only review the Aviation Statistical Report to see that VT-6 is the number one producer of T-28 student Naval Aviators. Further, VT-6 produces these students in a shorter period of time with fewer instructors and fewer aircraft.

Statistical facts point out that VT-6 *Trojans* are airborne so much that we have little time for air shows and static displays. Being the "world's greatest training squadron" and training the "world's greatest aviators" is our primary mission and we are set to that task and proud of our record.

Thomas W. Holden, Maj., USMC
VT-6 Safety Officer

Ed's Note: En garde, or should we say touche'?

Anyone for a Lucky Bag?

The staff of the 1980 *Lucky Bag*, recognizing the interest that many people have in the Naval Academy, is, for the first time, making available to the public copies of the yearbook. For further information contact 1980 *Lucky Bag*, Advertising and Sales Manager, Midn. Winford Knowles (80), 21st Company, Bancroft Hall, USNA, Annapolis, Md. 21412.

USAF History

The Office of Air Force History is revising *United States Air Force History - A Guide to Documentary Sources*, originally published in 1973. In addition, two new areas are being added: oral history collections and aeronautical museums.

We are soliciting assistance in locating documentary and photo collections inadvertently excluded from the current publication.

Anyone having knowledge of such collections please submit information to Mr. Lawrence J. Paszek, Senior Editor, Office of Air Force History (CVAH), Building 5681, Bolling AFB, Washington, D.C. 20332.

Kudos

I thought the covers on the May 1979 issue of *Naval Aviation News* were another step forward for the magazine.

The futuristic typeface dropped out of the full cover backgrounds was very effective

and the painting by Captain Wilbur was especially good.

Bob Hensley
9205 Honeycreeper Court
Burke, Va. 22015

Bravo to the staff of *NANews* for the many breakthroughs in military publishing achieved by the magazine. The May 1979 issue, from the new logo and the color "hot rod" to Ted Wilbur's NC-4 on cover #4, is a good example.

Matthew H. Portz
Director, Office of Information
The Aerospace Corporation
P.O. Box 92957
Los Angeles, Calif. 90009

Reunions

The EA-6B *Prowler* community will hold its 7th Annual Electronic Warfare Symposium at NAS Whidbey Island, Oak Harbor, Wash., October 2-3. The theme will be airborne electronic warfare in the 1980s. For further details contact LCdr. Oleg Jankovic, autovon 820-2793; commercial, 206-257-2793.

VT-82 and VA-175 will hold their reunions concurrently with the Association of Naval Aviation convention in Jacksonville, Fla., October 18-21. VT-82 personnel contact Bill Bivins, Rt. 3, 12 Lakeland Court, Gulfport, Miss. 39503; VA-175 contact Jim Shannon, 66 Harmony Hall Road, Doctors Inlet, Fla. 32030.

A reunion of ship's crew and Air Groups 6, 7 and 80 from USS *Hancock* (CV-19) will be held in Boston, Mass., in July 1980. For additional information contact Bill Collieran, 7623 North Rogers Ave., Chicago, Ill. 60626.

The insignia's poised and cocky blackbird, regally attired in tails, sports a derby and boxing gloves which represent the squadron's tactical punch. The blackbird was selected for its vigorous nature in attacking and outwitting its enemies. The green derby signifies the original squadron colors as part of Air Group Four aboard *Intrepid*. The original four regular and 20 reserve pilots attached to the squadron are recalled by the 4 and 20. The shredded and smoldering cigar denotes that most of the pilots were older and more experienced than in many other squadrons. The addition of the spats sums up the total picture.

Published monthly by the Chief of Naval Operations and Naval Air Systems Command in accordance with NavExos P-35. Offices are located in Bldg. 146, Washington Navy Yard, Washington, D. C. 20374. Phone 202-433-4407; Autovon 288-4407. Annual subscription: \$18.00, check or money order (\$4.50 additional for foreign mailing) direct to Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Single copy \$1.50.



Home-based at NAS Cecil Field, Fla., and led by Cdr. G. R. Hertzler, Attack Squadron 45's primary mission is instrument training in TA-4Js. Attached to Light Attack Wing One, it also provides adversary training for the fleet. The squadron traces its lineage to VT-75 and VA-4B which flew Avengers, Helldivers and Skyraiders. Description of the insignia appears on page 40.





NAVY
NAVY

USS NIMITZ



9