NAVAL AVIATION

NEWS

Navy Looks Ahead
Grumman Panther
St. Louis Reserve

MAY 1948

RESTRICTED

CIRCLES AND ANGLES

The double runways in the top picture should make identification of this West Coast station easy; the circles in the lower have special significance. *Ans. on last page.*

LATE IN November, 1947, a squat, square jet fighter took off from a field on Long Island. Grumman Aircraft Engineering Corporation had produced another new Navy fighter, this time the XF9F-2 *Panther*. The *Panther* is the ninth fighter type that Grumman has designed and manufactured for the Navy.

Asked about the latest Grumman airplane, the Navy project officer, close-cropped, Major Mickey, Marine combat veteran, stated: "The XF9F is a typical Grumman product—a damned good Navy aircraft." And that statement is typical, too, of the Navy's sentiment about Grumman's products. For the fighter pilot, the Grumman *trademark* is one of the best single pieces of equipment any fighter plane can carry.

This attitude was not easily won. The first item Grumman produced for the Navy was almost not accepted at all. It was an amphibious float and the Navy declared, "It's too light to be safe." But Roy Grumman, a naval aviator in World War I, climbed into the back seat of a plane equipped with his float and said, "Send it off." Both the flight and the float were successful. Grumman Aircraft was in business with the U. S. Navy.

The three men responsible for Grumman and still the guiding lights of the company are Leroy R. *(Roy)* Grumman, Leon A. *(Jake)* Swirbul and William T. *(Bill)* Schwendler. Roy, Jake and Bill were young hard-working engineers for Loening Aircraft when that company was merged with Keystone in 1929—a year of many such mergings and submergings. Keystone had jobs for the boys, but they would have to move to Bristol, Pa.

Bristol turned out to be a busy little town, manufacturing such down-to-earth goods as whiskey, paint, chemicals and soap. Located on the Delaware river, just 20 miles from Philadelphia, Bristol slept under the same blanket of smoke and stench that covered her big sister to the south. To the boys, the wind appeared to be a prevailing southerly.

It was a short conference. The lads from Long Island said, "Let's go back to the Sound." A few days later the three went down to see Commander John Towers, then assistant Chief of BUAER. They had an ambitious amphibious float in mind; "was the Navy interested?" The now Admiral Towers, USN (Ret.), would not commit the Navy. However, he admitted that anyone who could build a good amphibious float could probably do business with BUAER.

The boys returned to Long Island and a new corporation was born, Grumman Aircraft Engineering.

Floats To Fighters—Grumman Worked Up

THE NEW corporation was not depending entirely upon Navy business to stay in operation. Its primary means of income at first was derived from repair work on the Loening "Air Yachts", still flying. The corporation's first home was a garage on Long Island. It was touch and go for a time. The Navy wasn't immediately impressed with the Grumman float. They considered it too light.

But in the end, the float proved itself and small orders began to come in. The occasional repair job on some beaten-up "Air Yacht" helped. But Grumman had to stray afield from its "aircraft" concept now and then to keep going. During 1930 it built some 25 truck trailer bodies. Then a new model float was produced and larger orders came in from the Navy. In 1931 Grumman was ready to try its wings and showed a fighter proposal to the Navy. BUAER liked it and Grumman received its first aircraft contract.

EVEN THIS first plane that Grumman produced for the Navy showed the progressive spirit that has always marked the company's history. Up to that time, no military airplane had been produced with retractable landing gear. "It can't be done successfully," said the experts. "It would be nice, but the weight makes it impractical."

So Roy, Jake and Bill produced the XFF-1, the world's first military fighter with retractable gear.

By present day standards the old XFF-1 wouldn't stack up so well. But back in 1932 it was a red-hot airplane. It had the stubby, chesty appearance that has become the "mark of the beast" of Grumman airplanes.

The Navy liked this first fighter so well that they put in an order for some scout planes using the same basic design. Inasmuch as the XFF-1 was a two-seater, conversion to the scout configuration was a simple matter. Not so simple was the still additional modification of the XFF-1 design into the XJF-1, the first Grumman utility plane. The XJF was an amphibious adaptation of an SF-1.

Not content to relax yet, Grumman next designed and submitted to the Navy, the XF2F-1 proposal. It was the first single-seat fighter by Grumman, and the first of the still continuing F-number-F planes to join the Navy. The speed of this beer-barrel fighter was 250 mph.

FF-1 Built in 1932 this two-seater fighter was the first Grumman design, featured retractable landing gear

SHOT UP BUT HOME THIS HELLCAT SHOWS WHY THEY'RE CALLED TOUGH

By this time, 1934, Grumman was established with the Navy. In rapid succession came the J2F-1, the SBF-1 and work began on another modification of the F2F. In 1935, the famous F3F began to take shape. It was this plane that did yeoman service as the fleet fighter during the period just before Pearl Harbor, and as a fighter trainer later.

IN 1937 the preliminary forebodings of what was to come could be read in the daily newspapers. The Navy was expanding. Once more it turned to Grumman. "We want the latest, most modern fighter plane that can be built," the Navy told the company.

The answer was number one of the famous "cat" series. It was a midwing monoplane, the XF4F. With the F4F *Wildcat* came some new features that have since become synonymous with Grumman, the square wing tips, the squared rudder and elevators.

The *Wildcat* still had hand-cranked wheels and flaps; it still had the narrow housed-in-fuselage landing gear, but it was sturdy, fast and good enough to save the day at Guadalcanal. For this was the plane the Navy was using when she entered the war. There weren't enough of them available on 7 December, 1941, but production was multiplying rapidly. There were French and British orders to be filled in addition to the Navy's growing demands.

F2F Successor to the FF-1 design was this single seated fighter; Navy liked it well enough to buy 54 of them

WILDCAT WAS A FAMILIAR SIGHT ON FRENCH AND BRITISH SHIPS TOO

The *Wildcat* was to serve as a foundation in which to design the famous F6F. An innovation that came with the F4F was folding wings. The Navy was building small carriers, and it wanted to pack in plenty of planes on the restricted decks. The folding wing permitted a carrier to double its complement of fighters.

Just prior to the war, Grumman was working on another revolutionary idea, a twin-engined carrier plane. A retractable gear had been produced while critics said it couldn't be done; now Grumman was trying to produce a twin-engined fighter while the experts said "no." The plane was the XF5F. The *Skyrocket* never went into production, mostly because the war came along and the Navy had to have "proven" planes fast. Now, it couldn't afford to gamble. A later Grumman twin-engined fighter, the F7F, showed what might have been, if there had been time.

In 1942, the first year of the war, the Navy was busy putting together pieces of Pearl Harbor and fighting a war. New demands were placed at the Grumman doorstep. How they came through is shown by one production story.

After a task force operation that resulted in heavy Navy aircraft losses, additional Grumman planes were urgently needed. The factory was already straining under a tough production schedule, when, on a Friday afternoon, Jake Swirbul spoke to the men in the shop. He explained the circumstances and asked the men for 25 planes over the scheduled amount by that Sunday morning. The day shift worked through that night and the following night, and on the appointed morning there were 30 additional *Wildcats* ready for delivery.

In early 1942 Jake Swirbul took a trip out to Hawaii and spent a few days talking to returning fighter pilots. These boys said what they needed down south was "a fighter on the order of the *Wildcat*, only more so, and more of them."

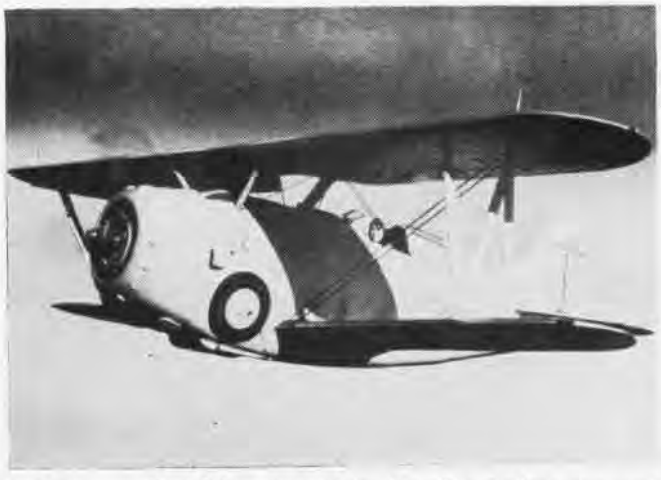
Jake could tell the boys that their plane was already in the works. It had been begun in 1941 and it was rapidly taking shape, as the F6F. But when Jake went back to Bethpage on the Sound, there were a few changes "just for the boys." And for those pilots on the small carriers, who were flying the *Wildcat*, the F4F-8, prototype for the FM-2 began taking shape.

In July of 1942, the first XF6F *Hellcat* flew. It had been one of the fastest design and engineering jobs on record. By year's end, the first Navy squadron had been equipped with *Hellcats*. This was the plane the pilots wanted.

ONE OF the reasons why the *Hellcat* was good, and why it got to the fleet in time, exemplifies the thinking behind Grumman. A new engine was in the works and would be available for the *Hellcat*. It would give the plane a little additional power and speed. But no matter how good a new engine appears on paper prior to production, it could give a lot of trouble during its first cruise.

There would be wrinkles; it might hold up plane delivery to the fleet. It might cause added pilot loss. "No," said Roy Grumman, "we'll install that engine later, after enough of the planes have been produced to meet the needs, after the engine has proved itself. Right now we can give the boys a better plane than they have. Later we can improve their situation even more—right now, let's be sure of improving their situation—right now!"

The record of the F6F in the Pacific speaks for itself. How the boys felt about the rugged *Hellcat* speaks well for it too. The F6F was a wide-wheeled fighter that Grandmother could fly, and it had a reputation for getting home *after* getting the job done.



F3F Best fighter type of its day, this airplane was used to teach aviation cadets fighter tactics during war

F4F Produced in 1931, the famed *Wildcat* was first Grumman midwing monoplane; it was used throughout war

In Peacetime Grumman Is Still Going Strong

SHORTLY after the war began, a need was felt for a night fighter. To meet this need, Grumman returned to the twin-engined concept. Begun in late 1942 and flown in 1943, the F7F *Tigercat* provided some more firsts for Grumman. Though it never got into combat, the F7F was the first twin-engined operational carrier plane and the first tricycle-geared plane to operate successfully aboard carriers. It still remains one of the Marine Corps first-line fighters.

The F8F *Bearcat*, one of the outstanding fighters in use today, and one of the two front-line carrier fighters, never got into combat during the war, though it did reach the fleet prior to VJ day. This plane was contracted for in 1943 and flew late in 1944. Originally designed as a carrier interceptor, the F8F, since the war's end, has proved its mettle against all competition. Its short, stumpy frame gets off the ground faster than any other fighter flying, and it holds the world record for fastest climb to 10,000 feet.

Navy pilots chuckle about the surprised Air Force pilot who pitted his P-51 against the F8F in a mock dogfight. The planes took off side-by-side from standing start, and, so the story goes, the *Bearcat* made two passes on the P-51 before the latter got his wheels and flaps up. Whether the tale is true or not, it shows what naval aviators think of the F8F. Reminiscent of the F4F in size, the F8F is of typical Grumman stock.

GRUMMAN did not enter the jet field until well after the end of the war. This was a Navy decision as much as Grumman. Production of operational models could not be jeopardized by experimental work in the jet field. After the war was over, contracts still had to be filled on the *Bearcat* and the *Tigercat*. It was late 1946 before Grumman proposed the XF9F-2. Early 1947 saw the mock-up, and before the year ended, the *Panther* had flown.

The XF9F-2 is a plane by Roy, Jake and Bill, just as was the XFF-1. Not that they personally designed and built the plane, undoubtedly the large staff of engineers and plant men did most of that, but the spirit of these men is Grumman. At Bethpage today one finds the same old instinctive ability to recognize and solve problems by the most direct methods.

The *Panther* is powered by a single centrifugal flow jet turbine. However, it can use either one of two different

XF9F PANTHER NOSE CAN BE TAKEN OFF AND REPLACED IN FEW SECONDS

models interchangeably, the *Nene* or the Allison J-33. The *Nene* is a British engine being produced in this country by Pratt and Whitney, and is the more powerful of the two powerplants. The Allison J-33 was one of the first American jets to go into large scale production, and is the powerplant used in the P-80 and the XP4M.

Of the first 100 F9F-2's that have been contracted for by the Navy, about half will be powered by the *Nene*, half by the J-33. This dual source of engines could be very handy in case either engine manufacturer developed shortages.

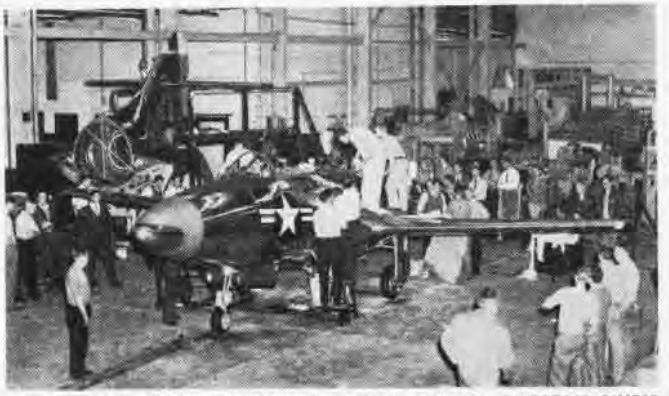
A jet plane requires a high speed wing, and a high speed wing makes landings hot and take-off runs long. A good carrier plane would have to keep these factors down, and Grumman has a reputation for building good carrier planes. What would slow down landings and expedite take-offs without compromising the high speed qualities of the plane? Conventional flaps could hardly be improved; there is a point at which added flap area doesn't give additional lift. And most modern planes have just about reached this limit. They had to go elsewhere.

THE GERMANS had fiddled around with a wing incorporating a type of nose-flap design. It was a wing whose leading edge deflected down in conjunction with the trailing edge flaps to further increase the wing's camber. In theory it was an excellent idea, but when the Germans tried it out on one model it didn't prove too successful. Why not? Grumman engineers looked over the German design and decided the failure had been due to faulty workmanship. They figured with the Grumman "touch" the design would work fine.

So, about six inches of the leading edge of the *Panther's* wing was hinged and dubbed a "droop snoot." On landing

XF5F Performance figures were beautiful on this twin-engined *Skyrocket* but it never reached production

F6F Total of 12,275 *Hellcats* were bought by the Navy during war; they did a big job on carriers in Pacific



AND THE TAIL COMES OFF MAKING ENGINE CHANGE OR REPAIR SIMPLE

and take-off the wing deflects down and joins forces with the regular flaps to give the high speed wing a large camber increase. Results to date have been very good, although insufficient data have been gathered so far to establish how much of the good low speed characteristics are due to the "droop snoot" and how much to the conventional flap. At any rate, the *Panther's* take-off and landing performance approximates that of the *Tigercat.* For a jet, that is good enough to do some bragging about.

At SLOW speeds there is less ram effect into the turbine. If more power is suddenly required for wave-off or emergency, and the throttle is opened at low speeds, there is insufficient air coming in the regular inlet air scoop to maintain an efficient fuel-air ratio. The F9F-2 takes care of this problem by a pair of spring-loaded inlet doors on top of the aft fuselage. These doors open by air suction demand and work automatically when the engine is starving for air.

In these days fighter planes do considerably more than just fight enemy planes. Missions can be either offensive, defensive or preventive. They may carry only guns, or guns and rockets, or guns, rockets and bombs. Or they may carry cameras or radar alone. Whatever the mission of the *Panther,* its payload will be carried in the nose. To make the armament or electronic installations in the nose rapid and easy, the whole nose shell is made removable. This nose can be taken off in a matter of seconds, leaving the "cargo" compartment wide open for maintenance men or for the rapid installation of new equipment.

The powerplant of the XF9F is installed in the fuselage, and to make maintenance and engine change simple, the aft section of the tail can be pulled off. This leaves the engine completely open for inspection or repair work and makes pulling an engine a pushover.

Like most jets, the *Panther* production model will come equipped with wing-tip tanks. The original contract didn't call for auxiliary tanks so the first experimental model didn't have them.

From one to two years pass from the time a plane's design is conceived to production. Progress in aviation is rapid. If improvements were not incorporated into a growing design, the plane would be obsolete by the time it became operational. These same modifications, intended to keep the plane modern, are one of the reasons why some planes that begin life with such beautiful possibilities on the drawing board, wind up sluggish by the time they fly.

The *Panther* cockpit is of functional design, very roomy for a jet. The production model will be pressurized, feature controlled temperature, a pilot ejection seat, automatic radio direction finder, bubble canopy with quick release, and, rumor has it, ash trays and a cigarette lighter.

A FEATURE to gladden the heart of pilots who know something about ditching—from personal experience—lies in the speed brake installation. The speed brake is a double flap affair located underneath the fuselage just aft of the nosewheel well. These flaps go down at about a 45-degree angle when extended. This location is the approximate position of a hydro-flap installation. Tests are now being conducted by NACA, investigating the possibility of using the speed brake as a hydro-flap in case of ditching.

Preliminary studies indicate the flaps will work fine extended about 20 degrees and "beefed" up to take the water landing load. This will keep the nose up and the aircraft planing on top of the water until forward way has been lost—a condition having infinite advantages over the submarine tendencies of some fighters during ditching.

From its small beginning, the Grumman company has developed into a large, modern aircraft manufacturing corporation. A research department with facilities to evaluate the latest developments, a skillful, experienced engineering staff, and highly trained shop technicians combine in producing combat and commercial airplanes of top caliber.

Roy Grumman, Jake Swirbul and Bill Schwendler are no longer the jacks-of-all-trades they were in the early days of the company. They have made the transition to executives guiding the efforts of a large number of competent people, many of whom are outstanding in the aviation field.

The fundamental spirit of the company, however, remains unchanged. The executive doors are open to anyone and the willingness to tackle a tough job and get it done in record time remains the outstanding feature of the company. "If it's Grumman, it's a 'damned' good Navy carrier plane."

F7F *Tigercat* flew in 1944; strictly a Marine project at present; one big reason why Leathernecks are so gay

F8F *Bearcat* never got into combat, although it was with fleet by V-J day; it climbs to 10,000 feet fastest

GRAMPAW PETTIBONE

Really "Fouled" Up Flight

The pilot of an F6F requested and was granted a VFR clearance from NAS DALLAS to NAS ATLANTA on a routine ferry flight. He gave his estimated time enroute as 3 hours, T.A.S. 180 knots, and estimated time of take off as 1330. The distance from Dallas to Atlanta is approximately 610 nautical miles, but the pilot was counting on a good tail wind at his proposed altitude of 10,000 feet.

Shortly after leaving Dallas the pilot descended to stay under heavy precipitation. Flying alternately on instruments and by visual reference to the terrain, he passed Shreveport and Jackson without being able to see either city. Near Meridian, Mississippi he climbed to his proposed altitude after receiving a somewhat garbled weather sequence, which he believed indicated that contact conditions prevailed on the airways ahead.

After 1600 the pilot was unable to get an accurate check point because he was flying above a layer of low broken clouds. He did not know how much time to add to his ETA as a result of the low flying which he had done during the first two hours of his flight.

When he intercepted the South-West leg of the Atlanta range he started a let-down in an effort to establish his position along the beam. By this time it was getting dark and he was unable to get a positive fix. Turning to a heading which he believed would take him across the NW leg of the beam near the range station, he commenced calling Atlanta Radio on 3105 kcs. and also on VHF. When he could not establish communications with Atlanta Radio, he shifted to Channel 9 on VHF and tried to contact Atlanta Navy. He could hear other planes talking on VHF, but received no answer.

Finally he spotted the neon lights of a liquor store on U. S. Highway 41 about 20 miles from Atlanta. His gasoline was almost gone and after a futile search for the Cartersville airfield, he decided to land on an open stretch of highway. He was able to distinguish the pavement, but did not see a bridge ahead. With his wheels and flaps down he stalled the plane about 20 feet over the road. The right wing dropped, and the plane hit the bridge and cartwheeled through the railing into the creek 75 feet below. It was all over quickly.

The plane came to rest, right side up in about three feet of water and the pilot waded ashore unhurt. As shown in the picture below, the cockpit was just about the only part of the plane which was not demolished.

Grampaw Pettibone says:

Maybe there were a few more mistakes that you could have made on this flight, son, but it's hard to think of them.

In the first place your request for a clearance from Dallas to Atlanta that late in the day was in direct violation of existing ferry flight regulations. You couldn't have completed your flight one-half hour before sunset, even if you had been able to stay at 10,000 feet all the way. And both you and the weatherman could tell from the sequences that you wouldn't be able to remain VFR and fly at that altitude. You should never have asked for that clearance and IT SHOULD NEVER HAVE BEEN GRANTED.

Apparently, at no point in your flight, did you bother to figure out your gasoline consumption or check your ground speed and determine that you were not going to arrive in the Atlanta area until after dark. By your own admission you violated CAA regulations, and Navy instructions for ferrying aircraft by continuing on instruments with a VFR clearance.

But the mistakes that came close to killing you occurred during your forced landing. With twenty gallons of fuel remaining you should have thoroughly investigated the area of intended landing. Perhaps you *could* have landed safely on one side or the other of the bridge, but if any doubt existed you should have made a wheels-up landing. My files contain a great many reports on aviators who decided to put their wheels down for forced landings at night and suffered "injuries multiple and extreme."

I'm mighty glad that you at least remembered to lock the canopy open and to tighten your shoulder straps and safety belt before you hit. As far as I can see those were the only things that you did right during the entire flight.

Some Check

Not long ago a pilot who had not flown for over 11 months reported to a Naval Air Reserve Training Unit and volunteered to do some flying. He was assigned to a check pilot who was cognizant of his long lay-off and of the fact that he had never soloed in an SNJ.

The volunteer was given a 20-minute cockpit check out and observed two landings from the rear seat. He then made one landing from the front seat and his check-pilot informed him that he was safe for solo.

On his first solo landing he misjudged his altitude above the runway and failed to break his glide at the proper height. The SNJ hit wheels first at rather slow speed and bounced back into the air. The pilot applied power but evidently it was "too little and too late." The aircraft went out of control and struck the runway with the starboard wing.

Grampaw Pettibone says:

I concur 100% with the comments of the Commanding Officer which follow:

"This is an outstanding example of the failure of this Command to properly supervise flight checks of Reserve Pilots..... (a) Only thoroughly qualified check pilots will be employed in the future, (b) Check pilots themselves will undergo periodic checks, (c) All pilots who are checked out for solo will be required to build up sufficient dual instruction time to insure that they are safe for solo, (d) Before assigning pilots for solo flight, their records will be more carefully examined to insure that they are qualified in type and have been flying regularly enough not to require a check flight."

Test That Pistol, Son!

Case No. 1. An SB2C pilot was coming in for a landing in night FCLIP. The runway duty officer, who was stationed about 200 yards down wind from the LSO, noticed that the approach was being made with the wheels up. He had a Very pistol in his left hand and the Aldis lamp in his right hand. He immediately attempted to fire a red star, but had to pull the trigger three times before the Very pistol would fire. The pilot hit the deck with his wheels up just as the flare fired. Inspection disclosed that the pistol had a faulty trigger.

Case No. 2. An F6F pilot making field carrier landings at night forgot to lower his wheels as he came around for his sixth pass. The runway duty officer observed that the wheels were not down and attempted to fire his Very pistol. The pistol was not properly breeched and he could not pull the trigger.

He dropped the microphone which he held in his other hand, and tried to pull the trigger with both hands. At the same time an ordnanceman who was assisting the duty officer tried to fire another Very pistol, but due to defective shell the pistol did not fire until the third time the trigger was pulled. The pilot by this time had received a "cut" and landed wheels up.

Case No. 3. An F4U-4 pilot was making night touch and go landings. On his fourth approach he called the tower and reported wheels down and locked. He was cleared for a landing and made a normal approach, passing over the end of the runway at an altitude of about 75 feet. The assistant runway duty officer who was handling the Aldis lamp noticed that the wheels were up, and the runway duty officer fired his Very pistol.

The stars, however, did not blossom with normal brilliance. Then the runway signalman, 1200 feet further down the strip, tried his pistol, but again the stars appeared only as thin pink streaks. By the time a satisfactory warning was fired the plane was about three or four feet off the runway. The tower operator, who had noticed the defective flares, also gave the pilot a wave-off at this time but it was too late. Just as the pilot added throttle, the F4U hit the deck. The plane slid 1200 feet farther down the runway. The unsatisfactory cartridges turned out to be five years old.

Grampaw Pettibone says:

You could fire a Very pistol from now until Christmas for less than it costs to repair one of these planes. Never take it for granted that the pistol is in good shape, or that you know how to use it, or that your cartridges will fire properly.

Guardian Angel At Work

The *Corsair* pictured above has just completed an outside loop after crashing on take-off. If you look closely you can see the pilot's seat in the right foreground.

The engine failure occurred when the plane reached an altitude of about 75 feet and the pilot continued straight ahead and made contact with the ground in a three point attitude. The plane crashed through the field boundary fence, hit an embankment, and made a complete outside loop. It came to rest with the engine and part of the fuselage on the original course.

The seat containing the pilot was on the ground under the largest portion of the fuselage. Upon arrival of rescue squads the pilot was found in the seat, well strapped in, but in a dazed condition. The shoulder harness and safety belt were released and the pilot was rushed to the dispensary. An examination by the Medical Officer revealed a few small lacerations and bruises and a small flesh wound on his head. The next day the pilot found that his shoulders were pretty sore. Aside from these minor nicks he was uninjured.

Grampaw Pettibone says:

Even with his harness and safety belt snug, this pilot certainly had a mighty close call. I agree with the opinion of the accident board that he would very probably have been killed except for the fact that he was using these safety devices properly. Even so I guess it wouldn't be a bad idea for him to go right on saying his prayers regularly.

Navy Relief Call

Grampaw Pettibone says:

The Navy Relief Society has announced its annual call for contributions will begin on May 4 and run through June 6. The dates were chosen to commemorate the Battles of the Coral Sea and Midway. Grampaw Pettibone has seen this organization assist the dependents of many pilots and crewmen who were killed or injured in aviation accidents. This year the goal is to get the maximum number of contributors. Approximately $300,000 must be raised by individual donations. Everyone in the hazardous business of flying should be glad to contribute to the organization that takes care of our own people.

Starvation Diet

A Marine Corps pilot flying an F4U from a carrier to a West Coast air base encountered engine trouble at an altitude of 1800 feet. Being only a few miles offshore, he immediately climbed to 4500 feet hoping, in case of complete engine failure, to be able to make a wheels-up landing on good old terra-firma. As he came over land his engine continued to lose power. He checked his instruments and found that all engine gauges were within operating limits and put his fuel pump on emergency position, but shortly thereafter his engine gave its last cough and died completely.

Unable to make the nearest airfield, he picked out the best available spot—a fairly level plowed field almost directly below him. Maintaining 110 knots on the approach, he landed wheels-up, flaps all the way down, shoulder harness locked, with all switches off. The F4U slid to a stop right side up about 250 feet from the point of first contact. It received sufficient damage to necessitate a major overhaul, but the pilot got out without a scratch.

The investigating board found that the engine failure was caused by improper installation of carburetor adapter part #78796 which had been installed in an inverted position, thereby closing off the bleed line from the top of the fuel feed valve. As the engine warmed up, the pressure evidently increased to such an extent that the fuel feed valve would not open to allow fuel supply for the engine.

Grampaw Pettibone says:

This is an example of excellent pilot reaction in an emergency that was caused by careless maintenance. Gaining a little altitude while he had partial power enabled the pilot to reach a relatively safe emergency landing area. The plowed field turned out to be quite soft and a wheels-down landing would have been dangerous to the pilot and would probably have resulted in strike damage to the aircraft. Proper use of the shoulder harness allowed him to walk away from his crash unhurt.

This squadron inspected all carburetor adapter spacer assemblies for proper installation, and the skipper notes that all aircraft maintenance personnel, particularly carburetor mechanics, should be cautioned concerning the ease with which this part can be improperly installed.

Let's not have a repetition of this particular accident.

We grieve to state that Ensign Proud
Liked flying contact through a cloud.
The hill he found was hard and stable;
Our Ensign now is much less able.

NAVAL AVIATION'S MISSION

CLOSE AIR SUPPORT FOR LAND OPERATIONS IS LISTED AS COLLATERAL DUTY FOR NAVY AVIATION

SINCE the Navy, Army and Air Force were merged into one fighting unit, many questions have been asked about what function each would have in the event of another war.

General policies setting down the functions of the three were adopted at a conference of the Joint Chiefs of Staff at Key West, March 11-14, with Secretary of Defense James Forrestal.

A staff paper outlining these functions was drafted and forwarded to President Truman with the recommendation that it replace Executive Order 9877 dated 26 July 1947. "If he approves my recommendation, I shall promulgate the new 'Functions' paper to the Services for their guidance," Secretary Forrestal stated.

Each service was assigned specific jobs in which it had clear-cut responsibility. In addition, each was given collateral functions in which it would assist and supplement the other service, whenever such participation will result in increased effectiveness.

Strategic air warfare was assigned to the Air Force as a primary function. The Navy was assigned "as a primary function the conduct of air operations necessary for the accomplishment of objectives in a naval campaign. Provision has been made for naval aviation to participate in the over-all air effort as directed by the Joint Chiefs of Staff," the paper stated.

"Moreover, an understanding was reached, which does not appear in the 'Functions' paper, that the Navy will not be prohibited from attacking any targets, inland or otherwise, which are necessary for the accomplishment of its mission.

"Similarly, the Navy has been assigned the primary function of anti-submarine warfare, while the Air Force has been assigned that duty as a collateral."

"The Navy would not build a large carrier on the basis of its contribution to strategic air warfare. On the other hand, it might not be able to justify the carrier solely on the basis of its naval function, but a consideration of its purely naval function, plus the contribution which it could make to strategic air missions, might be enough to warrant its construction, if so decided by the Joint Chiefs of Staff.

"The functions of the Marine Corps were clarified also. In addition to the functions provided by law, i.e., to provide 'for service with the fleet in seizure or defense of advanced naval bases and for the conduct of such land operations as may be essential to the prosecution of a naval campaign,' the Marine Corps has been assigned primary interest in development of those landing force tactics, techniques and amphibious equipment which are of common interest to the Army and the Marine Corps."

A specific statement appears in the paper that the Marine Corps will not build up a second land army.

PRIMARY functions assigned to the Navy were:

1. To organize, train and equip Navy and Marine forces for the conduct of prompt and sustained combat operations at sea, including operations of seabased aircraft and their land-based naval air components. Specifically:

a. To seek out and destroy enemy naval forces and to suppress enemy sea commerce.

b. To gain and maintain general sea supremacy.

c. To control vital sea areas and to protect vital sea lines of communication.

d. To establish and maintain local superiority, including air, in the area of naval operations.

e. To seize and defend advanced naval bases and to conduct such land operations as may be essential to the prosecution of a naval campaign.

2. To conduct air operations as necessary for the accomplishment of objectives in a naval campaign.

3. To organize and equip, in coordination with the other services, and to provide naval forces, including naval close air support forces, for the conduct of joint amphibious operations.

4. To be responsible for naval reconnaissance, anti-submarine warfare, protection of shipping, and for mine laying, including the air aspects thereof.

5. To provide air transport essential for naval operations.

6. To provide sea-based air defense and the sea-based means for coordinating control for defense against air attack, coordinating with the other services in matters of joint concern.

7. To provide naval, including naval air, forces as required for the defense of the United States against air attack.

8. To furnish aerial photography as necessary for naval and Marine Corps Operations.

Collateral functions of the Navy include these specific instances:

1. To interdict enemy land and air power and communications through operation at sea.

2. To conduct close air support for land operations.

3. To furnish aerial photography for cartographic purposes.

FORRESTAL PAPER ASSIGNS ANTI-SUB WARFARE AS PRIMARY TASK FOR NAVY AND ITS AIRCRAFT

Cigar-shaped *Fury* taxis off midships elevator on *Boxer* preparatory to takeoff following hangar deck check on landing

Flight deck crews on the *Boxer* prepare the FJ-1 for catapulting test; Lt. Cdr. Elder made the first catapulted takeoff

FURY ON CV BOXER

FIRST operational squadron to land jets aboard a carrier was VF-5-A, which performed the historic feat by bringing two FJ-1's down on the *Boxer* 75 miles off the Southern California coast on March 10. Nicknamed the *Fury,* the FJ-1's landed and took off again to demonstrate their adaptability to carrier operations.

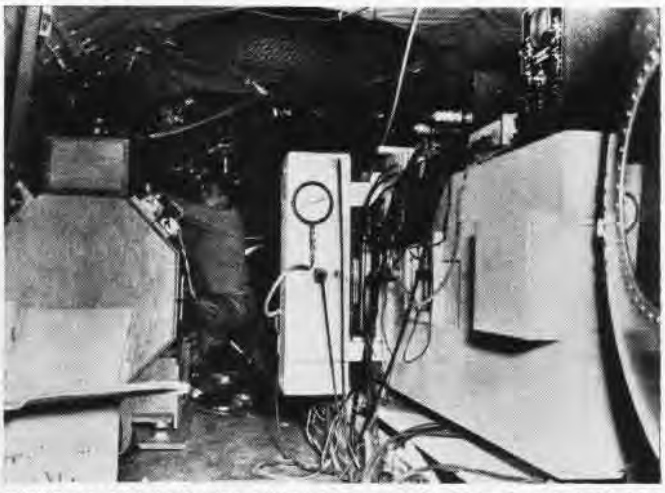
Cdr. E. P. Aurand, skipper of VF-5-A, brought the first one aboard, followed by Lt. Cdr. R. M. Elder, exec. Eight *Furies* took off from NAS SAN DIEGO and rendezvoused with the *Boxer* at sea. After twice buzzing the carrier in formation, two came in for landings at 110 mph. Aurand, first man on, caught the No. 1 wire and Elder the No. 2. The other planes did not land. Elder made the first catapult take-off. Between them, the two officers made 24 landings and take-offs. The FH-1 *Phantom* operated on the *Roosevelt* on 21 July 1946. Later, a P-80 also operated off the ship.

RAdm Harrill, VAdm Murray, Aurand, Elder, RAdm Greer, MGen Barcus and Capt. Ring, skipper of *Boxer,* pose

LSO and his assistants peer to see the *Fury* catch second wire during its qualification landings aboard the CV *Boxer*

These two men, Lt. Cdr. R. M. Elder, exec, and Cdr. E. P. Aurand, skipper of VF-5-A, made first FJ landings, takeoffs

THESE HYDROGEN BALLOONS ATTAINED AN ALTITUDE OF 107,000 FEET



INSIDE OF B-29 SHOWING EQUIPMENT USED IN COSMIC RAY RESEARCH

Cosmic Collisions

A STRIPPED down Air Force B-29 drones over Inyokern at 41,000 feet. In the Caribbean, a PV search plane reports a target on radar—bearing 165 degrees, altitude 80,000 feet. High on Mt. Climax in Colorado, a young scientist watches a light glow on a latticed screen. A man sits before a radar scope in the middle of the desert and reports a rocket ascent, "Now at 300,000 feet and still going up." A professor in New York develops a photographic slide and is exultant over a series of white spider-like cascades on his film.

These seemingly unrelated incidents are all part of cosmic ray research. For the past couple of years the Office of Naval Research has been sponsoring a number of cosmic ray investigations. These studies are being carried out at some 12 colleges and universities, by faculty members and students—experts in the field.

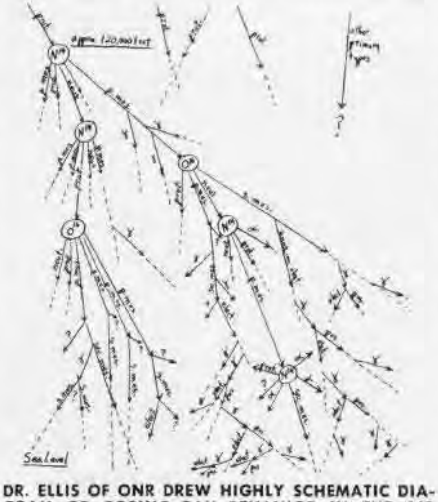
Without becoming too involved, the investigations are concerned with determining the *what* and *how* of cosmic radiation. Tremendous forces, as atom forces go, are involved in cosmic explosions, which, if they could be isolated and utilized, would provide a big step forward in atomic and nuclear research. In speaking of cosmic energies, one must keep in mind that the total energy brought to the earth by cosmic rays is about the same as by starlight. So when one talks of *tremendous* cosmic explosions, remember, the power involved wouldn't be noticed by an unhealthy gnat, but it knocks an atom cockeyed.

The earth is constantly under bombardment by a shower of nuclear particles arriving from outer space. These particles enter the earth's atmosphere

TYPICAL PARTICLE SHOWERS IN CLOUD CHAMBER

at terrific velocities, and when they hit primary atmospheric particles, a type of explosion or cosmic radiation results.

With these explosions, energies in the realm of one million Mev, i.e. million million electron volts, are involved. That's a lot of electron volts! The largest cyclotron man has ever built can only produce 250 Mev. The largest machine man has designed is expected to put out some 1000 Mev. Cosmic radiation then, produces a thousand times more electron volts than any machine man has even conceived in his



DR. ELLIS OF ONR DREW HIGHLY SCHEMATIC DIAGRAM OF COSMIC RAY BEHAVIOR IN THE AIR

mind, let alone produced. The ultimate goal of cosmic ray research would be the utilization of this gargantuan cosmic tool for investigating the structure of matter.

The particles raining into the atmosphere have been identified as mainly protons, by their tendency to converge around the magnetic poles. The proton is a well-known character scientifically. However, when the proton comes into violent contact with atmospheric particles, a less well-known by-product appears; this new character is the mesotron or meson.

UNTIL late in February of this year, a meson had never been artificially produced. Therefore the characteristics and mass of the meson have not yet been clearly defined. The life of the meson is short indeed, a fraction of a microsecond, so studying it in its natural state presents difficulties. However, in February a meson was produced at the University of California. Perhaps the secret will soon be out, the meson pattern established.

When the investigations began, although the whole subject was pretty much a puzzle, there were many immediate questions. What were the nuclear particles? What was the intensity of cosmic radiation? At what altitudes was it most intense? Did intensity vary with latitude? What types of nuclear reactions occur in the atmosphere?

In the two years of work on the subject, much has already become known. It has been established that the explosions are most numerous around 50,000 feet. The reason for this is explained by the line drawing.

AN INCOMING proton strikes an atmospheric particle at say, 120,000 feet. As a result of this explosion mesons, neutrons, etc., shoot off striking other atmospheric particles. The by-

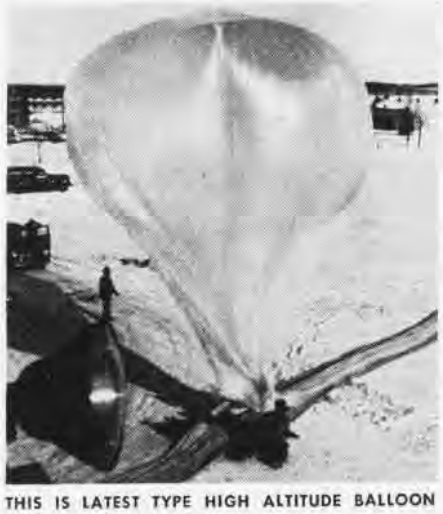
products of these secondary explosions, go rocketing off to set off other explosions. As a result of this initial proton explosion, perhaps a million or so resultant explosions occur before the initiating energy has been dissipated. As these multiple chain reactions occur, they penetrate downward. Maximum number of explosions is attained at around 50,000 feet. Most of the energy is gone by this time and these explosions produce fewer and fewer reactions at lower altitudes. Explosions are few and weak at the earth's surface. That is the reason that much of the cosmic ray investigation must be conducted at altitude.

At the present time, cosmic ray studies are being conducted at five altitude levels. Laboratories at various universities carry out sea level investigations.

Two laboratories on mountain tops, Mt. Climax and Mt. Evans in Colorado, study cosmic radiation at 12 and 14 thousand feet. A joint Air Force, ONR program utilizes B-29's for the third level work, conducted from 35 to 40 thousand feet. Balloons carry out the fourth level program at altitudes from 60 to 100 thousand feet. Rockets take it from there up 500 thousand feet for the fifth level program.

One of the principal pieces of equipment used in cosmic ray study is the Wilson cloud chamber. The Wilson chamber takes advantage of the fact that supersaturated vapor will condense more readily on ions, i.e. atom-carrying electrical charge, than on neutral molecules. If air saturated with water vapor is cooled by expansion just after an alpha particle has passed through it, tiny drops of water condense on the ions formed by the alpha particle and reflect a bright light strongly enough to be seen or photographed.

Photographs of proton activity such as shown on this page are analyzed by



THIS IS LATEST TYPE HIGH ALTITUDE BALLOON

scientists who hope to learn the secret of cosmic radiation. Until the recent U. of Calif. meson creation, this was the only method of research possible on this elusive nuclear particle.

THE WILSON chamber is the principal piece of equipment used in the B-29 investigations. It is also used extensively on the sea level and mountain top studies. The balloons and rockets normally carry a Geiger counter, radiosonde and various recording instruments. Quite often the gear sent up in balloons is retrieved. The equipment that goes up on the rockets, is like "My Darling Clementine . . ."—gone forever. So rocket research must rely entirely upon radiosonde and telemetering information.

The Geiger counter is a very sensitive instrument for detecting ionizing radiation. It "counts" any ionizing radiation that passes through it whether it happens to be an alpha particle, proton, electron, or photon. So it can be used to measure intensity of cosmic radiation.

A typical balloon investigation was carried out recently by Dr. Serge Korff and his associates from NYU. The experiment was initiated at San Juan, Puerto Rico. Two strings of eleven balloons were used. Each balloon group carried a set of radiosonde equipment, recording instruments and a Geiger counter. Sufficient hydrogen was carried in seven of the group of eleven balloons to just balance the weight of the equipment carried. The additional four balloons in each group provided the lift necessary to take the instruments to the desired 100,000 feet altitude.

After about an hour at altitude, some of the balloons break or are automatically cut loose and the balloons drift back to earth with the instruments. The equipment used in San Juan was expected to land at sea, so it was wrapped with waterproof covering and carried a bag of ping-pong balls for flotation.

San Juan was chosen in order to study the intensity of cosmic radiation at lower altitudes. Air currents were studied and a probable course charted on the basis of predetermined time-in-flight. Once released, the balloons were tracked visually and by shore radar to maximum distance. Aircraft provided by VP-ML-5 took over from there. The PV's tracked the balloons by radar up to altitudes of 107,000 feet. Coast Guard and Naval vessels stood by in areas where the balloons were expected to land.

Unfortunately, as occasionally happens, the cup sometimes slips before it hits the lips. And this time the balloons chose to stay out late. They came down during the night and were not picked up. The radiosonde equipment functioned perfectly however, and the data relayed back added another small segment to the growing pile of cosmic information.

So, in time, the secret of cosmic radiation will unfold. It is just another sector of the scientific frontier that is slowly being extended by the Office of Naval Research.

DR. KORFF (RIGHT) INSPECTS EQUIPMENT USED IN BALLOON RESEARCH

BALLOON BEING FILLED FROM A HYDROGEN CYLINDER IN PUERTO RICO

DID YOU KNOW?

NATS Studies Safety Ideas

Escape Lines, Outside Door Handle

Two safety measures for use on Naval Air Transport planes are under consideration, aimed to provide easier access to the interior in case of an accident and to provide a way to get out.

NATS aviation safety council task committee has recommended to BuAer that external handles be installed on all R5D cabin doors, designed to permit them to be opened from the exterior. Reports of a commercial airline crash indicate fewer persons might have been lost had it been possible for persons arriving at the scene to open the door immediately.

An R5D cabin door lock has been modified and the inside door safety lock removed. A mechanical device has been added permitting disengagement of the inside lock handle after the door has been closed. A lock permits locking of the door from the outside with a key.

The second feature, being tried by VR-4, is installation of two emergency escape lines at both doors of the R5D. These lines will tend to reduce probability of injuries sustained by passengers in the event the aircraft must be abandoned in a ground emergency. Where loading ramps are not available, passengers risk sprained ankles by jumping from the aircraft.

Navy Leaves Manus Island

NATS Evacuates Pacific Airbase Unit

NATS, Asia—Manus island, once the largest U. S. naval base in the Western Pacific, was serviced again by NATS on 26 January. A special flight was sent there to remove all of the remaining Navy personnel except one man.

In addition to eight military personnel, 22 civilians, who had been loading steel aboard naval vessels the past three weeks, made this evacuation by air. Delayed Christmas mail was sent down to these civilians containing candies, fruit cakes, and nuts. All passengers and crew were treated constantly with this Christmas joy, yet 27 of the 30 passengers requested the Maxson meal and praised it highly.

Fruit cakes were sliced with an eight-inch Maori knife, and it was an excellent dessert for the meal. The Manus Island Commander came out via this last trip without tears in his eyes.

Recognition *experts can spot these two new USAF jets for what they are, but how many garden-variety aviators can? The lower swept-back wing fighter with the hog-nosed air scoop is a sister to the Navy's FJ-1. The North American P-86 is classed at more than 600 mph. So great is the sweep-back of its tail surfaces that the starboard elevator appears to be missing in this picture. In the background is the companion plane, the B-45 four-jet bomber, flying formation with it at Muroc.*

Lightning Hits NATS Plane

R5D Takes a Bolt Flying to Hawaii

VR-8, Hawaii—If there is anything to the old proverb "Lightning never strikes twice in the same place," then an R5D in this NATS squadron should be a safe aircraft to ride out an electrical storm. It suffered a direct hit by lightning on 7 February while flying through a front 150 miles northwest of Kauai on a return trip from Midway.

Flying at 9,000 feet through moderate turbulence with some rime ice forming on the wings, the plane was experiencing considerable difficulty with radio communications. Suddenly an explosion was heard near No. 2 engine, and a distinct jar was felt throughout the plane.

Subsequent investigation disclosed that lightning had struck the aircraft, probably on or around No. 2 engine and had discharged from the tip of the port elevator, burning the fabric and the metal frame almost completely through. No. 2 engine cylinder head temperature gauge was knocked out but the engine otherwise was undamaged and ran without a hitch.

Signals could be received on the compass receiver only, and two-way radio contact was not established until VHF became effective through straight line transmissions. Plane Captain was Lt. Cdr. O. Malone and copilot Lt. Cdr. D. M. L. Hager.

Rules on Squadron Insigne

Designs Should Display Originality

Chief of Naval Operations has issued a circular letter outlining precedents for creation of squadron insignia.

ACL 8-48 states that "while no Navy Department directive covers subject matter or coloring of insignia, precedent dictated that:

1. The squadron number and designation shall not be used in the body of the insigne.
2. Identifiable aircraft which may become obsolete should not be used.
3. The design shall be in keeping with the dignity of the service.
4. The motif shall have originality.
5. The motif shall portray generally the mission of the activity and be of such scope that the design is appropriate for succeeding activities of the same mission."

NOW HEAR THIS!

WANT TO do something for the Naval Reserve and the Navy of the future?

When you get through reading your Reserve edition of NAVAL AVIATION NEWS, pass this copy on to some other former Navy man so he can keep up on what's new in Navy flying.

Or pass it on to the high school library in your community. Lots of high school boys are "hot" on aviation and they're the men the flying Navy of the future will be made up of.

Reserve Units looking for a "good turn" to brighten their day's record might subscribe to the NEWS in the name of their local library or send it to the model airplane clubs in their community.

NATS Licks 'Lost Planes'

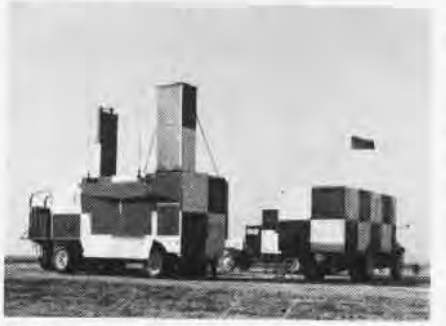
Seattle Maps Locate Aground, Flying

VR-5, SEATTLE—Flight control office of this NATS squadron has come up with a couple of ideas which may be valuable for other squadrons to adopt.

One is a magnetic aircraft position indicator board, installed in the office. It was originated by Lt. P. A. Schartz and built by him and C. S. Rhule, S1. Flight routes of VR-5 are drawn in color on regional D.M. charts and the completed map mounted on a lightweight plate of highly-magnetized metal.

Small horseshoe magnets were obtained and by means of removable inserts, miniature planes bearing bureau numbers of each VR-5 plane were placed on the magnets. On receiving position reports from enroute aircraft, the miniatures are moved along the corresponding position on the board, which measures three by six feet.

The second innovation is an aircraft spotting board. Although cognizant of the position of planes in flight, it sometimes is a problem to locate them on the ground around the hangars. So a plot of the hangar area was painted on a small board, with parking areas numbered for the hangar deck, loading ramp and parking of the plane. The board gives rapid and accurate reference to the spotted position of the plane on the ground.



El Toro's *GCA unit recorded its 2,000th landing during February, the Marine Corps air station there reports, in slightly less than a year's operations. It completed its 10th month of continuous duty without a landing mishap. In addition to Marine aircraft, 160 planes from outlying bases have made GCA landings.*

Those four *objects in the water of the picture above are not submarines. They are gray whales. NAS SAN DIEGO furnished a JRB and two aerial photographers to take Dr. Carl L. Hubbs of the Scripps Institute of Oceanography out whale hunting off Southern California coast. They photographed 25 on their way south to the bays of Lower California during the day's flight around San Clemente, St. Nicholas and Coronados Islands. Lt. C. W. Clampitt of NAS Operations piloted the Beechcraft.*

McNEILL, HOOD AND TOSH WEIGH COAL AT NAMC

NAMC Conserves Fuel Oil

Starts Up Fires in Old Coal Burners

To reduce expenditure of fuel oil, fires were started up on 19 January in the old coal burning boilers at the Naval Air Material Center at Philadelphia. This was NAMC's contribution to relieving the critical fuel oil situation that existed locally and nationally.

The amount of oil saved by the change-over was no mere drop in the bucket. All told about 2,200,000 gallons, contracted for during the period from 1 November 1947 to 30 April 1948, were released immediately by the Center. Getting down to cases, the some 501,000 gallons of oil saved during the first month were estimated to be enough to heat approximately 3,000 moderate-sized homes for the same time.

For NAMC's efforts Brigadier General Brenton G. Wallace, Fuel Oil Coordinator for Pennsylvania, wrote a letter to the Commandant 4ND expressing appreciation on behalf of the Governor and of the whole State for the wholehearted cooperation shown by him and by Rear Admiral Royce, Commander NAMC, in the emergency. In turn the Commandant commended Admiral Royce, pointing out that in addition to helping relieve the critical oil situation, a considerable financial saving was made since coal was cheaper.

The change-over, of course, did not take place without considerable work on the part of power house personnel and fuel handling crews. Actually the order for the conversion was received by Master Mechanic Edward F. Tosh on 16 January. That it was accomplished over the week-end was an outstanding achievement. Undoubtedly much credit should go to the know-how which Tosh, who had worked his way up the civil service ladder from oiler, had acquired in his 28 years of service in the Navy Yard and at NAMC.

In the first month more than 3,000 tons of coal were consumed. Unloading frozen loads from hopper cars not equipped to dump and operating in a 30 year old power house, where winter gales sifted through the warped windows, added to difficulties of work.

NAVY GCA SCORES NEW 'SAVES' HERE AND ABROAD

CUTTING a path through fog, rain and snow, GCA continues to pile up new victories in "helping to bring 'em in alive."

Most spectacular 'save' of the current crop was registered at NAS ATLANTIC CITY with the crew of a crippled PB4Y-1P sharing honors with the fast acting GCA unit.

Lt. Cdr. C. R. Eaton of VPP-2 was en route in the *Liberator* from Norfolk to Atlantic City on IFR flight plan with Lt. (jg) J. H. Roche, E. C. Saxe ACMM, C. D. Skillington ACRM and J. E. Campbell ACOM aboard.

Just prior to arrival at Atlantic City, multiple electrical failures developed with the VHF, radio compass, intercom and light going out. Chief Skillington was able to fix the light, but the only radio gear usable was the 3105 transmitter and 275 receiver.

Over Somers Point, Navy Atlantic Tower was contacted. Tower advised that the field was closed and the plane was to proceed to alternate.

At that instant the lights and radio failed again. Smoke with a typical insulation burning odor filled the cockpit. By cutting off the batteries and working on the generators, communications were reestablished on 3105-275, and permission to come into Atlantic City was requested. This request was granted.

Meanwhile Lt. F. F. Norris, officer-in-charge of the GCA unit, who had been in the tower, had driven out to the GCA unit which was being manned by the crew. The ground fog was so dense at that time that he would never have been able to find the unit, if he had not previously memorized the general layout of the runways and taxiways. As it was, he had to check and count off each runway light as it loomed up beside the jeep.

As soon as the GCA unit was put into operation, the plane was directed to come in. On the first approach, lights and radio failed. After these were fixed, a second approach was made. This time fire broke out and all gear failed again. Finally, although the batteries were dead, two generators gone and most of the wiring unfit to carry the current, lights and communications were reestablished.

The third approach was going fine until on final, when the lights went out for good and fire started in the plane's radio. At this point the plane was just short of the field and a little high. (Actually a wave-off was given, but, of course, was not received.) Just over the fog layer, the lights at the end of the runway were visible, so a decision was made to land. After passing the end of the runway at an altitude of about 40 feet, the fog layer was entered. Although visibility was such that only one runway light could be seen at a time, the plane rolled safely to a spot about 100 feet short of the end of the runway, then taxied slowly to the taxiway and stopped.

NAS Atlantic City GCA unit members F. Norris, T. Lassiter, A. Spano, T. Wright, W. Mullen, J. Wood, F. Drogen (rear) and VPP-2's C. Eaton, J. Roche, E. Saxe

THE FOG was so heavy that Lt. (jg) H. J. O'Meara, assistant GCA officer, who went out in the crash jeep to lead the plane to the line, was unable to spot the plane. Finally the sound of its idling engines was so close that he was afraid he might run into it, so a reconnaissance was made on foot. It was discovered 50 feet away from where the jeep had stopped. With the aid of a light truck, the plane was then led to the apron in front of the tower, where it remained for safekeeping until the fog lifted on the following morning.

Navy personnel are not the only ones whose lives are being saved by ground controlled approach units these days. Over at Kiangwan, China, airport, three C-47 aircraft were brought in within four hours in a field where normal instrument let-downs were impossible because of fog.

Two China National Aviation Corp., planes were landed by the Navy GCA Unit #2 at Kiangwan within 20 minutes of each other. Ceiling was 200 feet and visibility a mile. No alternate landing spots were open.

Later that afternoon Captain Leong of the same airline landed after having been given six wave-offs. He had not practiced GCA before but made excellent approaches to within half a mile of the runway, at which time his azimuth control became erratic, necessitating a wave-off. Unfortunately, the weather was practically zero-zero and he had not yet become contact at the half-mile point.

On the seventh run he reported 10 gallons of fuel left while on the downwind leg, so as an emergency measure the crew started an immediate approach with a two-mile final leg.

This approach was successful and the aircraft landed. A natural feeling of relief was experienced by all hands present. Lt. Jarman, OIC of the GCA unit, received a letter of profuse thanks from C. Y. Liu, managing director of the airline, for saving the three planes.

GCA BOX SCORE

February approaches	7,406
Actual instrument	307
Total approaches	90,930
Actual instrument	4,671

THE GCA unit at NAS GROSSE ILE recently "showed the way" to a couple of Reserve pilots who were caught out in some sticky weather in an SNJ and an SB2C. Neither pilot had made even a practice GCA run. To add to the hazards, the SNJ radio operated imperfectly. Both planes were brought in by means of flying formation and using the SB2C radio! Just as the SNJ was taxiing to the line, its gasoline gave out.

As a result all single engine Reserve pilots at Grosse Ile clamored for a GCA

lecture which was given to them that very afternoon. Now they are all practicing GCA landings.

Some weeks later, and perhaps with these landings in mind, a Grosse Ile Organized Reservist, who, as a civilian, was CAA control tower operator, recommended that a *Flying Tigers Line* pilot use Grosse Ile's GCA, when he was unable to land his plane at Willow Run due to ILS failure. The subsequent landing was successful, although this pilot, too, who was formerly with AAF, had never before made a GCA approach under instrument conditions.

DOWN AT NAS ATLANTA, recently, two landings were effected although weather was under existing GCA weather minimums. In the first instance, an SNB was over the field with insufficient gas to reach an alternate. In the other case an Army C-47, with General L. S. Hobbs, Deputy Commander 3rd Army, aboard, requested a GCA letdown because the only alternate was Miami.

When an AF B-25 called Columbus Approach Control recently for permission to let down over Columbus range to Lockbourne Field, since the engine was running too roughly to try for an alternate field, use of GCA was advised, inasmuch as the weather was below normal military instrument weather. An uneventful approach was made. The pattern had to be varied—early turn, long final—since the pilot, who must have had at least three dependents, made his approach at 170 miles per hour. After breaking through he was directed to Lockbourne, 12 miles south.

At NAS MEMPHIS the GCA unit is busy checking out pilots of American Airlines and Chicago & Southern, based at Memphis, in GCA procedures. In fact, checking out civilian pilots in these procedures is one of the routine services performed by Navy GCA units throughout the country.

And to spread the word about GCA even further, 32 members of the NROTC at the University of California recently visited Moffett Field for a demonstration. They were flown in two groups, alternating one group in the GCA trailer and one in the plane. The aircraft was rigged with an amplifier that reproduced GCA transmissions so that everyone in the plane could closely follow the approaches from the beginning. Like many others who have witnessed the wonders of GCA for the first time, the students were amazed at the ease with which a plane may be controlled through air-ground coordination and brought safely to the ground even under a possible ceiling of less than 100'.

Rough and Raucous

VR-5, SEATTLE—Although he had flown two winters in the Aleutian Islands which reputedly have the world's worst weather, Lt. Cdr. Fred Andretta, veteran NATS pilot encountered the most violent conditions in his career a few miles from Moffett Field, Calif. He advanced his experiences as a possible solution to the mystery surrounding many aircraft accidents during instrument approaches in severe weather.

Andretta's plane ran into bad weather in the San Francisco bay area. After starting his initial approach on Moffett, he ran into snow squalls, accompanied by light to moderate turbulence. As the descent continued hail became severe.

All range signals were obscured by static as the 7,000-foot level was reached and an immediate pull-up was made. Following a brief respite free of static at higher altitudes, a second approach was started. Again static and turbulence forced a climb out. On the third approach descent was accomplished to the 6,000-foot level, whence a routine let-down was made to Moffett by GCA.

Andretta stated that in addition to completely unreadable range signals and MHF and low frequency transmissions, it was the first and only time in his experience when the Green ADF antistatic loop was entirely unusable because of intense static, and this despite the fact that he was within 10 miles of the Moffett radio range.

He believes a pilot might easily be misled into continuing an approach by brief lulls in otherwise continuously obscuring static until, when below surrounding terrain, all radio contacts were entirely lost and a safely oriented pull-up impossible. A VR-3 R5D and an eastbound *Mars* arriving at Moffett the same afternoon reported similar conditions.

▲ ***BuAer Comment*—The static probably was caused by intense electrical fields due to charged cloud masses in the immediate area. A very carefully installed and maintained insulated antenna system usually will prevent corona with resulting static from the wire antennas even under these conditions. But the voltage may be so high that other parts of the plane may go into corona, radiating interference into the antenna.**

This emphasizes the need for "clean" airplanes with a minimum of sharp projections. If the plane was equipped with insulated wire antennas, they should be tested for possible insulation failure.

Some or all of the static may also have been caused by direct "atmospherics" caused by electrical discharges within the squalls. Research and development of special circuits for receiving equipment, it is hoped, eventually will minimize the hazards associated with loss of communications under these conditions.

NATS PILOTS' COURAGE SAVES LIVES

VR-3, PATUXENT—Pilot and crew of an R5D which crashed recently near New Orleans have been "highly commended" by ComNATS for the "skill and efficiency with which they handled a difficult situation" and saved the lives of their 14 passengers.

Flying along 15 minutes past New Orleans at 3 o'clock in the morning, the plane threw the propeller off its #4 engine, damaging the wing. The pilot, Lt. J. L. Scoggin, found vibration so bad he headed back toward the naval air station. It grew worse, so he put the transport down on the auxiliary field at Donaldsonville, a sod field with 2,700 foot runways and unlighted except for boundary lights.

A fast landing, allowing for a raised stalling speed due to the damage, was made in the darkness. The plane skidded out of the field, made soft and slippery by rains, across a road and up onto the levee along the east bank of the Mississippi river.

A fire started and burned the plane. Outstanding piloting and headwork

Lt. J. Rue, R. Pappan CSPV, Lt. Scoggin, A. Jembrysek S1c, Ens. J. Laubauch

demonstrated by Scoggin and Copilots Ens. J. Laubauch and Lt. John Rue had brought the plane down without injury to passengers or crew, other than shock.

In addition to this, the coolness demonstrated by flight orderlies CSPV R. Pappan and S1c A. N. Jembrysek can be credited with helping to save the 14 passengers aboard. They readied the passengers for the emergency landing and after the crash opened the main cargo doors and led the passengers out.

THIS IS the fifth of a series of short sketches of squadrons in World War II, based on reports filed with Aviation History, DCNO (Air).

VF 15

THESE FIVE VF-15 PILOTS ACCOUNTED FOR 21 OF THE 65 PLANES WHICH THEIR GROUP DOWNED

MILTON Caniff, author of "Terry and the Pirates," designed the insigne for Fighting FIFTEEN — a flaming cat with Navy wings—and the squadron in battle justified his dream of fury. These *bona fide Hellcats*, no fugitives from a comic strip, first dived out of the skies against the Japanese on 19 May 1944 against Marcus.

From 1 September 1943, when the squadron was commissioned at NAS ATLANTIC CITY, to 8 February 1944, VF-15 was skippered by that ace of Navy aces, Lt. Cdr. (later Cdr.) David McCampbell. Little did VF-15 dream that the C.O. was to send 34 enemy planes earthward in flames and win not only the Navy Cross twice but also the Congressional Medal of Honor. The skipper who made them flex their muscles in the cold New Jersey dawns and led them through months of intensive drill in the air and on the ground was a commander to be proud of. But that he should write across the Pacific skies such a record as was later his, these airborne warriors, unaccustomed to crystal gazing, could not know.

LT. CARR DOWNED 5 JAPS IN "TURKEY SHOOT"

On 15 February 1944 when Lt. Cdr. McCampbell was ordered to the command of Air Group 15, the leadership of the fighter squadron was vested in Lt. Cdr. Charles W. Brewer who, until his death during an air battle over Guam 19 June 1944, led the fighting *Hellcats* in their initial victories staged from the *Essex*.

When VF-15 engaged in its first combat operation against Marcus Island on 19-20 May and against Wake Island on the 23rd, these carrier raids were called "practice strikes under fire." There was nothing in the name, for these strikes were made, according to the squadron historian, "against as tough and accurate anti-aircraft fire as we encountered any place in the Pacific." On one attack, two-thirds of the fighter planes were badly holed by AA. Nonetheless, the squadron pressed its attack home and inflicted a damage the enemy could not afford in defense installations.

Although the rugged initial assignment against the enemy had been successfully accomplished, there was still the price to be paid for victory. Ens. W. T. Burnam was hit by AA during a dive and crashed at sea. Three other pilots were wounded in action.

The squadron had a brief respite at Majuro before it rejoined Task Force 58 to undertake operations which were to last two months and take the *Essex* and its Air Group from Saipan to Pagan, include the first carrier strikes on the Bonins, the Battle of the Philippine Sea and strikes in support of the occupation of Saipan, Tinian and Guam.

THE SQUADRON drew its first enemy blood in the air on the first fighter sweep into Saipan the afternoon of 11 June. It is not known who downed the first plane, but the sweep destroyed 5 *Zekes*, 1 *Mavis*, 1 *Emily* and 1 *Tojo*, all airborne. As a start, it was prophetic of the tremendous total scores VF-15 was destined to chalk up.

The next days were occupied with strikes against Iwo Jima, which dealt heavy destruction to enemy aircraft on the ground. On 17 June, the squadron headed for Saipan. Enroute it flattened with methodical aerial bombardment enemy luggers, trawlers and seagoing sampans in the bays and coves of Pagan.

WORD spread through the Task Force that the real enemy fleet was out, heading toward Task Force 58 from the Philippine Sea area. A search was made on the 18th, and before dawn of the 19th, contact with the enemy's naval air force snoopers was made. Five enemy planes were knocked out with no loss to VF-15.

As more word of the Japanese Fleet came in, all available fighters were kept rotating above the Task Force as CAP. At 0910, eleven fighters led by Cdr. Brewer took off, and at 1013 the first large raid was picked up on the screen 118 miles away. Cdr. Brewer and seven of his flight were ordered to climb to 24,000 feet, and the other fighters were ready to scramble. At 1035, 40 enemy planes came in at 18,000 feet—and the Marianas Turkey Shoot was on! Twenty

enemy aircraft plunged seaward, and the remainder fled in the face of this catastrophe. VF-15 came through intact. Lt. (jg) G. R. Carr had shot down five, and Cdr. Brewer and Ens. Richard E. Fowler, Jr., had scored four each.

Meantime 12 fighters led by Cdr. McCampbell scrambled to intercept Raid #2 160 miles away. Ten of the planes were able to get to 25,000 feet when the interception was made 45 miles from the ship. In this engagement, VF-15 got 20½ planes of the 50-plane raid. The rest dispersed.

The squadron historian describes the rest of the morning as "fairly quiet," probably just "the pause that refreshes." Early in the afternoon, the fighters were ordered to attack the enemy at Guam where it was reported that the Japanese had gathered their surviving airmen to refuel and prepare them for future raids. Cdr. McCampbell led 12 fighters in a sweep on that island and intercepted 40 *bandits* attempting to land on Orote Field. Fifteen Japs downed!

A little later Cdr. Brewer led seven fighters in the last action of the day in a sweep over Guam to intercept Raid #8. More than 20 *Zekes* were engaged, of which 7 were destroyed plus 1 *Judy*. In this action, Cdr. Brewer and Ens. Thomas Tarr were lost. Lt. E. W. Overton rendezvoused the remainder of the sweep and led it back to base. Lt. Cdr. James F. Rigg became the skipper.

The destruction of 67½ enemy aircraft and the probable destruction of 12 others, all airborne, at a cost of three pilots was VF-15's contribution to the total score of 385 planes destroyed that day. Air combat in which the *Hellcats* destroyed the Japanese on a 13 to 1 ratio was characterized by skill, daring and devotion. From that time on, the Japanese must have known that there was only one course open to them, retreat; only the inevitable end, defeat.

From 10 June to 24 June, that is from D—1 to D+10 Day at Saipan, VF-15 destroyed 100½ enemy planes in the air, 99 on the ground, sank about 15 ships, damaged 45 other vessels, exploded a large oil tank and two fuel dumps, and did extensive damage to airfields, buildings, gun emplacements, radio and radar equipment. VF-15 was more than a cloud against the sky to harass the Rising Sun. It was the "Divine Winds" in reverse.

THE MIDDLE of July after a rest period at Eniwetok, VF-15 participated in the neutralization of air and ground defenses of Guam and followed it up with air support of the occupation and defense of that island.

On 29 August, VF-15 became part of the Third Fleet. A red-letter day in their log was 9 September when they began to work over Mindanao. On their way back to the *Essex* the *Hellcats* saw their prey—42 ships off the east coast of Mindanao. Down the fighters went to sink 18 ships, leave 5 burning fiercely and another 9 dead in the water, hit 7 others and damage 3 underway. CL's and DD's of the Task Force came in to sink the remaining ships. VF-15 did more than its share that day.

All during September, VF-15 struck the Philippines—Mindanao, Cebu, Mactu, Negros, and the Manila area—and on 6 October headed northward to carry

JAP PLANES AND INSTALLATIONS BURN ON NICHOLS FIELD, MANILA, P. I., AFTER VF-15 ATTACK

ADM. MITSCHER CONGRATULATES McCAMPBELL

their battle against the enemy to Okinawa and Formosa. At dawn 12 October, they destroyed 20 *Zekes* and *Tojos* in a flaming battle in the air.

BY THE 15th, they were enroute to the Philippines once again, arriving off the Visayas the morning of the 21st. The morning of the 24th started simply enough, but then enemy raids started coming in. Cdr. McCampbell led the first scrambled CAP of seven fighters to intercept a raid of 60 assorted *bandits* coming from Luzon and personally destroyed 9 in the air and 2 probables. All in all, these seven *Hellcats* destroyed 25 enemy fighters as well as inflicting damage on many others. The surviving *bandits* fled. The second CAP shot down ten planes more.

Immediately all available planes were launched to locate and attack the enemy force which was reported to be entering the Sibyan Sea. Just off the SE tip of Mindoro Island they found it, a total of 26 ships including the *Yamato* and the *Masashi*. The fighters provided escort for 10 VB's and 16 VT's. While that task force was not stopped, it was heavily damaged.

The night of the 24th, the Third Fleet headed north full speed. Night fighters picked up a large carrier task force of 17 ships 200 miles east of Luzon. The dawn attack took the enemy by surprise. Of the 10 to 20 *Zekes* launched, 9 were shot down by VF-15 pilots, 4 of them by Lt. J. R. Strane.

On November 14 after spreading death and destruction through the Visayas and striking Manila for "auld lang syne" during the first days of the month, the *Hellcats* headed for home via Ulithi.

A great fighting squadron, VF-15 had destroyed 313 aircraft in the air and accounted for an equal number on the ground or water, and damaged or sunk more than 500,000 tons of enemy shipping. Once aboard the *Essex*, the enemy was theirs!

Transfer To USAF?

VARIOUS inquiries have been received from naval aviators, both regular and Reserve, relative to transfer to the U. S. Air Force. For general information, the following letter to CNO from the Department of the Air Force Headquarters, USAF, dated 3 March 1948, is quoted:

"1. Commissioned officers of the Navy with honorable and creditable service are eligible for appointment in the United States Air Force Reserve, and subsequent to appointment therein, can apply for extended active duty with the Air Force. However, no assurance can be given that such officers will be called to active duty inasmuch as recall to active duty at this time is based on needs of the Air Force consistent with its authorized strength.

"2. Prior to submission of an application for appointment in the United States Air Force Reserve, subject officer must resign his appointment in the Naval Reserve. Having accomplished this, WD AGO Forms 170 (Application for Appointment and Statement of Preference for Reserve Officers should be submitted to this headquarters, Attention: PMP-8-D.

"3. Subject officer may apply for extended active duty by completion of Form 160 and forwarding it to this headquarters, Attention: PMP-8-D.

"4. It is not the policy of this headquarters to recall former naval officers to active duty with the Air Force when a former Army or Air Force officer is available and qualified to fill the existing vacancy."

While this letter was in direct reply to the request of a Naval Reserve officer, it applies equally to naval officers of all categories. Present law does not allow a commission to be held concurrently in more than one branch of the service. Therefore, resignation of the presently held commission is a requirement before the individual can be commissioned in the other service. If the latter action then is not confirmed for any reason, there is no provision for reinstatement in the original commissioned status.

"Life in any of the armed services has invariably had its share of uncertainties," according to a veteran naval officer. "Distant pastures always look greener. The uncertainties of one service are no more predictable than those in a sister service. Life as a civilian is not free of corresponding uncertainties.

"What is most advantageous for one individual may not necessarily be most advantageous for a second individual in the same or another branch. It will require a Solomon in all his wisdom to predict infallibly the best course for an individual to pursue.

"It is a decision that must be resolved by each one, after serious evaluation of all the known facts together with the obvious uncertainties of the future. However, it will be wise to be mindful of past experiences — that temporary advantages and disadvantages within one of the Armed Services as compared to another service balance out over a lifetime career."

NAVY GETS 50 P-80's

TO FACILITATE interim familiarization training of fighter pilots until Navy jet planes become available in quantity, the Navy is procuring 50 Lockheed P-80's from the U. S. Air Force.

The Navy will designate these planes TO-1's since they will be used to train pilots and maintenance personnel in operation of jets and will not be equipped with arresting hooks or catapult fittings. They will be the P-80-C model, equipped with the Allison J-33-A-23 engine, and will be maintained in Air Force configuration.

To simplify problems of maintenance and logistic support, all of the TO-1's will be concentrated in the San Diego area. Twenty-four will be assigned to VF-6-A, 12 to a Marine squadron at MCAS EL TORO, and the remainder used for support of this program.

VF-5-A at San Diego already is equipped with the FJ-1 jet fighters and

P-80 JOINS THE RANKS OF NAVY JET FIGHTERS

is setting new speed records on the West Coast. On 11 March that squadron completed successful carrier trials with the *Fury* aboard the CV *Boxer*.

As soon as VF-6-A is "at home" in the TO-1's, pilots from other fighter squadrons will be ordered to VF-6-A for temporary duty for a short training course and will be checked out in basic jet operations and tactics. VF-6-A pilots will act as instructors and check pilots.

A limited number of Navy and Marine pilots, through the courtesy and cooperation of the USAF, have been given basic P-80 training at Williams Field, Arizona, to familiarize them with the plane. Some of these pilots will form the nucleus of the TO-1 squadrons.

The P-80 is not altogether a newcomer to Navy circles since several have in the past been used in projects at NATC PATUXENT RIVER and another P-80 has been used by the Naval Air Missile Test Center, Point Mugu, to track guided missiles and pilotless aircraft in test firings.

Marines Sink Jap Destroyer

Big Destroyer Used for Target Shoot

VMF-211, CHINA — This squadron has secured some excellent gunnery and bombing practice on five ex-Japanese ships turned over to the Navy after the war for use as training targets.

Latest and last of the victims was the DD *Hanasuki*, a 440-foot ship with 3/4" armor plating. A total of 16 aircraft participated in the strike, each bearing four HVAR rockets, two 500 GP bombs and 2,000 rounds of .50 cal. ammunition.

Bombs were dropped first, then the rockets and finally the strafing runs were made. Accuracy of the pilots was outstanding. Of 31 bombs dropped, 13 were direct hits. Sixty-two rockets were fired and 46 hits were scored.

When all bombs had been dropped, the target was settling and heeling slowly to port. After the rockets were fired, it was sinking. On final strafing runs only the bow was visible. The *Hanasuki* had 14 water-tight compartments and was completely empty. She was commissioned in 1944, used as a transport during the war and was active in the repatriation service until the U. S. Navy acquired her.

***Brigadier** General Christian F. Schilt, USMC, Commander, Marine Air Reserve Training, the first officer of flag rank to fly the Navy jet fighter, the Phantom, climbs into the FH-1 cockpit just before takeoff at Lambert Field*

AND THERE I WAS...

Bon Mot

A NERVOUS cadet was coming in for the final landing of a check ride. His check pilot was Lieut., now Commander, J. C. Skorcz, who had a reputation for letting a cadet know how he was getting along—but aloud. The N2S sneaked down between a pair of smokestacks with an inch to spare, hit the runway hard, leaped back into the air like a startled colt and finally landed after three more bounces.

As the cadet taxied back to the line he waited, cringing, for Lieut. Skorcz's comment. None came. The lad stopped the plane, cut the engine, still waiting for the explosion. Lieut. Skorcz climbed wearily out of the cockpit, leaned over the cadet for a moment, tiredly shook his head, murmured the two words, "whiffle-diffle" and stalked away. The cadet, eager to find out if whiffle-diffle meant "up" or "down", sought out the leading chief and asked him about the mysterious word.

"Well, son," the chief began, "a long time ago, when Pensacola was very young, there were a species of birds flying around Florida which were half-parrot and half-pelican. These birds imitated not the speech of man, but his actions. As Pensacola became more and more inhabited by pilots in planes, the birds picked up new tricks. Soon they could fly very creditable formations, do a neat Immelman, slow-roll snap-roll or about anything else the pilots did in planes.

"At dive-bombing the birds outdid themselves. They would roar down from 15,000 feet, drop their pebble bomb and pull out so low that their tails actually scraped the ground, and as they streaked across the field brushing the deck, they would shriek *whiffle-diffle, whiffle-diffle.*

"Well, it was bound to happen, the birds began emulating crashes and rapidly became extinct. But before the last few had disappeared, a young man from Yale came down and wrote a book on the 'Life And Times Of The Whiffle-Diffle.' And one of the things he established was what *whiffle-diffle* meant in *whiffle-diffle* language. Roughly translated into colloquial English, it means, 'KRE'IPES! What a sensation!' "

Icecapade

THE TWELVE witnesses who corroborate the essential facts in this story wouldn't believe it themselves if they hadn't seen it.

A pilot of VP-ML-12, based at Kodiak, Alaska, who was returning from a routine flight in a PB4Y, elected to land from a straight-in approach upon runway 25. A strong northeast wind was blowing, giving him a considerable crosswind-tailwind component, and the runway was very slippery because of compact snow over a layer of ice.

The approach was a trifle high and fast, and touchdown was not made until almost halfway down the runway. Braking action appeared to have little effect. With the end of the runway rapidly looming up, the pilot endeavored to ground-loop the plane by full application of the throttles on one side.

The ship responded by executing a graceful 180° turn, remaining in the middle of the runway. It continued down the runway tail first. The pilot applied full throttle on all four engines, using the thrust as a brake, and came to a stop on the turn-around area at the end of the landing strip. He then casually taxied back to the hangar.

Not Dumb, Chum

THEN THERE is the tale that some of the four-stripers tell about a well-known colleague. This unnamed gentleman landed at North Island one lovely day in an F3F-2, with, woe was he, wheels up.

The stubby little fighter came in smoothly enough, hopped along on its belly, turned over and came to a rending stop on its back. The fire truck, ambulance, various hangers-on and the squadron skipper all roared out to view the remains.

Upon arriving at the scene of the crime, the first thing that met their eyes was a set of wheels coming out of the wheel-wells and being laboriously cranked *up* to the "down and locked" position.

How to Lose Friends

IT WAS a black night, and planes were everywhere in the sky.

As the time drew near to return to the base, one of the British pilots training with us, entered the traffic circle for an approach.

The duty officer called him, but without response. He signaled him with a red light—still no answer. On the plane came, in an all too low approach.

In vain, the voice came over the air, "Pull up, pull up!". But on he came. As the plane sheared off its landing gear on the tree tops, the crash cars were on their way, and the duty officer all but took off as he raced his jeep across the field.

The plane hit resoundingly on its belly, and burst into flames, as trucks, cars and jeeps careened alongside.

Undaunted and unaffected, the "Limey" sauntered out and with little regard for the mess, said, "A beastly job, wasn't it sir?"

SPENCER M. SCHECKTER, LT. (JG), USNR
STATE COLLEGE, PA.

Thrice Told Tale

THIS ONE has to be told every so often: An N3N landplane instructor was temporarily transferred to a primary seaplane squadron, which was operating N3N's on floats. The instructor's first period went off fine until he returned to base. He made a nice approach on the land field.

The cadet, unable to speak to the instructor, shook the stick and pointed down. The instructor went around, could find nothing wrong and started in again. Once more the cadet stopped him on final—then came the light.

The instructor returned to the bay area, made a normal landing, tied up to the buoy and hopped out on the wing. "Boy, that was close," he shouted to the cadet, as he blithely stepped off the plane's wing into three fathoms of water.

NARTU JACKSONVILLE—Reservists participated in two searches during February, one for the EAL *Constellation* with Dick Merrill aboard (which was later reported safe at Bunnell) and the other for personnel missing from a burning shrimp boat off the coast.

INLAND EMPIRE FLIERS GET NEW NARA AT SPOKANE

At NARTU Anacostia, Captain Funke greets players from all over the country who were in Washington as guests of AMVETS for national teen-age basketball games

A NEW link in the Naval Air Reserve chain is being forged up in Spokane, Washington. Here a Naval Air Reserve Auxiliary is being established to serve the many Volunteer Air Reservists in that section of the Pacific Northwest, known as the Inland Empire, who want to fly.

In setting up this NARA, which is attached to NARTU SEATTLE, the Naval Air Reserve had to meet the challenge of terrain and weather. Between Seattle and Spokane loom the mighty Cascade mountains often shrouded in weather that varies only from bad to worse. Over such a course it would be impossible to maintain regular schedules for flying training-type planes(usually not equipped for instrument flying) over to the NARA at specified times during the month. So a new pattern for operating the NARA had to be devised.

In view of the large number of Reservists in the area, it was decided that it would be practicable to base a small number of training planes at the NARA and to assign a small detachment of active duty Reservists to administer the program locally. NARTU SEATTLE, of course, would continue to have the overall responsibility for administration and logistic support.

Before a paper plan, however, could be translated into action, many problems had to be ironed out. Here the cooperation provided by city authorities proved invaluable. Mayor Arthur R. Meehan and public utilities commissioner Willard "Duke" Taft, in particular, were most helpful in removing obstacles from the Navy's path. The way was smoothed for the Air Reserve to use the operating facilities at Geiger Field, a former Army field which the War Assets Administration is turning over to the city as a municipal field. Arrangements were also made to allow the unit to use a small hangar and two small buildings for offices and supplies.

In order to avoid duplication and unnecessary expense, a plan was also worked out with the Air National Guard of the State of Washington, which is moving from nearby Felts Field to Geiger Field. Under this plan, both units will cooperate in the joint use of certain facilities and equipment, such as that for fire and crash.

Meanwhile interest among Volunteer Air Reservists in the area has been at top pitch. More than 100 aviators in the vicinity have expressed a definite desire to join in the activities of the Associated Volunteer Unit, which the NARA is designed to serve. For helping to build up this interest much credit should go to Volunteer Reservist, Lt. Robert J. Anderson, a naval aviator in World War II who is now with radio station KHQ in Spokane.

Two officers and 24 enlisted personnel from NARTU SEATTLE are being assigned for active duty at the NARA, while 8 SNJ's and two SNB's are slated for basing there. Minor repairs and periodic checks (through 120 hours) will be made by NARA personnel, but major overhauls and repairs will be undertaken at the NARTU.

The training program for personnel will be based on current training syllabi. Not only Volunteer aviators but Volunteer ground officers and enlisted personnel will take part in unit activities and training.

Target date for beginning operations at NARA SPOKANE was 1 May.

High School Trail Blazers

ON THE high school front, interest in naval aviation seems to be running high. The Naval Air Station at Glenview, for example, reports that a great number of high school students are enlisting each month in the V-6 Reserve.

To encourage this interest, Naval Air Reserve units throughout the country are arranging to have groups of high school students come out to their stations and get a first-hand view of day-to-day activities and the technical training they offer. During February, for example, such stations as NARTU ANACOSTIA (visited by a group of 50 cadets from Chamberlain Vocational High School in Washington, D. C.), NARTU NORFOLK, NAS MEMPHIS and NAS NEW YORK stated that these educational tours were working out very well.

Inasmuch as it is the Navy's policy to encourage students to continue their

NAS Atlanta's H. Anderson instructs M. Dunham on F4U electrical trainer

He got the bird! Lt. Westmoreland and the ex-gull that smashed his windshield

education as long as possible and to cooperate closely with high school authorities, these tours, of course, are undertaken only with the full cooperation of school officials.

As members of the Volunteer Reserve, high school students are not required to participate in regular training. However, since the Organized Reserve trains only on weekends, an increasing number of students are joining that branch of the Air Reserve, where they can get useful training on a pay-for-drill basis.

One such group of Organized Reservists at NAS GLENVIEW, who are seniors at a local high school, have recently formed a school club which bids fair to be a trail blazer for similar high school clubs throughout the country. Open only to seniors who are also O. R's at Glenview, the "Naval Air Reserve Club" (as it is called) has its own charter, its own officers, and dues are paid from its members' Navy drill pay. Athletic activities and competitions with other groups are being arranged at the air station.

Naturally the Naval Air Reserve is glad to see all this interest in naval aviation among today's high school students, for these young men are the very ones who will be needed to take over important Reserve billets in the future.

New SAD Course for Reserves

THE FIRST class in the Naval Air Reserve's new Special Artificer's Devices training course at NAS ATLANTA got off to a gruelling start on 19 April. Gruelling is the correct term, for into the eight-weeks term is crammed training in all phases of operation and maintenance of the many special devices which have been assigned to Reserve stations and units. Stationkeepers, who graduate from the course, will return to their bases with that extra "savvy" which will enable them to get the fullest utilization out of the devices in connection with the training of Organized Reservists.

About 22 stationkeepers from Reserve units throughout the country are being specially selected for each class on the basis of their qualifications and ability to take over SAD ratings. Mechanical or electrical training is a prerequisite for rated men, while non-rated personnel must show mechanical or electrical aptitude.

In addition, selected personnel must successfully complete a preparatory "refresher" course, given under the direction of the training officer at their regular station, in order to qualify for the school. This course provides a review of mathematics, physics, hand tools, elementary electricity and electronics.

Three separate courses are set up at the school, one for chiefs and 1st class, another for 2nd and 3rd class personnel and one for seamen. All vary in scope, with the most advanced course covering six basic phases—review of electricity and electronics, electronics devices, projection equipment, navigational devices, gunnery training, and gunairstructor.

The training, though more condensed in nature, parallels that given at the school under Technical Training at NATTC MEMPHIS. The school at Atlanta is also under the cognizance of Technical Training. Personnel from the Special Devices Center in Sands Point, L. I. provide overall supervision, with most of the actual instruction being given by SAD personnel assigned to the school.

In addition a short course (about two weeks) in operation and maintenance of the ultrasonic trainer is being given Reserve stationkeepers at NAS NORFOLK. FAETULant facilities have been made available for this course.

Station Round-Up

NAS OAKLAND—*We "dip our wings" to this station for commissioning AVU(A)-3 at Fresno on 15 February.* Lt. Cdr. George H. Machette is CO of the new unit and Lt. Frank E. Turpie is the exec.

NAS MINNEAPOLIS—Although fortunately their services were not needed, medical department personnel, who stood by to furnish first-aid at the National Ski Championship jumps and also in a local disaster involving an explosion in a large house, received much favorable comment in the local press on their willingness to help out.

NAS DALLAS—Tulsa AVU(A) aviators piled up slightly more than 100 hours in their first month of operations. This is what is known as really getting off to a flying start.

NAS SQUANTUM—With 81 recruits brought into the Reserve during February by members of Organized Reserve squadrons, the enthusiasm of O. R.'s for the program is beginning to pay off in a big way.

NAS COLUMBUS—Meeting with Air Scout and American Legion officials, who are sponsoring the formation of Air Scout squadrons in the vicinity and making plans for the Air Scout Meet to be held in Columbus this summer, Navy representatives offered the facilities of this station for training Air Scouts in the area.

NAS LOS ALAMITOS—One of the pilots at this station, Lt. Talmadge Westmoreland, recently demonstrated his ability to handle his plane successfully under emergency conditions. Lt. Westmoreland, who was flying a Martin torpedo bomber on a routine training mission, was working his radar apparatus when he was suddenly smacked in the face by a bird. The sea gull (or hawk) apparently passed completely through the propeller without hitting the blades and smashed into the cockpit enclosure, showering Westmoreland with glass and particles of bird. Fortunately Westmoreland had his goggles off his eyes at the time, so they were not shattered by the impact.

NAS OLATHE—Plans for the National Model Airplane Meet, sponsored by the Olathe Chamber of Commerce and Olathe Legion Post No. 153, at this station from 3 to 7 August have now been firmed up.

NARTU Jax V. R.'s Sellers, Mahar, Hestilow, McConnell, Ragsdale, Rutledge, Kane and Farinas, Stevens, Swanson, Shaw, Winter, Tew, Bridges, Sullivan, Hospins

NAVY RATING STRUCTURE GETS OVERHAUL

ON 2 APRIL the new enlisted rating structure of the Navy went into effect. Under this structure, 198 ratings were consolidated into 77 general service ratings including 40 aviation ratings which were absorbed (in all or in part) by 13 general service ratings. At the same time a parallel list of new emergency service ratings, into which the general service ratings would be broken down in wartime, was established. Fourteen exclusive emergency service ratings, which would be activated only in case of national emergency, were also set up.

With the adoption of the new structure, the ratings of Regular Navy enlisted men and of Reserve stationkeepers and shipkeepers were changed to those of general service ratings which had absorbed the functions of their previous ratings. In some cases, such as that of aviation machinist's mate, no change in nomenclature was involved. In other cases, however, such as that of aviation machinist's mate (instrument) which was absorbed by the aviation electrician's mate general service rating, the nomenclature is entirely different.

Organized Reservists have also had their ratings changed to appropriate ratings in the emergency service rating group, inasmuch as their training of necessity is along specialized lines.

The ratings of Volunteer Reservists have been changed to appropriate ratings not only in the emergency ratings group but also in the exclusive emergency service rating group for which no training is provided in peacetime.

The broadening of duties under the new general service rating structure is designed to give Regular Navy and Reserve stationkeeper personnel the best possible background in their vocational fields.

In the event of national emergency, the more specialized emergency service rating structure would be substituted for the general service structure, and Regular Navy men and stationkeepers would be transferred to those ratings. Thus all Regular Navy and Reserve personnel would be in equal competition for advancement in the event of war. Here, the broad background which Regular Navy men and stationkeepers have acquired in their general service ratings would prove particularly helpful.

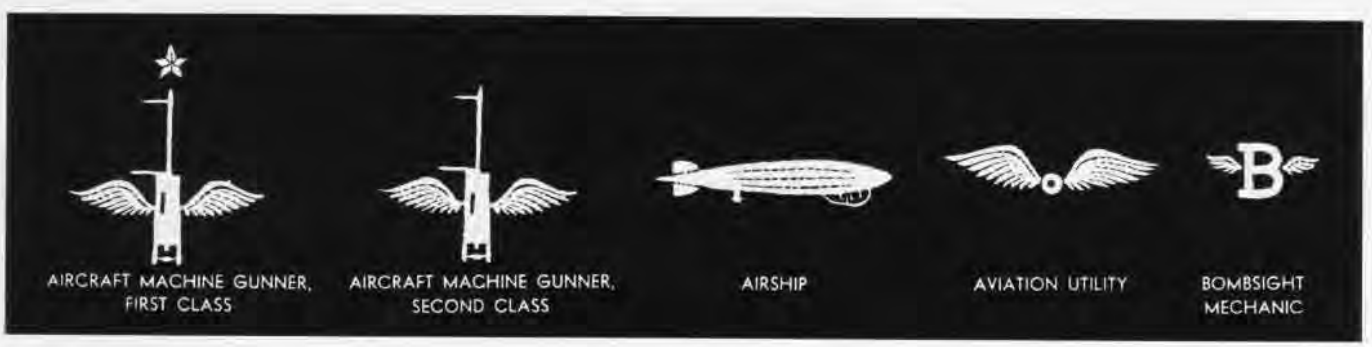
The abbreviations for the various ratings have also been streamlined. Only two letters, such as AD for aviation machinist's mate, are used for general service ratings, while emergency and exclusive emergency services ratings are designated by three letters. Grade is denoted only by C for chief and 1, 2, and 3 for the classes.

The branches, to which non-rated personnel are assigned, are also described more specifically. Former seaman 1c and seaman 2c who were assigned to aviation duties are now called airmen and airmen apprentices respectively. Apprentice seamen are now known as seaman recruits.

With the change in the rating structure has come an overhaul in Navy insignia. Reproduced on this page are the specialty marks for all general service ratings in the aviation group (which are also worn by Organized and Volunteer Reservists who hold the emergency service ratings within these classifications) as well as the distinguishing marks worn by qualified aviation personnel.

AVIATION GROUP

Previous Ratings Whose Functions Have Been Absorbed	*General Service Ratings and Abbreviations*
AMM AMMF AMMC AMMP AMMT SPV (Partial)	Aviation Machinist's Mate (AD)
AETM AFC (Partial)	Aviation Electronics Technician (AT)
ARM	Aviation Electronicsman (AL)
AOM AOMT AFC (Partial)	Aviation Ordnanceman (AO)
SPY RDM (Partial) SPXTS SPXQM (Partial) SPV (Partial)	Air Controlman (AC)
ABMAG ABMCP ABMGA ABMPH	Aviation Boatswain's Mate (AB)
AEM AMMI	Aviation Electrician's Mate (AE)
AM AMMH PTRV	Aviation Structural Mechanic (AM)
PR	Parachute Rigger (PR)
AERM	Aerographer's Mate (AG)
SAD SPG SPT (Partial) SPTLT	TraDevMan (TD)
SKV SPV (Partial)	Aviation Storekeeper (AK)
PHOM (Partial) SPPG (Partial) SPPLB (Partial) SPPVM (Partial) SPPMF (Partial) SPP (Partial)	Aviation Photographer's Mate (AP)



PULLING IN HER LANDING GEAR, THE CONSTITUTION SOARS OFF WITH FLAPS STILL DOWN

AIRBORNE LINER

THE NAVY is expected to take delivery this summer on its largest landplane— the Lockheed R60 *Constitution*. Since its first flight 9 November 1946, the plane has made 70 test flights and logged 140 hours in the air.

Four 3500-hp. engines, like the pair pictured above, drive the big ship, taking it off in less than 2,000 feet run with 184,000 gross weight. It will carry 180 passengers and has a range of 6,300 miles. Four-bladed, 19-foot propellers pull the 92-ton behemoth.

These interior photographs, first released on the plane, show the few instruments the pilot and co-pilot have to handle. The flight engineer handles all engine controls except on takeoffs and landings. He adjusts throttles, mixture controls, and superchargers. The assistant flight engineer handles electrical controls, cabin pressurization, heating, cooling and ventilation. Regulations require test crews to wear parachutes on all flights.

So big are the wings that mechanics can go out to all engines during flight to work on them. By crawling, he can get beyond the outboard engines if necessary. Seats are blue, carpeting rose.

CREWMAN CRAWLS INTO INNER-WING TUNNEL TO WORK ON CONSTITUTION ENGINES IN FLIGHT

LUXURIOUS AIRLINER-TYPE SEATS TOPSIDE; 76 BUCKET SEATS BELOW

SPACIOUS COCKPIT OF CONSTITUTION; FLIGHT ENGINEER ON RIGHT

CAPT. BERNER, CO OF WRIGHT, POSES WITH EDUCATORS WHO WENT ON THE CARRIER DURING FEBRUARY CRUISE TO STUDY AIR OPERATIONS UNDERWAY

Educators Visit Pensacola

Learn How Navy Trains Its Aviators

Carrier operations, ground school and other phases of a naval aviator's training were demonstrated to 100 college educators at Pensacola, April 26 to 30, when they attended the Naval Air Training Orientation Course.

The educators were presidents, faculty men and professors of naval science from half the colleges offering Naval Reserve Officer Training Corps work. They represent schools in the First, Third, Fourth, Thirteenth and part of the Ninth Naval Districts. At a previous course held last February, representatives of NROTC colleges in the other districts attended.

Object of the training course was to give the college officials an idea of how the Navy trains its aviators. They then will be able better to plan college courses which coordinate with this training. They visited classrooms where student pilots were being taught; they watched Celestial Links and Gunairstructors in operation. A tour of the Aviation School of Medicine was made.

Practice ground control approaches were flown to show them how the Navy's excellent foul-weather landing gear works. They went aboard the *Wright,* CVL-49, for a day's cruise to watch carrier qualification landings and flight deck operations. Lectures were given them to explain aviation's place in naval strategy. Finally, they were spectators at a flight show by the *Blue Angels,* the Navy's crack exhibition team of fliers in F8F's.

Alameda Float Wins Honors

Skystreak Jet Engine Gets Applause

NAS ALAMEDA—Thousands of spectators lining San Francisco's Market street and Civic Center cheered when NAS ALAMEDA's dramatic float, the jet engine used to propel the *Skystreak,* world's fastest airplane, passed by in the city's annual St. Patrick's day parade.

The float, one of hundreds entered in the parade, was awarded second prize. It was one of 23 naval floats participating. It was designed by Miss Aida B. Montier, NAS civilian employe. Other A&R employes decorated the winning float, under supervision of Lt. Cdr. Stanley E. Wagenhalls.

ALAMEDA TOWER BACKGROUNDS STATION FLOAT

New Helicopter Gets Tests

Sikorsky Job Has Blades That Fold

Flight tests on a new all-metal rotor helicopter, the XHJS-1, are being made for the Navy at the Sikorsky plant at Bridgeport, Conn.

This first Navy-designed helicopter is intended for rescue and utility work aboard carriers, hence the folding rotors and tail rotor placed high enough so that its fans will not hit personnel.

Other features of the new helicopter are its improved engine cooling system, nylon fuel cells instead of metal tanks and an improved method of unlocking and folding the rotor blades to the tail cone.

A hatch in the floor of the plane permits installation of an aerial camera or operation of an interior hoist for cargo loading or sea rescue pick-ups. Landing gear was strengthened to withstand deck landings in rough seas. The plane carries a complete set of instruments for night and instrument flying. Under design is an amphibious landing gear to be used interchangeably with wheels.

XHJS-1 has a 500-hp engine which gives it a range of 330 miles at 78 knots, with top speed of 95 knots. Rotors are 49 feet in diameter and climb is 1000 feet a minute.

UTILITY HELICOPTER HAS A HIGH TAIL ROTOR

Torpedo Pilots Score 12 Hits

VA-12-A Racks up a 75% Record

VA-12-A, PACIFIC—The old workhorse of the carrier Navy, the TBM, has again proved its merit as a torpedo bomber. On 5 January, VA-12-A of CAG-11 scored an average of 75% torpedo hits off the coast of Oahu. The target ship was the *Keppler,* DD-765, a component of Task Force 38.

The pilots were given one refresher flight, dropping 100-lb. waterfill bombs, for ranging and calibration. Officers of the squadron have lost none of their prowess as torpedo pilots. They were commended by the director of training, Fleet Air West Coast, for scoring 12 hits out of 16 drops, another 75%.

It might be interesting to note a few statistics at this point. Participating in four torpedo exercises, dropping a total of 64 torpedoes, our pilots scored 40 hits. Seventeen of these were directly amidships and of the 64 torpedoes dropped, 54 were hot, straight and normal runs. All exercises employed the use of a straight course target. The Air Group is aboard the *Valley Forge,* flagship of Rear Adm. H. M. Martin, Commander TF 38.

NATS, ALASKA—Some people sure talk loud. A NATS pilot flying between Kodiak and Adak tried to contact Adak tower. Tokyo radio answered loud and clear, as did a NATS plane over Newhall, California.

NAS
ST. LOUIS

RESERVES USE BUSY AIRPORT AT ST. LOUIS

St. Louis pilots Prater, Mathews and Snay (standing), and Scherting, Maddock and Roberts of VF and VA-75A, do some ready room flying; three are still college students

TWO CORSAIRS with yellow-orange belly bands came in for a landing on the snow-covered runway. It was difficult to tell where the concrete strip began and the grassy field ended. Flying clouds of powder-dry snow obscured them as they touched down and taxiied off.

A TWA *Constellation* floated in. Snow spurted from the skidding tires when it landed, instead of the usual wisp of smoke from rubber hitting concrete. Between runways two little yellow Piper *Cubs*, apparently too bashful to get in the traffic circle with the big jobs, were making bumpy take-offs.

Out of the blue sky came two TBM's for a landing. A Beechcraft taxiied up to wait for permission to take off and behind it an R5D commercial plane lined up. They waited for three Air National Guard P-51's to swish in and land.

Behind them a screaming wail arose as a *Banshee* F2H turned on its jet engines and taxiied out to join the waiting line. Its hot breath melted the snow like a blowtorch.

Where is all this happening? None other than Lambert Field, St. Louis, home of the Naval Air Reserve station, which also serves as that big city's commercial airport. Navy PBY's, F4U's, *Hellcats*, *Beeches* and R4D's have to wait their turn to use the runways, sharing facilities with commercial liners, private planes, and Air Force aircraft.

Probably no Reserve unit flies from a field on which more types of planes can be seen in a few minutes time.

At one time the city of St. Louis thought its airport was too crowded to permit Navy planes to be based there any longer. Last winter the word went out that the Navy had to leave. The controversy swept over city and state officials and finally saw delegations filing into the White House itself to present both sides of the picture. The Navy took no official part in the situation.

But NAS ST. LOUIS is there to stay for at least two and a half more years, under a new agreement signed between the Navy and St. Louis. Under the final agreement, the Navy furnishes crash fire trucks to protect all private and commercial flying on the field, as well as for its own planes. It furnishes ambulance service, medical and first aid, ground controlled approach for all planes in distress, no matter who the owner, snow removal and fire trucks to fight any blazes.

Reserves use the station on the south side of the field, while McDonnell Aircraft Corp., maker of Navy jet fighters, the *Phantom* and *Banshee*, is located across the field. Reservists see the jets being given their first run-ups on the ramps outside McDonnell and wonder when the day will come when they will be able to fly jets themselves.

LONG LINE OF ST. LOUIS RESERVE CORSAIRS FACE OPERATIONS TOWER: RESERVES SHARE LAMBERT FIELD WITH ARMY AND COMMERCIAL PLANES

Capt. Kauffman (2nd from left) receives British plaque from Captain Wooten, Comdr. Evans and W. H. Guthrie

Lt. Simon Reznikoff, VMF-221 briefs Lt. Edwin F. Goad, Capt. James O. Holton, Lt. George E. Morgan on close support

Aerology class of St. Louis U inspects instrument to determine high cloud moves, under direction of Lt. (jg) Hickman

THE GOLD-winged anchor is nothing new around Lambert field. St. Louis is one of the oldest Reserve bases in the country. Back in 1932, the city built a wooden hangar so that Reserve Navy pilots of those days could do their flying. Previously, in 1925, aviation-minded members of the Surface Reserve in St. Louis organized an air unit.

In 1926, Major Albert Bond Lambert of the Listerine fortune fame donated the first aircraft for these Navy pilots to fly, buying it for them himself. They also used rented or private aircraft to keep alive their flying proficiencies, so great was their interest in naval aviation. Came 1930 and the unit became a Naval Air Reserve Base, with Lt. Frank Weld, who helped organize the Reserve unit at Minneapolis, as its first commanding officer.

For some time, St. Louis Reserve pilots have been handicapped because there were not enough wide open spaces in Missouri to permit them to get in gunnery and bombing practice. They had to limit themselves to camera gunnery, a fact which made the station photo lab resemble a Bronx backyard on washday with its long streamers of film festooning the rooms.

Now the Navy has an arrangement whereby its pilots can land at Vichy army field at Rolla, Mo., and take on their bombs, rockets and ammunition. They then fly out to the artillery range at Ft. Leonard Wood and get in their practice in air-to-ground gunnery. Because of the settled areas around, it still is not possible to shoot at sleeves.

Olathe and Minneapolis Reserve fliers also fly over to Ft. Leonard Wood to do their gunnery and bombing work.

Organized Reserve flying is only one of the many activities which keep NAS ST. LOUIS in the headlines. During the disastrous Mississippi river floods last fall, Coast Guard aviation float planes were based there to patrol the river. The station aided in evacuating personnel and livestock from stricken areas, keeping 50 men in standby status.

The station furnishes honor guards, firing squads and buglers for occasions when World War II dead are returned to St. Louis for burial. Planes from the station fly cosmic ray detectors for Washington University's school of engineering. R4D's take the counters up to 11,000 feet to gather data on the scientific phenomena.

Students from St. Louis University come out to the station to take laboratory work in aerology. Lt. (jg) Howard K. Hickman instructs them in microbarographic wave work (*see photo, left*).

When the explosion wrecked Texas City, an R4D from St. Louis flew medical supplies to the Gulf city. Although the St. Louis area is not especially noted for its bad weather, the clouds usually roll in briskly every time the station tries to stage an open house, air show or Navy day celebration. Uniformly, they have been rained out or otherwise hampered by bad weather.

A smoke pocket often collects over the city, making

★★★

ST. LOUIS RESERVE SQUADRONS

CVEG-54—Air Group Commander—Lt. Cdr. John Francis Sutherland
VF-54-E—Lt. Cdr. William P. Mathews, CO; Lt. George Rush, Exec.
VA-54-E—Lt. Cdr. Amos B. Buchanan, CO; Lt. E. E. Wallace, Exec.
CVEG-55—Air Group Commander—Lt. Cdr. Corwin F. Morgan.
VF-55-E—Lt. Nelson M. McGuire, CO; Lt. Donald B. Pardue, Exec.
VA-55-E—Lt. Cdr. Herbert W. Wiley, CO; Lt. Dale R. Annesley, Exec.
VP-ML-68—Lt. Cdr. Richard P. Field, CO; Lt. Cdr. H. G. Palmer, Exec.
VR-56—Lt. Cdr. Thomas C. Brickey, CO; Lt. Robert F. Walsh, Exec.
CVG-75—Air Group Commander—Lt. Cdr. Earl H. Lankau.
VF-75-A—Lt. Lynn H. Pulford, CO; Lt. Lewis L. Tuck, Exec.
VA-75-A—Lt. Cdr. E. M. Yoder, CO; Lt. R. H. Koch, Exec.
VF-76-A—Lt. Cdr. H. E. Hartmann, CO; Lt. L. Sovanski, Exec.
VA-76-A—Lt. Cdr. W. W. Wright, CO; Lt. R. L. Gale, Exec.
FASRon 70—Lt. Cdr. John A. Klickman, CO; Lt. D. L. Rodd, Exec.
FASRon 170—Lt. Cdr. M. C. Pierce, CO; Lt. Cdr. R. C. Ford, Jr., Exec.

★★★

All is not work with Reservists: here stationkeepers and Organized Reserves whoop it up at NAS Halloween hop

Sgts. Kenneth E. Gronemeyer and Paul L. Reed of St. Louis' Marine detachment prove elbow grease still is latest style

Lt. (jg) Milton Poole of Reserve operations and David Leigh, manager of Lambert field, watch Navy clearing runway snows

visibility bad. Take the case of one airline pilot who contacted the tower. The control tower operator asked, "What is your position?" To which the pilot wryly replied: "Tell me, what is *your* position?"

Lambert field just recently opened up a new 5,000-foot runway, but it took a month to build and the Reservists had to let their planes sit for four weeks because it was impossible for them to take off or land. This curtailed their total flying time. Eventually, this runway will be lengthened to 9,000 feet and the other four to 7,000 feet, making Lambert field one of the best in the country.

Many of St. Louis' Reserve pilots come from neighboring colleges where they are finishing their college educations. Some come from as far away as University of Missouri at Columbia, 125 miles away, or from University of Illinois at Urbana. Shurtliff College, St. Louis University, Washington University, and Missouri School of Mines all send a quota of Reservists out to man the station's squadrons.

COMMANDING officer of NAS ST. LOUIS is Capt. Roland P. Kauffman, who took over that post in August, 1946. During the war he was executive officer of the CV *Intrepid* when it was rammed by five Japanese *Kamikaze's*, two within 30 seconds of each other. Another one of the station staff, Lt. Cdr. Bart J. Slattery, PIO, also had experience with Japs at close hand. He was on the air group commander's staff on the CV *Franklin* when it was almost blasted and burned out of the water.

Capt. Kauffman was in the Reserve program back in 1939 when he was skipper of the unit at Floyd Bennett field in New York. He also commanded air stations in Panama and Olathe and was CO of the CVE *Tangier Bay*. His exploits on the *Intrepid* won for him the Silver Star.

Executive of the station is Cdr. Norman O. Anderson, who has been in the Reserve program for 20 years, starting out as a seaman second. He was skipper of one of the Navy's largest aviation repair and overhaul units on Samar during the war and was in the training program at NAS JACKSONVILLE earlier.

Senior type training officer is Cdr. Jesse Dean Taylor, commander of Air Group 93 on the *Boxer*, CO of VC-69 on the *Wake Island, Bogue, Mission Bay* and *Guadalcanal*. He piled up enough combat time to win him a handful of DFC's and Air Medals.

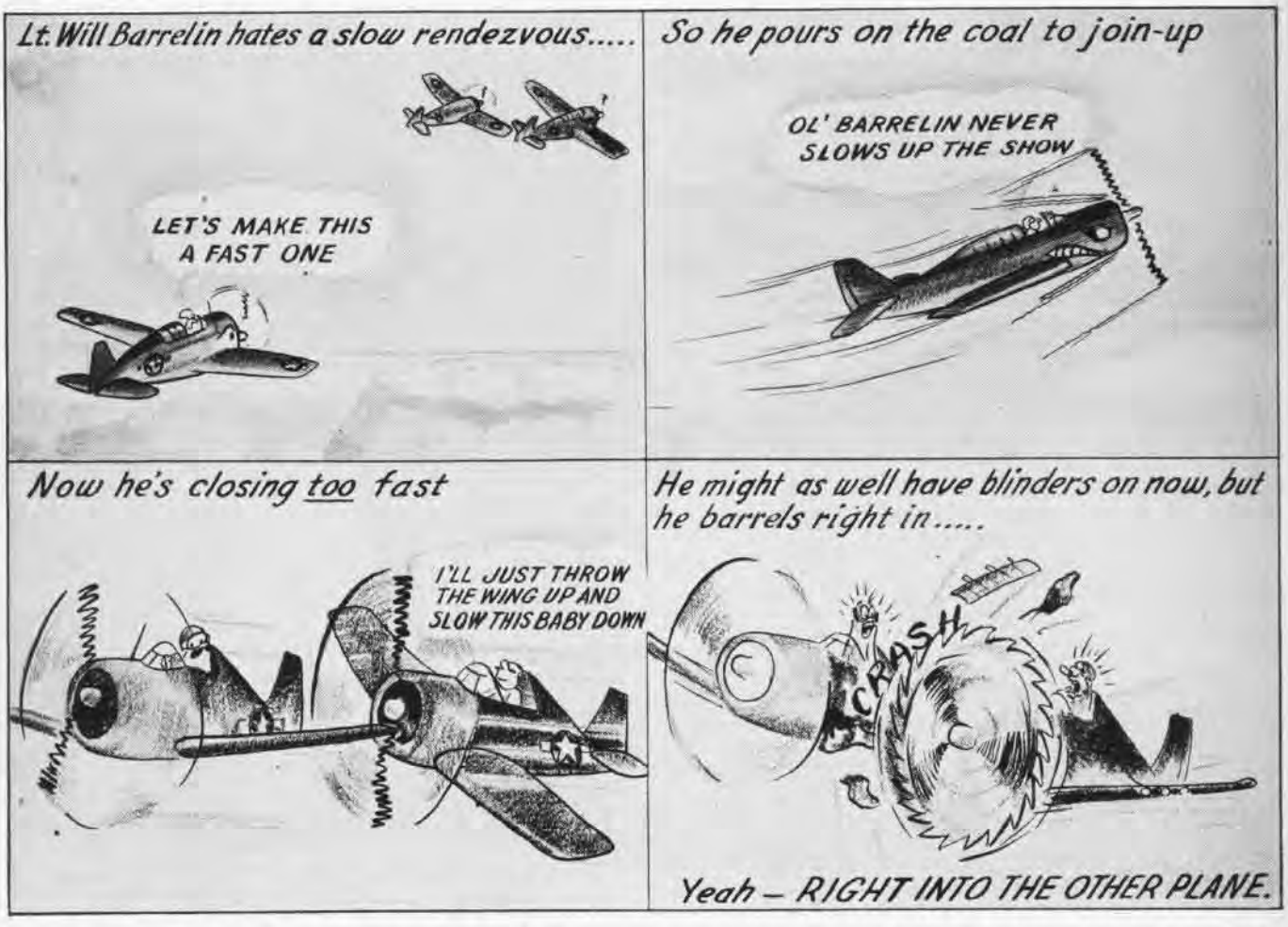
A couple of St. Louis' pilots won themselves medals for outstanding work during the war. Lt. (jg) Willard Fletcher won the Navy Cross for scoring a hit on a Jap cruiser in the Second Battle of the Philippines. Lt. Cdr. Wilbur C. Griese won the Navy Cross for getting three bomb hits on the Jap BB *Hyuga* in the Inland Sea. Both are assistant type training officers in VT and VF planes respectively.

Fletcher was shot down after torpedoing a *Nagato*-class BB and swam for five hours before reaching a nearby island. He joined up with the Filipino guerillas and fought the Japs, later rejoining the Navy for further service.

Pilots Smith, Giblen, Pollitti and Willett talk over war experiences as ferry pilots with Reservist Buddy Rogers

Ace trouble shooter, Sgt. James A. Klotz, fixes engine; Sylvester Weitkamp, Chas. Zachritz and Clifford Cannon watch

Beechcraft gets repairs by Bormann, printer: Bennett, aerial student: Bllel, diesel man; Nye, engineer; Baum, auto mech



LT. WILL BARRELIN

Moral: Close in Slowly on Join-Ups and Always Keep the Other Planes in Sight.

COLLISIONS during join-ups continue to take an unnecessarily high toll of Navy airplanes. Fortunately some of the recent accidents of this type have not been too violent and the pilots have survived to give accurate accounts of the mistakes which led to their mid-air collisions.

Most common error is closing-in too fast in the rendezvous. This, coupled with an attempt to slow the plane down by lifting a wing, creates a very dangerous situation which has caused several crashes. Another frequent error is concentrating attention on a single plane and not using the "swivel-neck" technique to keep track of what the other planes are doing. Joining up in the wrong direction, misunderstood or unclear signals, as well as abrupt changes in the course and speed of the lead plane are other important causes of collisions during rendezvous.

Never join-up on another plane without pre-arrangement and don't assume that, just because the plane ahead is the right type, it is necessarily the one you are looking for. It may turn out to be a stranger. If the pilot is not aware that you are joining up, he is likely to surprise you with an abrupt turn or a sudden change of speed. In closing-in always allow plenty of time to decelerate. Move in gradually. If you are closing too fast, don't try to slow your plane down by throwing a wing up and placing the lead plane in a blind spot. Plenty of aviators are under the sod as a result of this maneuver.

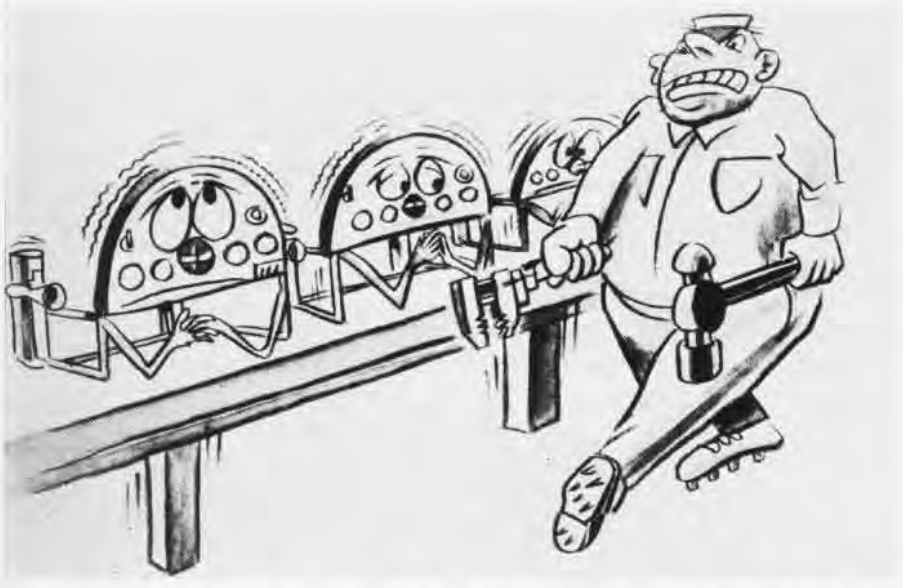
The cases listed below illustrate some of these errors:

Case #1

Two student pilots in SNJ's were joining-up at 2200 feet. Before the pilot who was joining had settled down in position, he looked into the cockpit. During that moment his plane slid to the left and up, so that his left wing struck the under side of the other plane's right wing. Before he could break away this wing pierced the fuselage of his SNJ just above the left wing root. Fortunately both pilots were able to turn their planes away from one another and break free. Instructors joined-up on each plane and stayed with the students while they climbed to 5000 feet and tested their planes for adequate control at landing speeds. They were then escorted back to the field and both landed safely.

Case #2

The pilot of an SB2C-3 was acting as the section leader (Number 3 position) in a four plane division. The division had just completed a strafing run and was joining up to the left. The section leader had overtaken the division leader's wingman and was to his left and slightly below. At this point both planes were in a slight left bank and approximately 150 yards behind the division leader. The #2 man then increased his left bank and dropped his nose. The #3 man started to slide under and ahead, but in doing so hit the wing of the other plane with his vertical stabilizer and rudder. The pilot flight tested his plane at altitude and then returned to the carrier for a safe landing aboard.



HANDLE WITH CARE

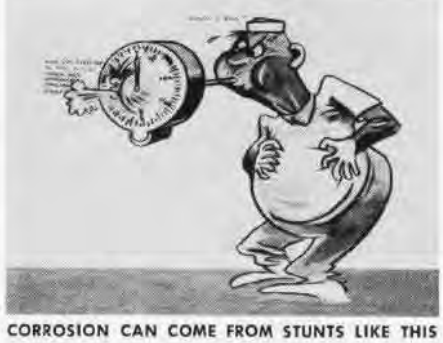
To the pilot of present-day, highly-complex, service aircraft, the success of each flight depends largely on the accuracy and reliability of the instruments installed. To him these instruments are the nerve center of the aircraft and indicate the condition of its operating components. In foul weather these instruments act as a "seeing eye" for a pilot who has no conception of the attitude of his aircraft in relation to mother earth.

Every pilot realizes the importance of properly functioning instruments; however, many overhaul, maintenance, and supply personnel do not. Those connected with overhaul are more likely to handle instruments with care, because they know the critically sensitive characteristics of their internal mechanisms.

During the war, enormous quantities of instruments were procured and only a small percentage of requirements was filled by overhauled instruments. Today the reverse is true. The number of new instruments procured has been drastically reduced because of the limited Navy budget. In order to meet replacement requirements, more instruments must be furnished from overhaul.

Reports received by the Bureau of Aeronautics indicate that overhauled instruments often do not compare favorably with new instruments or earlier replacements. This condition may be caused by attempts to meet the increased workload imposed by mounting supply requirements. If the quality of the instruments presented to operating units for installation were improved, the total quantity required would be greatly reduced because of a longer average service life and reduced rejection rates.

A survey of instrument failures reported on RUDM's indicates that the operating time of overhauled instruments has become increasingly low. In



CORROSION CAN COME FROM STUNTS LIKE THIS

conjunction with the Naval Aircraft Factory, the Bureau of Aeronautics has established a project to assist in determining the reasons for this condition. Early conclusions indicate that improper overhaul technique and failure to adhere to prescribed assembly tolerances have been the primary reasons for early failure of those instruments so far inspected. These conclusions apply primarily to instruments reported on RUDM's and evaluated by the NAF to date. Instrument overhaul activities should make every effort to improve overhaul techniques, with particular attention to assembly tolerances. It is essential that every instrument be tested in accordance with existing instructions prior to return to stock as ready for issue.

These comments on overhauled instruments do not include the thousands of instruments which have not been sent to the NAF for evaluation. Premature failure of instruments received for overhaul can be attributed, in part, to non-compliance with existing maintenance procedures. No in-

THOSE BANANA FINGERS AREN'T HELPING ANY

strument can be expected to operate adequately unless properly maintained. Squadron commanders should insure that maintenance personnel thoroughly understand and comply with all applicable instructions regarding maintenance of installed instruments.

Gyro instrument failures are the most frequent. Many such failures could have been prevented by proper maintenance. Changing oil and air filters, adjusting oil pressure and suction regulators, checking electrical wiring, power supply, and connections may seem relatively unimportant, but reports indicate that many of the failures could have been averted if such standard maintenance procedures had been applied.

Improper handling, packaging, or storage also result in a substantial number of premature instrument failures.

Instruments not properly packaged after overhaul or test, or not placed in shock-absorbing containers prior to removal from the instrument shop, will almost certainly be damaged in subsequent handling. Even when properly packaged, instruments may sustain internal damage or require recalibration unless handled carefully at all times. Many other packaged supply items will stand rough handling, such as dropping or jarring, without injury, but NOT AIRCRAFT INSTRUMENTS. These are in the "FRAGILE" classification. They cannot stand even the mildest sort of mistreatment. *All* personnel should remember that a box marked *"Delicate Instrument—Handle with Care"* means just that, and should be handled with even greater care than a crate of eggs.

Continuing research is directed toward evolving greater packaging protection. Experience has demonstrated that present packaging is adequate to withstand normal handling without damage to the instruments. Except under unusual circumstances packaged instruments received should never be removed from the package until immediately prior to installation.

INSTRUMENTS should be stored at all times in a place which will prevent exposure to unfavorable climatic conditions. Units from stock should be selected for issue according to reinspection dates. Instruments on the shelves longest should be issued first. Such a procedure will greatly reduce the number of instruments becoming overage. To reduce further the number of instruments becoming overage, stock of instruments kept in storage by each unit in the Supply System should be limited to those necessary to meet normal requirements. An activity in the Pacific Area recently found it necessary to reject all directional gyros which were supposedly ready for issue. Upon inspection all units were found to be corroded to such an extent that the caging mechanisms were frozen. This was caused by improper packaging and storage.

Operating activities indicate that many overage instruments received for installation fail to pass pre-installation functional check. In addition, many overage instruments which do pass pre-installation check fail during service operation in a very short time. Tests have shown that instruments which require periodic lubrication cannot be expected to remain operative when installed after being held in storage beyond the allowable time limit. Activities should minimize the installation of overage instruments and should refuse to accept overage instruments for which relubrication is necessary.

NIX ON THE OLD CORN SHUCKING TECHNIQUE

Supply officers and squadron commanders can assist in improving the availability of instruments and obtain maximum use of each unit by insuring that all hands connected with the overhaul, maintenance, and supply of aircraft instruments personally decrease the drain on the critically short instrument supply by correcting conditions noted in this article.

When instrument failures do occur, submit an RUDM. Procedures set forth in *Technical Note 11-47* and *Aviation Circular Letter 60-47* have been designed to provide information by which BUAER may determine the cause of failure and the remedial measures necessary. Make instrument RUDM's complete! RUDM's which lack informative details are a burden to all. They serve no useful purpose in the overall program to give YOU better aircraft instruments.

BOOKS

Frontiers of Flight; The Story of NACA Research. George William Gray. Knopf, 1948, $6.

Instrument Flying. P. V. H. Weems and Charles A. Zweng. Pan American Navigation Service, 1947. $4.

Jet Propulsion Progress; The Development of Aircraft Gas Turbines. Leslie E. Neville and Nathaniel F. Silsbee. McGraw-Hill, 1948, $3.50.

Radar Aids to Navigation. Edited by John S. Hall. Office of Scientific Research and Development, National Defense Research Committee. McGraw-Hill, 1947, $5.

MAGAZINE ARTICLES

The Naval Aviation Program. Rear Adm. A. M. Pride, USN. *Aero Digest*, March 1948, pp. 55-57, illus.

Why No Guided Missiles—Yet. Albert B. Scoles, Rear Adm. USN (ret.). *Aero Digest*, March 1948, p. 67.

Trends in New-Type Powerplants. *Aero Digest*, March 1948, pp. 68-75. (Eight engineers discuss problems created by the latest in aircraft engines.)

1948 Reaction Powerplants Directory. *Aero Digest*, March 1948, pp. 77-87, illus. (Round-up of jet engines.)

1948 Directory of Piston Engines. *Aero Digest*, March 1948, pp. 89-98, illus.

The Design Engineer's Role in Airplane Cost Reduction. Horrell Gustave Erickson. *Aeronautical Engineering Review*, Feb. 1948, pp. 24-30, illus.

Designing Secondary Power Sources and Mechanisms for Airplanes. John H. Meyer. *Aeronautical Engineering Review*, March 1948, pp. 36-45. (McDonnell engineer discusses secondary power systems with particular reference to the *Banshee.*)

Special Education Issue of *Air Affairs*, Winter 1948. (Entire issue devoted to a survey of education in the air age.)

Survival in the Air Age. *Air Force*, March 1948. (Entire issue devoted to Report of the President's Air Policy Commission.)

Fighter Planes Gain High Speed at Sacrifice of Maneuverability. *Aviation Week*, March 1, 1948, p. 18.

Unveil Constitution's Design Highlights. *Aviation Week*, March 1, 1948, pp. 20, 21, illus.

Swept Wing Taxes Piloting Skill. Robert McLarren. *Aviation Week*, March 8, 1948, p. 30. (Bell L-39 as test vehicle for high speed fighters.)

Jet Fuel Shortage Is Big Question. Stanley L. Colbert. *Aviation Week*, March 15, 1948, p. 15.

NACA Expands Its Facilities. *Aviation Week*, March 15, 1948, p. 22.

"Droop Snoot" Configuration Aids Jet Fighter Landings. Robert McLarren. *Aviation Week*, March 15, 1948, p. 26.

FJ-1 Makes First Carrier Test. Scholer Bangs. *Aviation Week*, March 22, 1948, p. 13, illus.

Supersonic Pulses Probe Metals to Hunt Flaws, Check Thickness. H. C. Drake and E. W. Moore. *Aviation Week*, March 22, pp. 21-23, illus.

NACA Cites Many Attainments in Year of Intensive Research. *Aviation Week*, March 22, 1948, pp. 28-31.

Power and Glory on Wings. W. B. Courtney. *Collier's*, March 27, 1948, pp. 26, 61-66. (Discussion of what constitutes true Air Power.)

Why Pilots Make Mistakes. Col. Paul W. Tibbets, Jr. *Flying*, April 1948, pp. 14, 15, 52, 54, illus. (Complicated cockpit controls cause pilot error.)

Navigate by the Rule of 60. E. S. Quilter, Cdr., USN. *Flying*, April, 1948, pp. 31, 32, 50, illus. (Twelve steps in dead reckoning.)

Utility Uses for Airships. Lt. J. Gordon Vaeth, USNR. *Naval Institute Proceedings*, March 1948, pp. 296-299.

Yokosuka Naval Air Base and Japanese Naval Aviation. Sgts. C. Ray Stokes and Tad Darling. *Naval Institute Proceedings*, March 1948, pp. 339-343.

Tony LeVier, Test Pilot. William R. Nelson. *Skyways*, April 1948, pp. 22, 23, 57, 58, 61, illus.

Fuel Tank Leaks Cut Down

VR-5, SEATTLE — The pro-seal fuel tank sealing system continues to be 100% successful in the aircraft of this squadron. Lt. Cdr. L. T. Nuss, VR-5 engineering officer, reports that BUNO 56545 has flown 573 hours in three months with no fuel tank leaks and BUNO 564540, with 322 hours in its first month in VR-5, has the same excellent record.

The only discrepancies in other pro-seal equipped squadron planes were minor leaks found in aircraft used on local bounce drill.

WINTER SWOOPED DOWN LIKE A DRAGON ON THE MARINES AT TSINGTAO AND CLUTCHED PLANES PARKED ON TS' ANG K'OU AIRFIELD IN AN ICY GRIP

CHINA MARINES CONQUER HARD WINTER

VMF-211, CHINA—King Winter arrived in China with a vengeance. During one snow storm that lasted for two days, flurries were so heavy that the entire parking line at the airfield was obscured. All traffic was suspended while runways and parking areas were cleared. It was necessary to push bulldozers with tanks to dig out from under the heavy snow fall—all this with a 6° temperature, the lowest recorded in 13 years.

Operations and maintenance problems, caused by extreme cold and snow, greatly hampered activities. Due to the experience gained in three years of winter operations in North China, however, VMF-211 was able to cope with most of these problems during the past winter.

Use of preheaters was mandatory. Any ice accumulations were melted off with these preheaters, heat being applied until the surface was thoroughly dry. However little ice was encountered, as it was a dry cold and temperatures seldom got high enough to allow the snow to melt and freeze again.

Snow was brushed off as soon as it fell. Little trouble was found with frost on plane surfaces.

Fuel strainers were drained each day and were often found to contain ice.

Oil dilution was used and found to be essential to successful operations. On several aircraft in which oil dilution had not been installed, external heat was used, although the process was extremely slow.

External power was always used to start a cold engine. The external power unit was mounted in a jeep. This proved an excellent arrangement, although frosted spark plugs caused some difficulty.

Considerable hydraulic trouble was experienced, particularly in regard to external leaks, inasmuch as the type of seals installed in the F4U-4 had a tendency to harden in cold weather.

In the last analysis the most difficult problem VMF-211 had to combat was the effect of the extreme cold on the personnel, which was bound to decrease their general overall efficiency.

FURY SETS WEST COAST SPEED RECORD

VF-5-A, San Diego—The air between NAS SEATTLE and Los Angeles was sizzling recently when an FJ-1 jet from this squadron whistled through the skies to set a new north-south record.

Cdr. E. P. Aurand, squadron skipper, set the new mark on 29 February when he made the 950-mile flight in one hour 58 minutes and seven seconds, averaging 550 miles an hour, thereby breaking the old P-80 record by 16 minutes.

Lt. Cdr. R. M. Elder, exec, set another record by flying from Seattle to Mills Field, San Francisco, in one hour 24 minutes. Lt. Cdr. J. J. Magda, flying directly to San Diego, reached San Diego in two hours 12.9 minutes. By coincidence, his arrival proved a fitting climax to an "open house" being conducted by NAS SAN DIEGO.

Delayed in his flight from San Francisco to Los Angeles by minor discrepancies, Elder left on 1 March on the speed run. Although passing close aboard the Los Angeles municipal airport at a reported 34 minutes, haze and visibility conditions were such as to delay his actual passing of the tower until 45 minutes had elapsed. This was about two minutes over the previously established record.

JETMEN WANGGAARD, ELDER, AURAND, MAGDA

An unofficially timed attempt was made on this same speed run by Lt. Cdr. L. Wanggaard Jr., on 3 March. Unfortunately, this pilot also encountered visibility difficulties and was not clocked by the Mines Field tower at any better time than 46 minutes.

On their flight northward to Seattle, the four FJ-1's obtained valuable information on long range, high altitude cruise control of the plane. Similar experience was derived on the south trips.

Propeller Shaft Gets Pits

FASRON-119, PACIFIC—A major discrepancy, which is believed to be of interest to other activities, was discovered in a PBM-5 engine recently. It appeared to be oil leaking from the thrust nut.

Removing the prop to check the nut, it was found the propeller shaft had numerous pits, and that the front cone was damaged beyond repair. Subsequent investigation revealed what is believed to be improper use of preservative compound specification AN-C-52. Pacific Fleet TB 12-TB-47 apparently was not followed.

Further, a heavy coating of AN-C-52 compound had been applied to the prop shaft, including the thrust nut threads. In view of the damaged shaft and front cone, the engine is being changed.

▲ ***BuAer Comment*—A test is being made at NAS Patuxent with a number of compounds and oils to select a material and develop a procedure which can be used universally at each propeller installation. The object is to select a material which will be safe even when carelessly applied, providing propellers are properly torqued and retorqued.**

It is feared that careless use of a compound which cannot be displaced by the cones when the prop is being torqued or retorqued after the first run-up will cause more damage from fretting due to future loosening of the propeller than would have been caused by corrosion. This fear seems to be borne out by this FASRon-119 case.

Planes to Carry Crash Meters

The Navy hopes to secure valuable scientific data from installing load-recording dynamometers on 800 F6F aircraft, to measure loads sustained by pilots in the event of a crash.

Two of the dynamometers will be installed in the junction of the lap safety belt to the seat structure and a third between the shoulder harness take-up mechanism and shoulder harness straps. These small pieces of equipment each have two round steel rings which will be bent to an oval shape by crash forces on the belt and/or harness. The amount of deformation will indicate the force sustained.

Development of the dynamometers by BuAer and Bureau of Standards, with the manufacturing aid of Naval Aircraft Factory, is a long step toward getting actual figures on which to base aviation safety studies. Heretofore, these data have been secured only through use of dummies in test vehicles and mockups.

Inclusion of the dynamometers in the lap belts and shoulder harnesses will in no way weaken them. They are designed to a 44% margin of safety over the harness and their attachment fittings. These devices will furnish first hand information on the ratio of shoulder harness to a lap belt load in a crash, as well as the amount of force the body can withstand or the amount that causes the injuries.

DYNAMOMETER WITH BENT, NORMAL STEEL RINGS

Dynamometers will be sent to supply officers at Alameda and Norfolk for distribution to service activities for installation in F6F's in accordance with Service Change #105. An aviation circular letter # outlines procedures to be followed by concerned activities in forwarding dynamometers and reports following aircraft crashes.

Water in Gas Hits Marines

VMF-211, China—During a recent cold snap, fuel pressure lines in the F4U-4's froze in many instances, forcing this squadron to adopt measures to keep them thawed out.

Indications of the trouble were negative readings of the instrument pointers and no increase in pressure when the emergency fuel pump was operated.

Trouble-shooters discovered that fuel pressure lines were frozen at the lowest point, which is in the line from the instrument to the access panel located under the right side of the aircraft. An isolated case was found when the instrument itself was frozen, as well as the fuel pressure line.

The trouble was traced to water in the supply of aviation gasoline. It was a simple matter to thaw out the lines with a preheater, then drain them. Draining lines periodically keeps the accumulation of water down to a minimum and prevents this trouble.

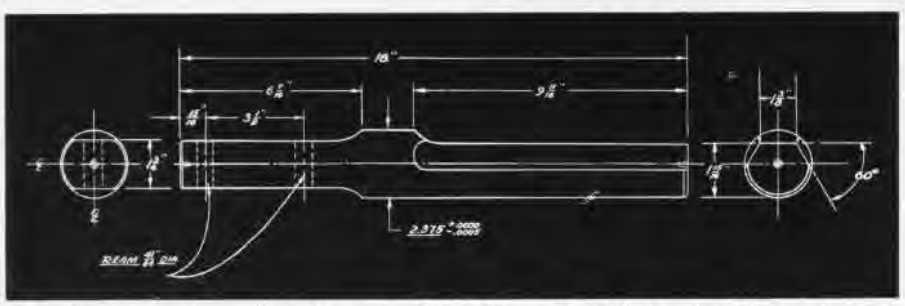
Gyro Bursts, Kills Seaman

Aircraft gyroscopes may be fun to play with when they make a noise like a small boy's siren whistle, but they are lethal weapons when misused. A seaman first class at a Florida air station was killed last November when a gyro pulled out of a scrap pile burst.

The man was "running up" the gyro by applying air from a pressure air hose. The gyro rotor reached such a high speed it disintegrated and a piece about the size of a dime pierced the man's abdomen. He died of internal bleeding.

Tests have shown that gyroscopes have safety limits which range from 20,000 to 70,000 rpm. An average person using one in an unauthorized manner has no way of knowing when it will pass its safety mark and burst from centrifugal forces.

BuAer recommends that people with a yen to overspeed gyroscopes change their hobby to something a little less dangerous.



Precision *ground mandrel shown in NAS Alameda A&R drawing above gives satisfactory means of removing dents from damaged F6F hydraulic landing gear cylinders. Dented cylinder body is fitted over mandrel (material SAE 1020, case harden .010) and dents are tapped out with soft hammer. As dents are tapped out, cylinder slides further on mandrel until all dents are removed. Process, taking 30 minutes a cylinder, saved 40 cylinders ($35 each) which normally would have been scrapped.*

Marines Train Radar Techs

VMF(N)-542, El Toro—With the critical shortage of electronics personnel, this squadron worked out a system which helped considerably in alleviating the situation.

Potentially scientific men were sent to Fleet Airborne Electronics Training Unit at Ream Field for a 22-week basic course. These included both general duty men with the necessary aptitudes and also the airborne radar intercept operator.

The men were sent in small groups to each class, thereby assuring a small but steady flow of personnel to the squadron to which they are returned upon completion of the course. After finishing the fundamentals and study of certain airborne electronics equipment, the men are assigned to the combined radio-radar shop of this squadron and VMF(N)-513 and VMR-152 where they gain practical experience working with equipment currently in use by the squadron.

The men are rotated until they are qualified in all equipment. On completion of this on-the-job training, they are recommended for an appropriate SSN. Thus far nine men have qualified as radio-radar repairmen (SSN 879) and one as radio-radar technician (SSN 878).

Two new policies announced by the Marine Corps have aided the program. One is that men return to their squadrons after finishing the school. The second is a waiver of the regular minimum time requirement for promotions for men completing certain phases of electronic training.

▲ ***BuAer Comment*—A good solution to the training of squadron personnel and one that might be followed by other CO's.**

Gas Blast Rips NATS Mars

VR-2, Alameda — Aviation maintenance activities may get some good advice out of the experience this NATS squadron had when a vacuum cleaner ignited gas fumes and caused an explosion which damaged the *Philippine Mars*.

Two men were removing aluminum chips and dirt from the after tank in compartment D following fuel dump valve modifications in the bilge tanks. One man was below the tank with the intake tube of a small vacuum cleaner, the other on deck alongside the cleaner in compartment E.

Simultaneously with discovery of flames at the exhaust port of the vacuum cleaner, an explosion lifted the starboard quarter of the compartment's deck. One man was burned about the eyes.

Examination of the cleaner indicates it is a type which should not be used at any time aboard a plane having fuel cells in bilge or fuselage. The man collecting the shavings also drew gasoline vapors into the suction tube and it passed the open motor commutator where they ignited. Both squadron vacuum cleaners were in station overhaul and the small substitute cleaner was used.

Lessons learned were: *1.* Always use an underwriters-approved type fume testing device and be sure it is operated properly when there is the slightest possibility of an explosive mixture. *2.* No matter how carefully the gasoline is drained from the aircraft there probably will be some in the gas lines, valves and elbows. When wind blows and rocks the plane, some gas may be relased from the above and drain into a previously dry tank. *3.* Beware particularly of days when humidity is at or near 100%. *4.* Never use unauthorized equipment, no matter how innocent it looks.

NEW FUEL FOR JET ENGINES

EVALUATION of a new fuel for use in all aircraft gas turbine engines is now underway as a result of the issue of Army-Navy Aeronautical Specification AN-F-58. This specification presents the requirements for an aircraft turbine and jet engine fuel for experimental and development purposes only. It is the basis of a comprehensive test program now in process, which ultimately will yield a specification for the procurement of a fuel for all military turbojet or turboprop powered aircraft.

Since gas turbine engines can, with appropriate design, operate on any cut of petroleum, the tendency has been to emphasize the use of heavy fuels for reasons of economy and safety. There is need to modify this tendency, however, because of the effects of such fuels on availability, tank explosion hazard, and engine operation under extreme ranges of temperature.

Availability is the principal factor in selecting a fuel for military use. In determining the availability of a fuel two variables must be considered: freezing point and volatility (Reid Vapor Pressure). On the basis of these two variables the National Advisory Committee for Aeronautics compiled preliminary figures on the potential production of gas turbine engine fuels based on a unit quantity of crude petroleum. These data were used by the Air Force and Navy in determining requirements of Specification AN-F-58 and indicate the approximate two-to-one availability advantage of light, wide boiling range fuels over the heavy, narrow boiling range fuels.

Gunfire tests have definitely demonstrated the inherent military disadvantages of the heavier fuels from the standpoint of tank explosion hazard when the aircraft is subjected to enemy action.

With kerosene (AN-F-32, grade JP-1), the most commonly used of the heavy fuels, engine starting at temperatures below approximately —40° F. is extremely difficult. Light, or gasoline-type, fuels can be operated at temperatures as low as —76° F., but they have a lower heat content per unit volume which results in a loss of range for volume-limited aircraft.

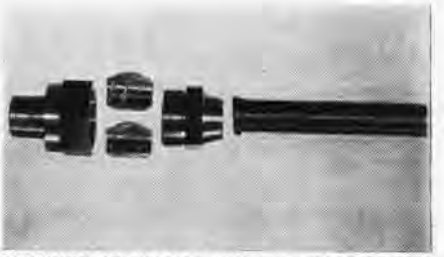
The relatively wide latitude in the specification for the experimental fuel will allow considerable variance in the products presented for testing. The work of evaluating the fuels is being conducted cooperatively at the Air Materiel Command, at the Aircraft Engineering Laboratory, Naval Air Experiment Station, and at various petroleum laboratories now working on USAF and BUAER jet engine fuel contracts.

Batches of fuels supplied by various refiners in accordance with the new specification, and special blends, are being tested in representative gas turbine engines and engine components of both Services to determine the operating qualities of the fuels, any possible engine modifications required, and possible revisions to the specification to increase availability or to meet engine operating requirements.

At the same time, engine manufacturers are anticipating any possible modifications needed in their present products by conducting experiments with varying fuels, and performance guarantees of engines under development are being predicated on utilization of the new fuel. It is expected, that few engine modifications will be needed.

Probably two years will be needed to complete the entire fuel evaluation program, although valuable pertinent information is being collected from day to day in the course of the testing.

The final results will be a specification for a "referee" fuel—bedrock minimum qualifications—to provide a fuel for demonstration of engine operation, a "procurement" specification to which fuel may be purchased to support service aircraft operations, and the incorporation of the "procurement" fuel specification in engine specifications.



IMPROVED CONNECTOR CUTS ELECTRICAL HAZARD

Squeeze-Type Joint Handy

NAS NORFOLK—An A&R employee has developed an improved squeeze-type connector for securing electrical extension cables or cords to condulets and connector junction boxes.

The connector provides sufficient gripping action to prevent the cables from slipping or pulling out of condulets or boxes on portable electrical equipment.

Parts of the connector are a male half connector, a two-piece cable clamp, a female half connector and a cord protector spring. Advantages of this device over the old are the positive grip action to hold the cable tight, elimination of abrasion and sharp bends in the cable and elimination of necessity of carrying stocks of different size cable ferrules or bands.

The connector will last indefinitely since there are no parts to wear out or require replacing. One size connector is adaptable to most standard-sized three or four conductor cables used for portable extensions. Personnel hazards from shock are reduced. The device was designed by N. W. Brinn.

▲ ***BuAer Comment*—This connector is a good idea and a good design for the use intended. It is possible that its use will be limited, but where required it should prove beneficial.**

SAN DIEGO OVERHAULS FIRST PB4Y-2

NAS SAN DIEGO—The first PB4Y-2 *Privateer* to be completely overhauled by the A&R department made its initial flight on 14 January. The NAS has ben designated as the overhaul base for PB4Y's on the West Coast.

The *Privateer* was piloted by Lt. Cdr. J. E. Porter, with Lt. (jg) Bouldin as copilot and Capt. E. M. Condra, head of A&R, as technical observer.

To set up the program for overhaul, 15 picked men, Navy and civilian, were sent to Corpus Christi for a week's duty to observe overhaul division techniques there.

At the same time all available blueprints of the parts and structure of the plane were gathered, and information was amassed concerning tools, lines and men needed for the job. An operational sequence unit was organized to coordinate existing facilities in A&R with the special work needed for this project.

The first plane took 60 working days to complete. Subsequent jobs are expected to be finished in half that time. The program—in reality a dual program, overhaul and plane modification—is geared to take care of about 20 to 25 planes a quarter. Despite the large size of the plane, less time is necessary to overhaul it than any other type handled by the air station, a noteworthy achievement.

CREW WHICH FLEW FIRST OVERHAULED AIRCRAFT

In the overhaul process, the planes are complete dismantled, all parts are checked, repaired or replaced, and necessary modifications are made. The planes are then reassembled and tested until ready for duty.

Crew members, included in the accompanying photo, who participated in the first test flight were Lt. Cdr. Porter, Jr.; Lt. (jg) Bouldin; Capt. Condra; A. I. Wasilik, AETM2C; A. M. Dale, AEM2C; K. E. Low, AMM1C; L. Lozier, AETM2C; G. M. Femrite, AMM2C; C. Kemp, AMM3C; H. L. Beauchamp, AMM1C; and E. F. Ammerman, ACMM.

Combat Planes Track Typhoons

VP-HL-2, GUAM — The task of patrolling Pacific typhoons fell on Heavy Landplane Squadron 2 following decommissioning of Weather Reconnaissance Squadron 1. Within a month, it had reported on three typhoons, despite the fact that the season was supposed to have little storm activity.

Five former VPM-1 pilots helped check out pilots of this squadron in weather flying. Operating instructions call for the aircraft to circumnavigate the storm on the 40 kt. circle. But ask any pilot who has flown a tropical storm if this can be accomplished. Our pilots report that everything is fine at 300 ft. with the 40 kt. wind on the tail and slightly on the starboard quarter when suddenly the clouds and rain close in and the aircraft starts down.

Almost full power is added instantly but the aircraft continues downward. Finally, after the aircraft has all but broken in the middle, the downward movement stops and starts back up in the same vicious manner. The aerologist reports 70 kts.

The pilot immediately turns the starboard wing into the wind hoping to get back out to the 40 kt. arc as soon as possible. Usually after a few minutes of severe turbulence they are again at the 40 kt. arc and they continue their mission. Squadron aircraft which fly typhoons are easy to spot—the paint on the leading edge of the wings and empennage has been worn off.

Pilots feel that *Privateers* can track typhoons successfully, even though the location of the eye will not be as accurate as when tracked by the special weather-configurated aircraft.

INSTRUMENT SHOP IMPROVED

NAS SAN DIEGO—What is believed to be one of the most modern instrument repair shop spaces in the naval establishment has recently been completed and put into operation at this station. Embodying many recent developments in lighting, air conditioning, and room construction, the alterations were accomplished on a limited budget and without erecting a special building. Much credit is due to all concerned for devising many ingenious solutions to the problems met.

Because of the exacting work required in assembling and testing the many delicate instruments used on aircraft, it was necessary to provide dust-free air, even temperature, strong non-glaring light evenly distributed at bench level and without shadows.

Built at a cost of approximately $37,000, the new shop enclosure features a suspended overhead which was devised to avoid use of supporting stanchions and consequent loss of valuable floor space. The suspended overhead also provides a means of using the latest flush-type fluorescent lighting fixtures and permits dissipation of heat generated by these lights to the space outside the shop. This alone is an outstanding design feature, because greater facility for repair and maintenance of the lighting and air conditioning system is provided through easy access to the units involved and the needed capacity of the air conditioning plant is reduced.

The lighting source is brought to a more effective height from the work bench by the use of an unrestricted nine-foot ceiling. The lighting system utilizes Holophane control lens which provides prismatic control of lighting intensity and reflects sufficient light to the overhead to minimize shadows. The system was designed for an intensity of 100 foot-candles at bench level, approximately 233 percent more than normally is provided by general lighting. This feature has reduced the need for spot illumination by bench lights to a minimum. While bench lights are provided for each four benches, it is the exception rather than the rule when a worker is found using them.

When the shop is entered through a series of double door air locks, one's initial impression of the room is soft, bright and completely shadowless illumination. The air is fresh and moderately cool, and very little evidence of dust is apparent. Noise is considerably dampened. The assembling and testing of aircraft instruments requires an unusual amount of concentration, and the feeling of restfulness resulting from good lighting and conditioned air is reflected in the ability of the workers to accomplish a heavy workload with a minimum of fatigue.

▲ ***BuAer Comment*—The need for an improvement in instrument overhaul shop conditions has long been recognized. NAS San Diego is to be commended for its initiative and ingenuity. This renovation should result in greater efficiency.**

NAVY FILMS

Navy. No.	*Classification*	*Title*
MN-6602	Non-classified	Oral Hygiene — Swab Your Choppers
MN-5056a	Restricted	Ammunition Handling Aboard Ship—Medium Caliber Ammuniiton
MG-5379	Non-classified	Operation of Ocean Station Vessels During Search and Rescue
MN-6605a	Non-classified	Recruiting — The Navy Recruit
MN-9153	Non-classified	Naval Chapels in the Pacific
MN-5311	Non-classified	Physiology of High Altitude Flying
MN-6611	Non-classified	Make No Little Plans

Film libraries in every Naval District, at various air stations and centers, and at selected locations outside the continental United States, will furnish all training films required by the Navy and the Marine Corps.

MIRROR INSTALLED ON WINDSHIELD OF CORSAIR

Mirror Change Aids Vision

VMF-224, EL TORO—Engineering department has devised a safety mirror which it has installed on the windshield of the F4U-4B plane for better rear visibility.

The mirror was moved from the cockpit canopy to the top of the windshield molding, enabling the pilot to have good rear vision when taxiing, taking off and landing or any time it becomes necessary to have the canopy open.

The bracket holding the mirror to the molding was made of .04" half hard aluminum at first but excessive vibration caused the mirror to be ineffective. Then .04" ST aluminum was tried with the same results, and it was found the most practical metal was 20 gauge galvanized steel.

The mirror still has the same vertical adjustment as before. However, it has been lowered about 1½", causing slight discomfort to tall pilots.

▲ ***BuAer Comment*—To permit the pilot to see astern without turning his head, this change should materially assist in reducing the number of accidents that occur while landing, taxiing and turning up. Also reduce the possibility of injury to pilot if canopy inadvertently closes. However, the problem of visibility restriction should be considered.**

Marines Spot Check Tools

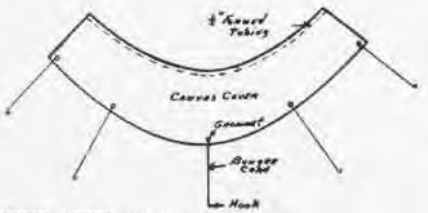
VMS-33, EL TORO—Material section of this service squadron set up a running inventory system which other squadron commanders may find valuable in keeping track of whereabouts, condition and use of all material.

An inventory team consisting of a staff sergeant and one pfc. goes into a shop at any time and takes inventory. When they have completed this they go to another at random. Many times in a 30-day period they will go up to a mechanic working on a plane, have him put his tools in his tool box, give him a like tool box that is complete and inventory his.

Doing this has reduced the loss of hand tools to a great extent, discrepancies are discovered and remedied sooner than otherwise could be done.

The Group ordnance officer of MAG-33 devised another plan to tell at a glance availability of personnel in the various squadron ordnance departments. A diagram outline made of removable cards in holders shows status of each individual and indicates whether the man is on leave, in the hospital, at the rifle range, on guard duty or mess duty.

The system is used to assist the Group personnel officer in the equalized assignment of men with SSN 911 to the concerned squadrons.



HOOKS, CORD HOLD EXCLUDER TO AIR INTAKE

Canvas Shield Curbs Dust

VMF(N)-513, EL TORO — To keep the dust out of the air intakes of F6F-5N, the parachute department constructed for the engineering section a good air intake dust excluder made of canvas.

One-half inch scrap dural tubing was formed to fit inside the nose cowling. Canvas cloth was sewed to this tube and cut to shape to fit over all air intake openings. The cloth was held securely over the ducts by bungee cord that fastens to the inside of the rear cowling. The excluder is of simple design that can be made for any number of aircraft with a minimum of time.

NATS Asia Draws Fire Bill

NATS, ASIA—As a result of a recent R5D fire in another command, a careful study of established NATSASIA fire prevention measures has resulted in the following program:

1. An improved plan for removal of aircraft from nosebay hangars, in case of fire, which includes tow bridles installed, parking brakes off, a long range method of removing chocks, and tow mule tractor standing by. This is to be augmented by frequent fire drills for proper training of all maintenance personnel.

2. Establishment of well-marked alternate fire exits from office and shop spaces of the nosebay hangars.

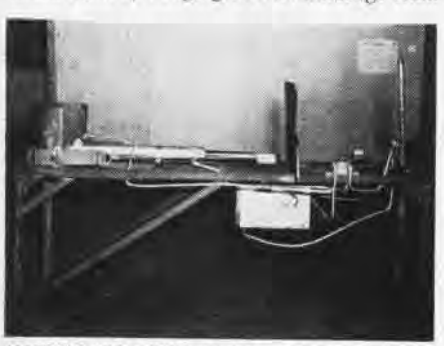
3. Posting of eight large "No Smoking" signs in the hangar area.

4. Establishment of a new parking area for all line maintenance equipment well away from aircraft parking and servicing areas. This is to avoid possible fire hazards which might result from the engine exhausts and to minimize interference with movement of aircraft in emergencies.

Machine Tests Safety Belts

VMR-152, EL TORO — Two mechanics of this squadron devised a machine to speed testing of the 720 aircraft safety belts the outfit is called on to check each six months under TO 3-45.

Before using the machine, the squadron tested them by hanging 800 lb. sandbags from the belts, a system which took two men five minutes a belt. With the new tester it is possible for one man to test a belt in two minutes.



MACHINE HAS ARMOR GUARD TO PROTECT WORK

A piece of armor plate is mounted on the machine to protect the operator in case of failure of the belt. Most of the parts for the machine were secured from a salvaged R4D or F4U. They included a hand pump, gauge, landing gear strut for stretching the cable, curved sheet iron, selector to determine flow of fluid, armor plate and a hydraulic reservoir.

▲ ***BuAer Comment*—This device is similar to that described in *TN 1-48* and serves the same purpose.**

COLLAPSIBLE LADDERS BUILT AT CHERRY POINT

New Ladder Aids Servicing

MCAS CHERRY POINT—To facilitate servicing of JRB and SNB aircraft and to prevent personnel from damaging the wings, Aircraft Engineering Squadron 46 manufactured a collapsible ladder. The break down form also allows for ease in storage in the luggage compartment, and a half of the ladder may be used for entering or leaving the plane.

These ladders are constructed of standard stock, 1" OD aluminum tubing. In six months of use they have proved very sturdy, light and useful.

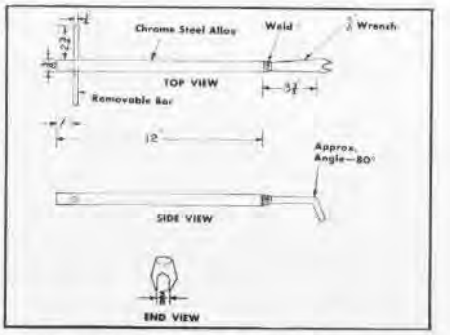
▲ ***BuAer Comment*—A very useful item—recommend stations fabricate locally where needed.**

Stud Drill Idea Saves Time

VR-3, PATUXENT—A chief machinist's mate, Admiral D. Sutphin, has produced a tool for drilling out ignition harness studs which speeds up the job and insures that a slip will not occur which would require an engine change.

The tool consists of a machined guide with center hole, which is inserted in the harness brace hole from which the broken stud has come. A machined center punch then fits in the center hole of the guide for a dead center punch.

A drill with a long extension then is inserted and drilling is begun. A 3/16" drill for easy out pulling or a ¼" drill for drilling out the stud completely may be used. The drill shaft has been made larger than the drill to insure that the latter does not go too deep and drill out the nose section casting.



To facilitate *removal of starter from the F4U-4, mechanics of VMF(N)114, MCAS, Cherry Point, designed the wrench shown above. It was made by welding a 12" extension on a 5/8" end wrench, which was bent 80° just behind the head and which had the jaws filed down to a width of 1¼ inches.*

Canal Zone GCA Operating

NAS COCO SOLO—France GCA unit was placed in operation on 27 December, based at New France Field, Canal Zone. The Unit, under Lt. Cdr. W. R. Shaver, formerly was at NAS NORFOLK.

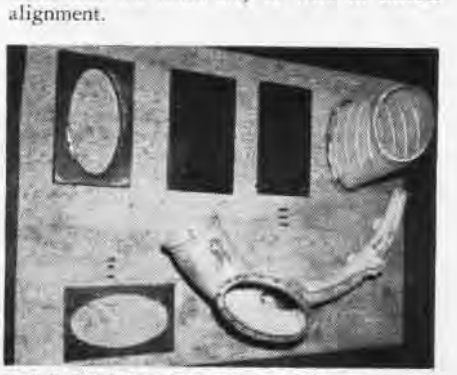
Two months were spent prior to operation, conditioning the equipment and sharpening up before the unit became operational for training Navy and Air Force pilots based in this area. The unit is now operating 24 hours a day during inclement weather to aid any Navy, Air Force or commercial planes.

Tool Aligns Exhaust Stacks

NAS ALAMEDA—A tool to facilitate alignment and fitting of exhaust stacks has been developed and successfully used at NAS ALAMEDA. The tool was designed by Hiram E. Jackson, Metalsmith, Maximum, under the Navy Employees' Suggestion Program.

The suggested fixture consists of case hardened metal plates with holes accurately drilled in bolt hole position to accommodate case hardened taper pins. This fixture will properly align holes in exhaust stack assemblies that have been previously distorted by the application of heat during the process of removing carbon and welding.

The part with holes out of alignment is placed on the proper plate. A taper pin is then driven through two aligned holes. Then as each consecutive hole is drawn into correct position by the application of heat from a blow torch, additional pins are driven into the plate through the flange of the part in order that the holes may be held in correct alignment.



PLATES GIVE PATTERN FOR STACK BOLT HOLES

AVIATION ORDNANCE

INQUIRIES SHOULD BE ADDRESSED TO THE CHIEF OF BUREAU OF ORDNANCE

Gun Barrel Bursts on Range

The barrel of a Remington Sportsman autoloading 12 gauge shotgun burst while firing doubles on the skeet range at the NAS MOFFETT FIELD. Fortunately no one was hurt.

The first round fired resulted in what was an apparently weak explosion or hang-fire; a large muzzle flash was noted and the gun failed to eject the case. The case was ejected manually. When the next round fired, the barrel burst just aft of the Cutts-Compensator. *(See accompanying photograph.)* Previous to the day of the accident, the gun had fired about 200 rounds without malfunction.

DIRTY BARREL CAUSED A SHOTGUN EXPLOSION

RECOMMENDATION: It is recommended that all personnel using shotguns for skeet or other purposes refer to TM-9-285 for an excellent presentation of the functioning and maintenance of all types of shotguns including the Remington Sportsman and Model 11. This manual clearly outlines the "do's" and "don't's" for shotgun users and should be available at every skeet range.

▲ ***BuOrd Comment:*** **It is the opinion of BuOrd that the direct cause of the barrel failure was an obstruction in the bore. As a *precaution* to all users of shotguns make sure that the barrel of your gun is *free* of grease, oil, cleaning rags, dirt, mud, or any other obstruction that may burst the barrel or blow out the bolt. If a gun malfunctions, immediately unload it and carefully examine the component parts for causes of failure.**

Jato Bottles Will Blow Up

Results of two tests recently conducted at NAD HAWTHORNE, seem to have properly established the degree of hazard which may be encountered when Jato units are involved in fire and are directly exposed to flame.

BUORD has consistently considered Jatos to be subject to high order detonation and has required that they be stowed alone in high explosive type magazines, although, for transportation purposes, they had been classified as fire hazard material by the Interstate Commerce Commission.

In these tests, the Jato units, type 12AS1000D, were placed in horizontal position in piles of scrap lumber which were then ignited. In six minutes and nineteen minutes respectively the two units exploded violently, digging a large crater. The large fragment pictured here was found at a point 960 feet from the scene of the detonation, while numerous smaller fragments were widely distributed over the area.

FRAGMENT OF JATO BOTTLE WAS BLOWN 960 FT.

CAUTION: For obvious reasons, fires if involving Jato units as in magazines or storehouses should be combated, if at all, with extreme caution and full realization that high order detonations, resulting in extensive fragmentation and missile hazard, may occur.

▲ ***BuOrd Comment:*** **Jato units are not considered to represent any undue hazard, if stowed within the normal temperature limits, and other conditions which have been prescribed by applicable BuAer and BuOrd publications, and handled in full conformity with approved procedures, including the restrictions against attempts to use them at normal temperatures subsequent to previous exposure to unauthorized temperatures.**

Missile Photography Plane

For the past year, the Naval Aviation Ordnance Test Station, Chincoteague, Virginia, has been using a F7F-3N camera chase plane for the purpose of photographing guided missiles of the *Bat* type in flight.

The installation, designed and constructed at NAOTS, consists of one 35 mm Mitchell and two 16 mm Cine' Kodak Special cameras

ARRANGEMENT OF CAMERAS IN TIGERCAT NOSE

boresighted so as to converge with the line of flight at 400 feet, and mounted in the nose compartment, where the night fighter radar had previously been housed. Minimum vibration, triple coverage, and easy accessibility are features of this installation.

Each camera port is covered with plate glass. A dull black painted tube leads back from each of the two outer 16 mm ports to the 16 mm camera lens barrels which are supported in the tubes by sponge rubber grommets. No support for the 35 mm camera barrel which points through the center port, is required. The two Cine' Kodak Specials operate off the plane's power supply; however, a special 12 volt battery is carried for the Mitchell.

'EYES' OF MISSILE CAMERA POKE OUT OF NOSE

A 63 mm lens is used on one of the 16 mm cameras, while six inch lenses are used on the other 16 mm and the 35 mm camera, giving horizontal angle coverage from 3.6 to 9°. Kodachrome film is usually used.

No difficulties have been encountered in flight. The missiles, after being released from the parent aircraft, are trailed at a distance of 100 to 150 yards, using the pipper of a Mark 8 sight as a reference point for tracking the missile.

20mm. Maintenance Manual

TM 9-229, pertaining to the operation and maintenance of the 20 mm. automatic gun M3, is being distributed by BUORD.

Although this TM is intended to replace and supersede OP 1317, it is recommended that copies of the OP be retained for reference.

While TM 9-229 has been given wide distribution, any activity that may have been inadvertently omitted may obtain copies by submitting NAVGEN form 47 through its district publications and printing office. Inasmuch as the supply is limited, BUORD requests that discretion be used in requisitioning this manual.

NAS MEMPHIS—Latest techniques in fire fighting have recently been learned by 122 enlisted men at this unit of Air Reserve.

SUPPLY NEWS
FROM ASO AND SUPPLY DIVISION BUAER

How Source Coding Works

Source coding of airframe parts came into existence as a result of supply and demand. As early as 1940 aviation supply personnel realized that there was a need for advising field activities, by a code, just what parts they were required to manufacture locally and what would be procured through the airplane contractor.

With such a system the support of naval aircraft by operating and overhaul activities could be expedited, since time would be saved through the indication of just which items could be requested from ASO. As a result of this thinking, the Bureau of Aeronautics issued ACL 128-44, designating the coding to be a joint action of BuAer and ASO, and also establishing and defining the codes.

CODE 'P'—PARTS PROCURED:

1. Code 'P' is applied to parts which are procured in view of relatively high usage. Local manufacture of these parts is within the facilities of a dependent type activity or its supporting activity. Restricted local manufacture is considered practicable, if critical, but only after an attempt has been made to procure from supply sources.

2. Code 'P1' is applied to parts which are very difficult to manufacture. Local manufacture is considered impracticable.

CODE 'M'—PARTS NOT PROCURED:

1. Code 'M' is applied to parts which are within the facilities of a dependent type activity, or its supporting activity, to manufacture. Procurement is not justified in view of the relatively low usage, or nature, of these parts. Needs are to be met by local manufacture as required.

2. Code 'M1' is applied to parts which are difficult to manufacture and which can be manufactured only with the facilities of class 'A' or 'B' repair activities. Procurement of these parts is not justified in view of their relatively low usage. The needs of all activities are to be met through salvage, or by local manufacture at supporting class 'A' or 'B' repair activities.

CODE 'X'—*PARTS NOT PROCURED AND CONSIDERED IMPRACTICABLE FOR LOCAL MANUFACTURE:*

1. Code 'X' is applied to main structural members, or similar parts, which, if required, would suggest extensive aircraft reconditioning. The need of a part, or parts, coded 'X' should normally result in a recommendation to strike aircraft.

2. Code 'X1' is applied to parts for which procurement of the next larger assembly coded 'P' is justified: e.g., an integral part which is inseparable from its assembly; a part machined in a matched set; or a part of an assembly which, if required, would suggest extensive reconditioning of such assembly, etc.

CODE (*)—ITEMS NOT TO BE REQUISITIONED:

Code (*) is applied to (1) installation drawings, diagrams, instruction sheets, etc.; (2) obsolete parts. Items coded (*) are not to be requisitioned.

Some confusion was aroused in the field by assigning the 'M' and 'M1' codes to an assembly job. Such codes sometimes were assigned to airplane contractor's part number which consists of assembling a number of detail parts such as castings or forgings which were obviously coded 'P' or 'P1' and which would normally be procured through the provisioning meetings, or it may have meant putting together a number of AN standard parts normally carried as standard stock in the supply system. Although it was never intended that the field activities manufacture such detailed parts, but instead that they requisition the 'P' or 'P1' items or the AN standard parts and merely assemble them, yet many complaints were received that they could not manufacture these parts because they required extensive tooling, jigs, or dies. To eliminate this confusion BuAer issued ACL 112-47 which established the 'A' and 'A1' codes.

Code 'A' is applied to assemblies made up of two or more units, each of which carry individual part numbers and nomenclature, and which may be assembled only by activities having Class 'A' or 'B' facilities.

Interchangeability Lists

It is the policy of ASO to revise interchangeability publications semiannually and to forward them to all shore stations and fleet units engaging in maintenance and overhaul of navy aircraft engines and/or propellers.

These lists serve in a dual capacity, in that supply requirements are combined and coordinated with a resume of all technical data and changes, to provide one common basic source of information pertinent to parts application, identification, and procurement status of each engine part. Maintenance and overhaul factors are included to provide recommended requirement limitations. Their use facilitates consolidated procurement and reduces tendencies toward the accumulation of excess stock by controlled spares allocation and distribution. From a maintenance standpoint these publications may be utilized to identify replacement parts which have common usage on the various models of engines of the same manufacturer.

In addition to the contractors' part numbers and nomenclature, the respective stock numbers, technical data relative to equivalents, standard parts, supersedures and interchangeability of parts also are incorporated. References to engineering changes, engine bulletins and modification instructions are included.

The contents of this compilation are restricted and limited to active procurable parts required to support maintenance and overhaul of current aircraft engines and propellers. All non-procurable parts or parts not usable as details have been omitted from the lists.

All additional service requirements are completely covered in Army and Navy (AN) Service Instructions, Overhaul Manuals and Parts Lists with illustrations for each specific aeronautical navy engine.

Interchangeability lists currently in force are the following: Pratt & Whitney Engines — #ASO-02-10-911; Wright Engines — #ASO-02-35-911; Hamilton Propellers — #ASO-03-20C-911; Curtis Propellers — #ASO-03-20B-911; Aeroproducts Propellers — #ASO-03-20D-911; Propeller Governors, Electric Head (Eclipse) — #ASO-03-20E-911.

Fragile! Handle with Care

Reports are being received by BuAer and ASO indicating that Class 88 instruments are being shipped from aviation supply activities to BARR'S, INM's and other naval activities in a damaged and/or overage condition.

When a damaged or overage instrument is received by an operating activity or an aircraft contractor, costly delays are experienced in maintaining flight and production schedules. To reduce the frequency of these occurrences, it is recommended that all Supply Officers charged with the responsibility of custody, stock rotation, handling, packaging, and/or shipment of Class 88 instruments instruct all personnel concerned on the importance for observation of every precaution in handling instruments, and, further, in the necessity for positive rotation of stocks.

Safety Belts Disappearing

Apparently too many safety belts are being consumed. The issue rate for the past six months almost equals that during the war. This has resulted in critically low stocks of safety belts in ready-for-issue condition.

Obviously, users must practice better conservation, and Supply Officers must ration available stocks and effect prompt salvage and repair of belts. (See ASO S/L serial LOs1235-CF5-s, dated 3 November 1947.)

Disposal Directives Index

ASO recently has issued a new index including all currently effective directives on disposal of surplus materials. This index will be reissued from time to time in the future as a supplement to ASO Circular Letter #200. It should be understood that constantly changing conditions in operating and overhaul plans necessarily result in frequent changes in these directives.

Marines Keep F4U's Flying

VMF-115, Pacific—This squadron recently set what is believed to be a near-record for availability of planes. During a two-day period, 90 consecutive sorties were flown before a single plane went out of commission.

These sorties were from one to three hours duration and included gunnery, rockets, bombing and tactics. The second day was made up of three flights as part of the joint Army-Navy-Air Force exercise held with Task Force 38. On the third flight of the JANAFEX, 23 *Corsairs* were airborne for a dive bombing attack on the Task Force, which represented an availability of 100%. This was accomplished with 35 men available for both line and engineering sections of the squadron.

SERVICE Test
INTERIM REPORT DIGEST

This digest covers the 15 March Interim Report of Service Test, NATC PATUXENT, and does not necessarily reflect BUAER policy.

FJ-1 (46 Hours)

Test of aircraft delayed by engine change at 46 hours and a failure of auxiliary landing gear shock strut assembly.

Cable Clamps. Electronic equipment cables throughout airframe are supported by non-standard canvas straps and buckles. *Recommend* that contractor comply with specification AN-W-14a, para. C-1b.

Cables. Electronic equipment cables in vicinity of the ARC-1 and ARR-2 are routed underneath and less than six inches from hydraulic lines at station 82. *Recommend* that contractor comply with specification AN-W-14a, para. C-2c(2)m.

Gaskets. (Flared tube, universal, AN-902-4, AN-902-6, AN-902-7, AN-902-9) Fourteen gaskets failed or began leaking when total engine time was between 25 and 30 hours, accumulated over 11 weeks. Gaskets were replaced with standard AN "O" ring packings.

Engine Exhaust. After a hard aircraft landing the end of the exhaust nozzle was found to be approximately 1½" to the left of center. A burned paint area 6" x 2" was found on the left side of the fuselage 1" forward of aspirator. Right tail pipe support trunnion was off the guide track and vertical inside diameter of pipe was ⅜" greater than horizontal diameter at support trunnions, indicating that the pipe had been deformed at that point. *Recommend* that contractor improve method of holding tail pipe trunnion in guide track.

Hyraulic Reservoir. Capacity of manual pressure relief valve which vents entrapped air in hydraulic reservoir, P/N 134-58051, during filling operations is too low, resulting in excessive time (15 minutes per gallon) to fill reservoir. *Recommend* that manual pressure relief valve be redesigned.

Access Door Hinges. Double hinges attaching the oil tank, fuel tank, and engine access doors throughout the aircraft loosen with use. This allows upstream edge of access doors to project into airstream. Repeated tightening of hinge loops has caused hinges to become quite brittle. *Recommend* that contractor provide a suitable hinge to retain these access doors flush with skin of aircraft in flight.

Danger Area Survey. Tests, in static position, so far indicate that the danger area forward of air intake duct is much smaller than indicated by previous tests conducted by other activities.

F4U-5 (36 Hours)

Surging. Aircraft has made 27 flights. During flights 4 and 5 (high altitude) surging was encountered at low power and aircraft was restricted to altitudes of 15,000 feet and below on subsequent flights. An anti-surge valve was received on 24 Feb. and installed. Two flights have been made to test operation of engine with anti-surge valve. Engine functioned properly, but has not been tested at high altitude.

Engine Starting. Difficulties have been experienced in starting the R-2800-32W engine, and several small exhaust system fires have occurred.

Bonding Wire. Several bonding wires attached to the cowl flaps were found to be loose from the quick-disconnect clip attached to the channel assembly. Bonding wires could not be refastened to the quick-disconnect clip because of fatigue of the metal in the clip. *Recommend* that present method of attaching bonding wire be replaced with method specified in AN-B-10a, amendment -1, fig. 4, dated 21 Aug. 1945.

Trim Tab Indicator. (Panel trim tab, L. H. auxiliary control, VS-58056) Screws securing the instrument body to instrument case dropped out, allowing instrument body to fall away from instrument case. As remedial action, original screws were replaced with 2-64 ¼" round head steel screws, AN 520-2R4. Slots on the screw heads were aligned and safety wire was used to prevent the screws from backing out.

Inter-Cooler Door. (Support assembly, inter-cooler flap pump, VS 56239) The left side of the support assembly was torn loose from the inner metal liner of the inter-cooler door. The inter-cooler door is of metalite construction. Support assembly was secured by eight cherry rivets, ⅛" diameter, four on either side of the support assembly. As remedial action, cherry rivets were replaced with steel screws, AN 505-8-20, using a typical through bolt installation.

AM-1 (61 Hours)

Nose Cowl. BIS item S-54 on AM-1 BUNO. 22267 reported cutting of the nose cowl attachment bolts, P/N AN25-42, by "D" row cylinder rocker platform assemblies, P/N 91208 and 91209, and recommend as temporary fix enlarging the holes in the platform assemblies from 5/16 to 3/8 of an inch. After 60 hours of operation with the new bolts, a second inspection revealed an identical cutting of the attaching bolts.

At 60 hours airplane time, AM-1 BUNO. 22266 was inspected and all bolts were found cut. Deepest cut was ⅛". No washers were found between the platform assemblies and the inside of the tines of the nose cowl support link. Absence of these washers and differential air pressure on the adjacent baffles permits the fork to shuttle on the cylinder ear and allows platform assemblies to vibrate and cut the bolts.

The present bushing shanks, P/N 10-5062079, are not long enough to clamp the platform assemblies to the cylinder ear, unless the clearance between the cylinder ear and the link support tines is filled with shimming washers, AN960-516 and AN-516L. Shimming is complicated by restricted access and the spring tension present in the platform assemblies.

The contractor has furnished this unit with a set of specially hardened shear bolts as a substitute for the present AN standard bolts. These bolts have been installed on AM-1 BUNO. 22266 with one AN960-516 washer on each side of the cylinder ear. Believe that contractor has complicated the installation by the addition of special parts in lieu of the use of AN standard parts. Also believe that discrepancy will not be eliminated if present bushings are used unless shimming is provided between the cylinder ear and the inside of the tines of the support link.

One set of bushings has been manufactured by this activity with a shank length of .317" and installed on AM-1 BUNO. 22267. It is important that an AN960-516 washer be installed on each side of the cylinder ear to provide bearing surface for the bushing shank and prevent shuttling of the link support. The longer shank bushing will eliminate the addition of a special bolt and shimming, and will provide for adjustment due to wear.

Positive indication that the platform assemblies are clamped against the cylinder ear can be made by observing the clearance between the outer surface of the support link tine and the hexagon shoulder of the bushing. No installation difficulties were experienced. *Recommend* that the nose cowl attachment to "D" row cylinders be modified as described above.

Exhaust System. A modified exhaust system, P/N 10-500008, installed on AM-1, BUNO. 22266, incorporates the following modifications: Slip joints and clamps are used at the point where the exhaust stacks pass A-2 cylinder. This whole assembly is rigidly clamped to A-2 cylinder. A larger thrust stabilizer support arm is incorporated.

The following installation discrepancies were discovered during installation of the new exhaust system: *1.* The clamp attaching the forward leg of the exhaust thrust stabilizer support to the engine mount rod is too large and requires a circular shim .080" thick. *2.* To install the number one bank exhaust system it is necessary to completely assemble the exhaust stacks and gradually work the assembly into its position. Increasing the width of the ears of the fixed clamp bolted to A-2 cylinder would permit removal of the tail pipes without the otherwise necessary complete removal of the system. *3.* The figure eight clamp for bank number five was too wide and allowed the clamp to ride on the dimple. The clamp width was decreased 1/16" at the dimple.

Armament Changes. The following armament changes were completed during past month:

1. Inboard feed chutes were replaced with an improved type, P/N 10-2080-4111, equipped with additional tabs to prevent stoppages.

2. Four improved wing trunnion assemblies, P/N 10-2080126, were installed.

3. Redesigned latches, P/N 10-2080642-1 and -2, were installed to prevent breakage of the boresighting mechanism.

4. Modified anti-rotating pins, P/N 10-20800074-1 and -2, for the boresight locking assemblies were installed.

5. An improved modified Douglas bomb ejector assembly was installed.

6. Modified bomb ejector jack screw nuts were installed.

7. An ejected case deflector was installed on the outboard ejection chutes.

8. Ejected link deflectors were installed on all link chutes to prevent rocket pigtail failures.

FH-1 (136 Hours)

Emergency Selector Valve. At 115 hours total aircraft time the emergency selector valve, P/N TCD-15600-2, could not be actuated with cockpit control handle. Linkage was disconnected at the valve and was found to be free. An unsuccessful attempt was made to turn the valve with a wrench with the linkage disconnected. Valve was removed for investigation. Prior to disassembly a force of 40 inch-pounds was required to turn the valve when dry. On disassembly the valve appeared to be in good condition. It has been returned to contractor. *Recommend* that contractor investigate.

Nose Landing Gear. In accordance with McDonnell Bulletin No. 4SB11, nose landing gear trunnion, P/N 8382D-14A and torque arm bolts, P/N 8382D-40 and 41, were replaced. Change is designed to prevent shimmying action of the shock strut resulting from abnormal wear of the bushings where the strut passes through the trunnion. Change was accomplished by two men in four hours.

J-30-P-20A Engine. Engine No. P-400008 has accumulated 100 hours total operating time and a 50 hour extension has been requested.

Tool Corrects Gasket Size

VMF-214—On receipt of *P&W R-2800 Engine Bulletin No. 214* (Supplement No. 3) which stated that fuel feed valve cover gaskets, P/N 77398, have been fabricated with an incorrect inside diameter, the Engineering Officer of *VMF-214* made a "go-and-no-go" gauge to facilitate checking of the gaskets. The gauge also serves as a cutting tool should the inside diameter be incorrect.

The tool, fabricated by Warrant Officer James E. Sparrow assisted by M/Sgt. Henry G. Palfey of SMS-12, was turned out on a lathe, with the finished product having a cutting edge which gives an inside diameter of 1.290. As the cutting edge is pushed through the out-of-size gasket, it bottoms on a surface of plastic which insures a longer lasting edge. (*See photo.*)

This action was necessitated by the fact that information contained in the engine bulletin was necessary to safety of flight. Since supply activities were unable to furnish proper size gaskets, the new tool has been a great help to the squadron in maintaining a high availability.

▲ ***BuAer Comment*—Very excellent idea. Naval activities will probably find this ingenious device of value in checking and cutting gaskets, P/N 77398, to proper size.**

GAUGE, CUTTING TOOL FOR OFF-SIZE GASKETS

The A&R procedure for reworking defective gaskets in large quantities is to pack the gaskets in a tube whose inside diameter corresponds to the outside diameter of the gaskets, clamp them tightly, and bore out the inside diameter of the gaskets to the required dimension.

Gas Charts Cuts Consumption

VMF-224—The Material department of this squadron has hit upon an excellent method of making pilots gas conscious. A record of gas consumed by each pilot is kept on a large chart posted in the ready room. This visual display of individual consumption keeps the boys aware of their gas-consuming habits better than any other method tried.

The chart records three figures for each flight, total gas consumption, flying time and consumption per hour. This last gives the meat of the subject in a nutshell. It is a comparative figure by which pilots can grade themselves. And it spotlights the "gas hog" as well as the man who is flying "cheaply."

Minor deviations in gauges, flight time, character of flight and what not, can make a noticeable difference in the computation of averages. However, over a period of time the discrepancies balance out and the chart serves its purpose very well. Since the inauguration of this chart program, a material reduction in gasoline consumed per hour flown has been noted.

Marines Open A New School

Out at El Toro, the Marines are conducting a school for the qualification of vehicle operators. The school qualifies men in all types of transportation in a four-week course. Films, lectures, safety procedures, and driving courtesies are taught during the first two weeks, with the second two weeks being devoted to road instruction and trouble shooting in the field.

ON-THE-SPOT REPAIR IS TAUGHT IN THE SHOP

At the end of this training the student is graduated *cum laude* as a polished driver. He is well-grounded in the fundamentals of safety, knows the nomenclature of vehicles, and has a complete knowledge of hand signals. Final driving tests are conducted over the course used in the Southern California's Championship Truck Driving Trials.

Magneto Checks In Flight

In the interest of conserving spark plugs, a recent Pratt & Whitney information letter is passed on.

Some pilots make a practice of checking the magnetos in flight after establishing a cruising mixture. Backfiring often results during the check, and the pilot returns to base for a plug change. Backfiring of an engine when a magneto check is made in the automatic lean mixture position is not abnormal at the usual lean settings of most carburetors.

With a lean mixture, a lower flame speed results. Cutting out one plug during the mag check does not allow sufficient time to complete combustion and scavenge the cylinder by the time the intake valve opens for the next cycle. The still-burning cylinder charge ignites the incoming charge and the result is backfire.

Therefore, automatic rich mixture should always be used when making a mag check in flight. Usually, it is not necessary to make a mag check at the beginning of cruise operation anyway. After the ground check, the takeoff and subsequent climb give actual proof that the plugs are functioning properly. Fouling and shorting out of the spark plugs are most likely to occur after extended cruise operation.

This is particularly true at low or moderate powers and with cylinder head temperatures below the recommended range. So, in order to prepare for possible plug changes on landing, a check in flight may be made near the end of the flight prior to letdown. This check should be in automatic rich *only*, with the cylinder head temperature in the normal range (180-200C). Then, if the engine indicates roughness or otherwise unsatisfactory operation, an additional check can be made after landing.

Aid for Aircraft Batteries

USS CORAL SEA—This vessel has an electrical installation of two WD 3200 generators and eight outlets, four on the flight deck and four on the hangar deck, for use in servicing aircraft. Although this system proved to be most valuable for recharging aircraft batteries after flight operations, it was inadequate for total aircraft needs.

This problem was partially solved by use of a distribution box capable of servicing four aircraft from one outlet by use of jumper cords, thereby providing a trickle charge and insuring a fully charged battery prior to the next operation.

▲ ***BuAer Comment*—The present 28 volt *D. C.* system in *CVB43* is an interim installation. Shipalt CVB 169 will provide ships of the class with facilities for charging batteries simultaneously in at least 72 aircraft under any condition of parking.**

LETTERS

SIRS:

At the close of squadron competitive exercises, trophies in the form of appropriately inscribed models of the F8F *Bearcat* were awarded to the pilots having the highest individual performances for the year 1947.

For outstanding proficiency and high-score in air-to-air gunnery, Lt. (jg) Robert L. Richardson was presented a trophy and a letter of commendation from the commanding officer (See picture below taken aboard the *Valley Forge*.) Lt. (jg) Richardson is holder of three D. F. C.'s and six Air Medals. He has previously served in VF-24, VF-50, VF-28, VF-84, VF-37, VBF-7 and VBF-11.

A similar award was presented to Lt. (jg) Warren J. Thomas for attaining the highest proficiency in rocket competition for 1947.

The *Valley Forge* with her Air Group, ACVG-11 at present is on an extended round-the-world cruise.

M. C. HOFFMAN, LT. CDR.
VF-12-A COMMANDING

SIRS:

Attack Squadron Eleven (Able) aboard the U.S.S. *Valley Forge* (CV-45) is now leaving Tsingtao, China, on a cruise that has turned into the "dream cruise" that would warm the hearts of many an old sea-dog. Attack Eleven is returning to San Diego via the Suez and Panama canals; the first dive-bombing squadron to have ever gone around the world on a single cruise!

Sharing the honors will be the U.S.S. *Valley Forge* (CV-45), Flagship of Rear Admiral H. M. Martin, U.S.N., Commander, Task Force 38, which will be the first United States aircraft carrier to make such a cruise.

After leaving Sydney, Australia, Task Force 38 engaged in joint maneuvers with the Royal Australian Navy, the climax of which was a simulated air attack made upon the combined fleets by Attack Carrier Air Group 11, supported by heavy land-based Lincoln bombers and torpedo-laying *Beaufighters* of the Royal Australian Air Force. A stowaway was discovered aboard the "Happy Valley" and was transferred to one of the Australian "cans" for return to Sydney.

Arriving in Hong Kong the officers and men of the Task Force quickly loaded themselves with Chinese objects d'art and became acquainted with the sights, sounds, and smells of this mysterious port of the orient, the mystery being—how fast the money goes, even at such reasonable prices.

After visiting other foreign lands on the new itinerary the *Valley Forge* will return to the United States in the spring.

R. A. BOYD
VA-11-A COMMANDING OFFICER

SIRS:

On 12 January, this squadron left sunny San Diego, and headed north into the fog, rain, snow and generally poor flying weather surrounding Sandpoint, NAS SEATTLE. There wasn't a pilot in the squadron that hadn't been convinced he should leave everything behind but his foul weather clothing and a deck of cards, for at least three Jupiter Pluvius's had assured us that husky fronts, fresh from the Aleutians, spend their fury on Sandpoint on the average of one every six hours. A gloomy outlook indeed.

But a big Babloon went to work and blew the weather off the coast and even our lumbering *Avengers* were able to make the trip between the promised fronts. Weather CAVU. No planes behind, none lost, strayed or stolen on the way. A beautiful trip—where was that terrible weather!

Our friend the Babloon wasn't through. He then blew most of the bad weather over us the first week while we were too busy getting squared away to fly much anyway. Since then we have enjoyed as many flying days as we could have expected in San Diego.

We found many facilities available here that weren't available at home. Most outstanding among them were the GCA installations at Sandpoint and Whidby Island. Their anticipation of our needs, cooperation and skill enabled us to qualify all of our pilots in GCA in about three weeks.

Lt. Fernand, the senior final controller at Sandpoint, made every approach with him a humor story. When your controller tells jokes and sings songs to you on final, you just have to feel comfortable. If the purpose of practice hooded approaches is to give the pilot confidence, he certainly accomplishes it in a most pleasant and efficient manner.

The entire base has bent over backwards to make our stay comfortable and profitable. Base operations cooperated to the limit in getting us maximum time in the air. The BOQ operated its dining room at a considerable loss to give officers a mess bill comparable to a ship's. The men call Seattle "Little Australia," a real compliment to any city's friendliness.

If the squadrons due to spend a few months here are dreading it, as we must confess we were, our suggestion is that they come up here expecting to find the answer to how pleasant and profitable TAD can be.

But bring your wives you brownbaggers. Sixty days is still 60 days.

C. H. CARBILL, JR., CDR.
VA-6-A
NAS SEATTLE

CONTENTS

● THE COVER

The Navy's newest jet fighter, the Grumman F9F, is pictured on this month's cover in a striking photograph by Harold G. Martin. Powered by a *Nene* or Allison J-33 jet, this high-performance carrier fighter is soon to be flying in quantities. The *Panther* carries wingtip tanks for longer range, has a "droop snoot" leading edge of the wing for greater lift in landing. Martin also took many of the current photographs for the feature article, *It's Grumman, One to Nine.*

ANSWERS TO QUIZZES

● AIR STATION QUIZ

(Inside front cover)

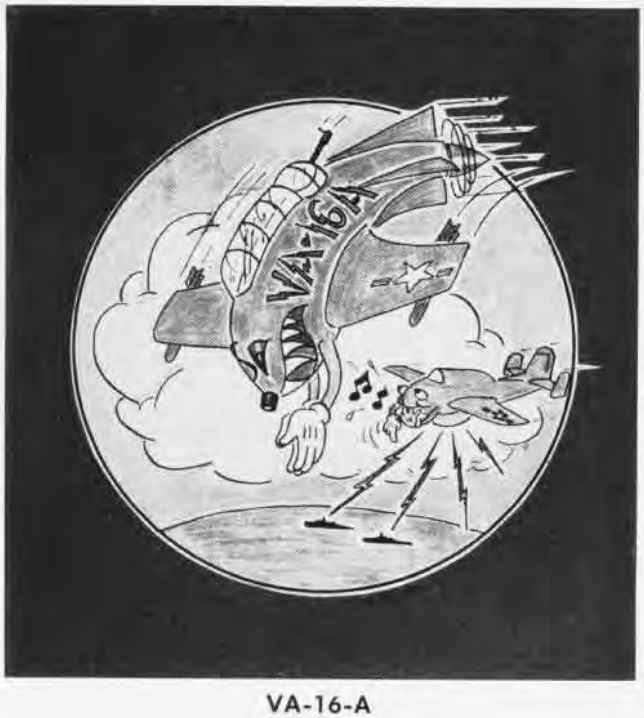
Top—Marine Corps Air Station, El Toro, Calif, one of the two main stations still operated by the Corps in United States. Bottom—NAS Lakehurst, New Jersey, home of the Navy's lighter-than-air program for many years. The big hangars and the landing circles make spotting this station easy.

NAVAL AVIATION NEWS

Published monthly by Chief of Naval Operations (OP-50-D) and Bureau of Aeronautics to disseminate safety, survival, maintenance and technical data. Air mail should be used if practicable, address to: Chief of Naval Operations, Naval Aviation News, Navy Department, Washington 25, D. C. Direct communication can be made to Naval Aviation News, Room 4927, Main Navy Bldg., office telephone extension 61662.

SQUADRON INSIGNIA

ONE OF the most modern squadron insignia is the new one approved for VA-16-A, showing an attack-type TBM loaded with rockets, its tail like a torpedo. A guppy-type TBM points out targets. A special weapons squadron with Atlantic fleet, VP-HL-4's insigne features a bat and a *Bat*, the radar-guided missile its planes carry in combat. Utility squadron One has a unique one also, depicting the aerial photography, towing of sleeves and flying of mail and passengers. Father Neptune rides a rocket, carries a gun-spear on VP-ML-2's.



VA-16-A

VP-HL-4

VP-ML-2

VJ-1

Grampaw Pettibone
FIGHTIN', FUMIN', FEUDIN'

- **Fightin'** is over for most, but for Grampaw Pettibone, the war against the Dilberts and dunderheads of aviation runs hot from dawn to dusk
- **Fumin'**, says GP, is no good against the guy who forgot to fill that extra tank, unless it's done *before* the flight and not *during* the trip
- **Feudin'**, states the Grand Old Man, against wheels-up landings, gasless takeoffs and dumb flathatting, is a pleasure and a joy forever
- **NOW HEAR THIS!** The life you save may be your own. Read Grampaw's sage advice in *Naval Aviation News*. Send in the coupon. Do it today!

SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON 25, D. C.

PLEASE SEND THE NAVAL AVIATION NEWS FOR ONE YEAR TO THE FOLLOWING ADDRESS. ENCLOSED IS A CHECK (OR MONEY ORDER) FOR $2.00.

NAME.....

ADDRESS.....

CITY..... ZONE..... STATE.....

MAIL THIS TODAY