

NAVAL AVIATION

# NEWS



Midway Shakedown  
FIDO • Maintenance

February 1946

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## What About Your Ship?

All right, all right—so your carrier has a story to tell! Then forward the facts, figures, incidents and photographs, as directed in Aviation Circular Letter No. 128-45, and let NAVAL AVIATION NEWS tell it for you. The treatment will depend entirely on the quality and amount of material your ship makes available for NAVAL AVIATION NEWS.



...ted nine aviators. Essex took only one Kanbu but was launching planes against all four.



Essex pilots check their work against Jap planes following York strike. Swartzke at right marks Victories shot in Mediterranean.

# ESSEX

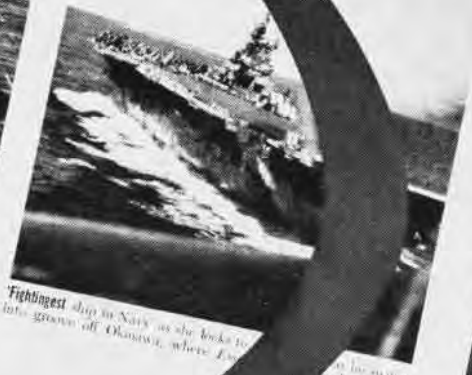
The U.S.S. Essex, whose crew claim for her the title of "fightingest ship in the Navy," amassed an impressive two-year record of 68 combat operations, supporting every major Pacific engagement from Tarawa to Tokyo Bay.

... a 20 mm gun position and tied up flight operations half an hour. The box score of the Essex in the war was outstanding. Her anti-aircraft crews shot down 33 attacking planes. Her air groups destroyed 1531 Jap aircraft with 800 more probables. Her air 25 Jap warships and 28 non-combatant ships, damaging 419 more. Tonnage sunk totaled 368,770 tons. Tonnage ... invasions supported by the Essex.

Ship' Fought Japs in 68 Combat Actions; Only Or Hit by Desperate Attacks in War



Anti-aircraft guns on Essex get tracking drill during hill while defending Okinawa action for 70 consecutive days without resting.



'Fightingest ship in Navy' as she looks into green off Okinawa, where Essex ...

OFFICE WASHINGTON

### AVIATION CIRCULAR LETTER NO. 128-45

To: All Ships, Stations and Units of the Navy and Marine Corps  
 Subj: Naval Aviation News  
 Ref: (a) Circular Letter No. 5-35, File Aer-F-5-ETC, A7-1(3), dated 17 April 1935  
 (b) U. S. Navy Regulations, Art. 76 (4) (a)

- Reference (a) is hereby cancelled and superseded.
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## Action Addressees:

C.O.'s of All Carriers, Sea-plane Tenders, Aviation Training Commands, Air Stations, Squadrons, Marine Aviation Units, Fleet Air Wings.



U.S.S. MIDWAY, FIRST OF THE CVB'S, SHAKES DOWN IN CARIBBEAN

# CVB SHAKEDOWN



CAPTAIN JOSEPH N. BOLGER

THE BIGGEST, most formidable aircraft carrier the world ever had seen, sailed out of Norfolk for shakedown Nov. 7, 1945, riding at more than 60,000 tons loaded. She was the U.S.S. *Midway*, CVB 41, first of the CVB class and one of three that will be part of the Fleet. The others are the *Franklin D. Roosevelt*, already commissioned, and the *Coral Sea*,

scheduled for commissioning sometime during this year. A thorough shakedown was arranged. The ship's unique features and size had to be proved. Measuring 962 feet over-all length, she carries a 912-foot flight deck of unpierced 3½ inch steel, the first U. S. carrier so equipped.

Few luxuries grace the new class carrier. She is a fighting

ship. Her armament includes eighteen five-inch 54s; twenty-one 40mm quads and twenty-eight 20mm twins.

A designed complement of almost 4,000 is required to man the *Midway*. Her electrical equipment includes coffee makers that turn out 10,000 cups at a time; six roasting ovens each capable of cooking 180 pounds of meat at a time; dough mixers that handle two barrels of flour at once.

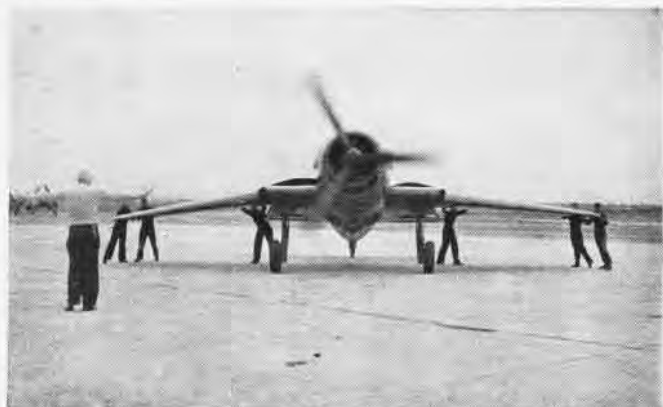
The ship carries 290 separate systems for ventilation and heating, requiring over six miles of vent trunks. Three hundred blowers force air through these trunks. Over 2,000 telephones and 600 speakers carry the word throughout the ship. Two hundred and thirty miles of piping and tubing worm their way through the floating fortress' 1,750 compartments. Most important of all, her cavernous hangar deck and vast flight deck are designed to handle 144 planes.

The monster's size requires teamwork to a fine point. And the 57-day shakedown cruise to the Caribbean area was aimed at developing that teamwork. No phase was skipped.





THOUSANDS OF CARRIER CREWMEN TRAINED ON THIS CONVERTED GREAT LAKES STEAMER, THE RECENTLY RETIRED U.S.S. WOLVERINE



Plane handlers undergoing pre-shakedown training at NAS ATLANTIC CITY, learn wing folding procedures under capable instructor



Instructor in plane handling teaches his crews to perform under same hand signals they will get from plane directors on a carrier

# PRE-SHAKEDOWN TRAINING

## Nucleus of Carriers' Air Department Well Grounded

THE MIDWAY, like any large carrier, drew the nucleus of her air crew from a CASU under COMAIRLANT. These men were well grounded in Air Department duties. Training began when they were screened from boot camps by NATechTRACOM, into such groups as plane handlers, catapult and arresting gear men, plane directors, and gasoline handlers.

From boot camp, plane handlers were sent to the Great Lakes where they went aboard the U.S.S. *Sable* and the U.S.S. *Wolverine* to work as aviation rate strikers for periods up to six weeks. There they learned basic carrier work.

The men then proceeded to a CASU, where they awaited shakedown of a carrier other than their own. Their own still was building. Most of the *Midway's* original crew leaders shook down on the U.S.S. *Antietam* and the U.S.S. *Charger*. On this shakedown, embryo plane handlers stood battle stations, observed the regular crew at work and finally assisted. They were supervised by a training officer from COMAIRLANT who watched and expedited their progress.

Following this shakedown, the *Midway's* nucleus crew returned to a CASU near where the ship was building. Here they were groomed in taxiing, spotting and parking aircraft. The work is accomplished on a runway painted to simulate a flight deck. Also, they familiarized themselves with the aircraft they would be using, learned wing folding procedures, tire failure discernment, and other necessary duties.

Last week of training after CASU is spent in a fire fighting school on the Atlantic Seaboard. Here plane handlers get a stiff workout fighting gasoline and oil fires. Mock-up planes are soaked with gasoline and lit; hangar deck fires, aviation repair shop fires and gasoline trunk fires are simulated. The men wear no asbestos suits, but fight the roaring blazes armed with fog and foam hose. Officers train with men. The plane handlers are watched closely. From each group of 60 men, 11 best are picked for crash detail. Nine others, quick witted under duress, will be the barrier detail nucleus.

The plane handler must know not only his own job, but also must pinch hit for plane captain, a job usually assigned to third or second class AMM's.

The plane handlers in this war were a staunch lot, often working 12 to 18 hours a day. One man, in charge of flight deck tractors, made AMM3c after months of rugged sea duty. When his ship took two Kamikazes off the Philippines, he was wounded by the first, but led fire fighting parties anyway because no one else was capable. After the second hit, he was told to head off for sick bay. Instead, he worked through and was a vital factor in saving the ship. He finally was carried to sickbay in a state of exhaustion—but under protest, and later was awarded the silver star.

During the big offensive on Kavieng and Rabaul, through Eniwetok, the plane handlers of another ship operated full deck loads daily for two months, averaging 3½ hours sleep a night. Then they got an 11 day "rest", preparing and loading logistics for a V-1 division. Following that they went on to the first attack on Truk and the Marianas, launching full deck loads daily for another month. In one month's time during this period, one plane handler striker went up to AMM1c, purely on his own extraordinary merit.

## PLANE DIRECTORS

These specialists, who guide revving planes to position on the flight deck, went through the same pre-shakedown training as plane handlers during the early part of the war. Later, however, petty officers, leaders of plane handlers and well experienced, were transferred in quotas on a rotation basis from the Pacific by COMAIRPAC. They are sent to COMAIRLANT, after 30 days leave, for assignment to construction carriers. Nucleus of the *Midway's* plane directors were obtained on rotation from the Pacific in this fashion.

## GASOLINE CREWS

For these Air Department specialists, petty officers and seamen are selected by the Air Force Atlantic Fleet personnel department from Fleet air activities in the command. They are pooled at Norfolk for further assignment.

They are then sent in quotas to gas school at NTS, Newport, R. I., for two months intensive training. Here they work on mock-up carrier gas systems and attend classroom work each day. Movies and operations ground them in the extremely complicated nomenclature, and methods and use of inert gas.

From an average crew of 19, who form the nucleus of a carrier's gasoline crew, two are picked as inert gas specialists. It is their duty to see that, during attack, or when the gasoline system of the ship is not in use, the system is purged with inert gas. The tragic loss of the old *Hornet* and



For actual carrier work, many plane handlers trained on U.S.S. *Charger* in Chesapeake. Here, chockmen on ship learn the ropes



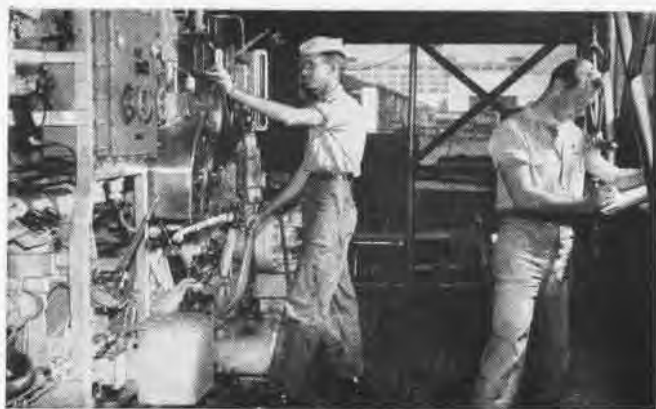
Occasional mishaps during pilot qualifications on the *Charger* provide green deck crews with realistic lessons in plane recovery



Pilots and flight deck crews train for carrier work on "field" carrier decks, complete with landing wires, barriers and an LSO



Shorebound catapults like the one at NATC PATUXENT RIVER, give catapult men as well as pilots an opportunity to learn principles



Catapult detail students work at the controls of a complete installation at the Naval Air Experimental Station in Philadelphia



All details of the II-2 catapult, used on CVEs and CVLs are studied carefully in pre-shakedown school. Students discuss buffer



Wrecked planes soaked with gasoline provide fires for embryonic flight deck crews to fight at fire fighter schools on East Coast



All hands on a carrier must know how to fight fires. They practice on oil fires lit in structures resembling ship's compartment

other carriers at the outset of the war proved the urgent need for this protection.

Last four days of the course is spent in fire fighting, like the plane handlers. But training is more intensive and dwells heavily on gasoline fires especially. The men must learn to quench gasoline fires with *water!* The water is atomized by a special nozzle.

Upon completion of this training, gasoline crews return to COMAIRLANT for shakedown on a carrier other than their own, where they observe and stand regular gasoline watches. Then, they proceed to the yard where their own carrier is building, and work with prospective gas and air officers in actual construction of the ship's gasoline system. COMAIRLANT's Training Staff assists in further training, and accompanies the crew on final shakedown aboard their own ship to oversee efficiency of the system and approve or disapprove time limits for gassing and draining aircraft.

## CATAPULT and ARRESTING GEAR

BUPERS designates this crew by number, and subdivides the ratings that will be allotted each ship. The *Midway's* complement was larger than most, due to number of wires and barriers. BUPERS also assigns one officer to each division.

These crews are sent to the Naval Aircraft Factory at Philadelphia, to the plant's special catapult and arresting gear school. The officers assigned train along with the men, working on actual installations planted on the ground at Mustin Field, Philadelphia. They work at actual operations and maintenance for six weeks, then are assigned to a ship that is building.

Upon completion of the course, the men are sent to COMAIRLANT for shakedown training on a carrier other than their own. On board, they are assigned to a petty officer in the catapult and arresting gear crew—as his helpers. Usually one day's operations falls to the green crew during this shakedown. The entire operation is turned over to them—officers included. A training officer from COMAIRLANT is with them to observe their fitness, and also to instruct them in night catapult and landing operations.

## GUNNERY DEPARTMENT

Other departments on the ship also are manned by crews having a nucleus of well-grounded personnel. At Newport specially selected men are designated from boot camps to attend the gunnery school there. The course usually requires six weeks, but for the *Midway's* gunnery crew nucleus, seven weeks were designated. Here, the men spent five weeks learning shipboard routine and handling of ammunition of all types, both in classrooms and in operations. An additional two weeks were devoted to actual gunnery. When they boarded the *Midway* they were ready.

## DAMAGE CONTROL

All of the *Midway's* damage control Chief petty officers, and petty officers first class, were required to attend the damage control school at Philadelphia for a four-week intensive course in the ship's damage control system. Following this, they reported to Norfolk for an even more intensive course on familiarity with the ship itself. The last week before shakedown was spent at fire fighting school in Norfolk, covering the same ground as the plane handlers. Every officer and man assigned to the *Midway* was ordered to the Norfolk fire fighting school. The ship started its shakedown with 100 percent complement of thoroughly trained fire fighters equipped to handle all types of fire.





UNDER THE GUIDANCE OF PLANE DIRECTORS, PILOTS ON THE MIDWAY MOVE THEIR PLANES FORWARD SO THE NEXT PILOT CAN COME IN



Re-spotting the *Midway's* vast flight deck is a complicated job for the plane handlers, and is accomplished largely with tractors



LSO's eyes, ears and voice: talker communicates with the bridge; hookman checks incoming planes; deckman checks for obstacles

# SHAKEDOWN OPERATIONS

**Coordination Between Divisions  
is Purpose of Shakedown Cruise**

FOLLOWING preliminary training on other ships, the crews board their own ship for the real shakedown that will mold them into a fighting team. The *Midway* rode out on a 57-day cruise, of which 51 days would be spent in air and gunnery operations, simulating all types of wartime conditions. Exercises included fueling escort ships at sea, damage control drills and problems, AA tracking and firing at towed spars and drones, emergency lub-oil drills for engineers, arming and re-arming of planes, gassing, and use of inert gas. Air operations involved all types of flying and battle exercises, climaxing the tour with a two-day strike against the Caribbean island of Culebra—a well beat-up three square miles of land especially devoted to strikes by U. S. warships on shakedown in the area. A peninsula of this island, off the coast of Puerto Rico, was leased by the Government early in the war. Dummy pill boxes, revetments, gun emplacements and surveyed equipment provide targets for air groups and ship to shore bombardments.

## Shakedown Operations...cont'd

Coordinated precision is the basis of any carrier's efficiency, especially in the air department. Besides the usual problems of training inexperienced crews in teamwork, the *Midway* faced the additional hurdle of operating with only 70 percent of their assigned air department complement due to demobilization. Under the Air Officer, the V-1, V-2, V-3 and V-4 divisions worked long and hard to achieve good results.

V-1, RESPONSIBLE for operation and maintenance of the *Midway's* two catapults, 14 landing wires and 6 barriers; the ship's three elevators, fore, after and port; all plane handling equipment; control of aircraft on the flight and hangar decks; repairs to flight and hangar decks; clearing of crashes, and fire fighting, required several weeks to hit full stride. On the *Midway* there is more of everything to consider. Coordination requires practice.

However, hook men soon learned the importance of speed in disengaging and securing tailhooks; less and less time was required to retrieve stretched wires; barrier operators developed split second coordination in raising and lowering their machinery. Planes that would have been waved off because of a fouled deck early in the cruise, were coming aboard without difficulty by the end of the second week. The entire flight deck crew played a large part in helping to cut early landing interval averages of 30-35 seconds to 25 to 30 seconds before the cruise was over.

Plane handlers learned how to work in organized groups, instead of miscellaneous masses. After two weeks of almost daily operations, spotting and respotting the deck became a logically thought-out routine instead of a mad scramble.

All flight deck personnel discovered quickly that an unpierced steel deck affords few handholds when you're in a slipstream. After a few men were sent skittering along on their differentials for 50 yards, they learned to throw themselves flat, or scoot away, crouched over.

V-2 crews, whose duty is upkeep and maintenance of all aircraft and aero equipment; keeping of plane, engine and prop logs, and operation of all maintenance shops, shook down to a routine of about 12 planes a day cleared on 30, 60, 90 and 120 hour checks.

Biggest V-2 problem usually is that of keeping up with, and keeping track of aircraft needing repairs—"status control". The *Midway's* crew faced a prodigious job in this respect, with 121 planes to care for, and huge spaces of flight and hangar decks for planes to get lost on. One plane with a minor hydraulic leak might easily slip by unnoticed, with disastrous results. The *Midway's* V-2 outfit solved the problem, however, by using the ship's sound-powered telephone system. The hangar deck chief, with phone hooked to his belt ready to plug into the system at any one of the hundreds of outlets on board, checked each plane coming in, noted necessary repairs, and by plugging in was able instantly to notify Air Plot, Flight Deck Control, and the V-2 office. The plane was unmistakably earmarked.

With this problem solved, V-2 easily kept more than 80 percent of the *Midway's* aircraft in constant readiness.



Flight deck officer plans his deck spotting with plastic planes on a deck diagram board in the flight deck office before operations



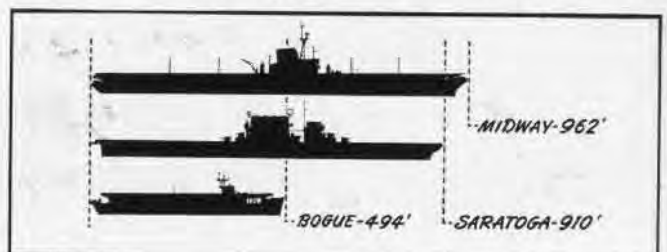
Status control board on the flight deck tabulates all troubles; information is relayed to Air Plot, Flight Deck Control, and V-2



Pre-shakedown training is put to the test on board ship. Here a *Midway* catapult crew fixes bridle to plane about to be launched



Swabbies usually are a civilian's idea of Navy life, but the *Midway's* steel deck wouldn't soak oil, required frequent scrubbing





# NERVE CENTER

**Air Plot, C.I.C., Message  
Center Pool Vital Data**

**M**OST INTRICATE system of secrets on any carrier is harbored by the V-3 division. All matters pertaining to control of aircraft on combat missions; preparation, evaluation and presentation of all intelligence to accomplish missions, and intelligence obtained from missions, as well as upkeep of all airborne radio and radar equipment, falls in V-3's domain. On the *Midway*, the Combat Information Center, Air Plot, and Message Center are located for utmost efficiency in carrying on their extremely vital, interdependent work.

In the C.I.C. room, a 24-hour watch was maintained at sea on surface and sky sweeps. Gunnery and/or air operations being conducted almost daily during the entire cruise meant full complement on duty steadily in the "nerve center"; radio monitors in the message center maintaining contact with the air group on several frequencies; Air Plot recording vital information on operations and constantly preparing information for the next mission; C.I.C. tracking all operations.

Although the shakedown involved a total of thousands of hours of flying in individual aircraft, the "nerve center" had little practice picking up distress calls. There were exceedingly few forced water landings. On those that did occur, the center functioned perfectly, and in each case the pilot was back aboard in a short time, picked up by one of the ship's escorting destroyers, transferred by bos'n chair.

# GUNS AND GAS

**L**IKE THE proverbial provider, V-4, under the gas officer, has the unenviable job of feeding the hungry maw of the *Fighting Lady*.

Fueling of aircraft, operation and maintenance of the ship's gasoline, lub oil, inert gas and alcohol systems falls to these red-shirted crews. Furthermore, their division handles all aviation ordnance, servicing ammunition from the magazine doors to the planes, and maintaining all aviation ordnance equipment. On the *Midway* that's a lot of equipment.

Many men in this division had previous basic aviation ordnance training at schools under NATECHTRACOM, and the nucleus of crew leaders had carrier training before boarding the *Midway*. But real practical experience for most came on the *Midway's* shakedown when every man aboard was engaged in some phase of operations.

Arming and re-arming of planes occurred before and after each bombing, strafing and torpedo exercise; and there were 17 such exercises during the cruise. These included use of 1000- and 500-pound bombs, machine guns, rockets, napalm bombs, torps with dummy warheads, smoke tanks, pyrotechnics and camera guns. It provided lots of exercise for the crews. Planes were gassed three and four times a day during operations.

Destroyers accompanying the *Midway* were refueled at sea in relays. About 10 such refueling operations were conducted during the tour, some of them in fairly heavy sea.



**Jack-o-lantern** lighting characterizes *Midway's* large CIC room, where these men are plotting a problem on luminous plot board



**Surface** search is watched constantly on this radar set in the CIC room. Twenty-four-hour watch was maintained all during cruise



**Red-capped** V-3s bring ammunition from the magazine hatches to the planes. Here a load of rockets is rolled off an ammo elevator



**Arming crews** prepare wing guns for a strafing operation. At far end of bench, machine gun belts are being loaded on special gear



▲ **Air operations** during shakedown cruise included several coordinated attacks on the ship by the air group in mock battle. Planes dove in, strafed and bombed the carrier

▼ **Fly-away** of deck load keeps plane directors busy bringing planes into take-off position so that the starter is never without a revving plane. Planes take off seconds apart



# AIR GROUP

V-5, THE AIR GROUP under the air group commander, is made up of four squadrons on the *Midway*: VT, VB, VBF and VF. *Helldivers* comprised the bomber and torp squadrons; F4U-4's the fighters and fighter bombers. Although designed for 144 planes, the ship carried only 121 on shakedown, 30 more than the most heavily loaded CV.

The 240 pilots in the group enjoyed at least one note of luxury on the war-trimmed ship, for each of her four spacious ready rooms is equipped with individual galley.

Spaciousness of the deck appeared mightily to all pilots. "It's like coming in at LaGuardia Field—almost!" one fighter commented. Lack of turrets in the vicinity of the barriers on the *Midway* removed another mental hazard that had been prevalent on the smaller class carriers.

Real shakedown workout for the air group began the day that the *Midway* put out of Norfolk. Group operations were conducted daily at sea. The schedule was thorough. Exercises in routine patrol, message drop, search, photo reconnaissance, coordinated attacks on the ship. Rocket firing, bombing and strafing on towed spars was worked out always on a regular "mission" basis, with all the trimmings. Pilots worked hard to bring down the time on their landing intervals. Competition developed between the *Helldiver* and *Corsair* squadrons and culminated in each squadron writing songs about the other. The songs were piped over the PA system occasionally—uncensored! Operations also included practice in the use of radar window. Several torpedo missions as well as aerial and camera gunnery kept the squadrons in the air for about 50 of the 57 days of shakedown.

Night flying was light, but not neglected. Two nights of operations went off the deck and back without a hitch. Photographic records of the take-offs and landings were made, and pilots later were briefed on mistakes back in the ready rooms.

Several thousand landings were logged up during the cruise. The important one—the first—was made by CAG himself. The usual cake and ice cream ceremony was performed on the flight deck and in the ready room for the pilot who made the 1,000th landing, the second week.

**Night operations.** Camera set up to record faults of pilots that will be discussed later in ready rooms, show take-offs (below, left). Egg shapes are deck lights. Lights off port are destroyer's. Solid streaks are wing and tail lights; jagged lines, exhaust. Note one droopy take-off to starboard. Below, right, is the landing pattern



Message dropping practice gave all combat crewmen opportunity to wing the red packet at the deck. This one is about to be a ringer



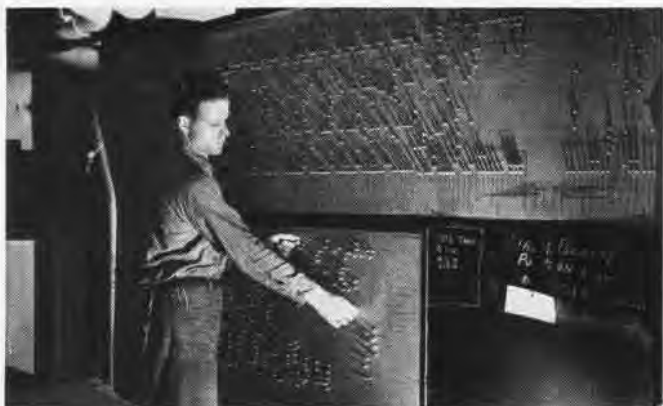
Air officer on the Fly Control bridge controls air operations; starts and stops landings or fly-away with green and red flags



Air group came aboard under direction of "Windmill" (the man on the cover). In his long career, he's brought in thousands of pilots







Damage control is simplified on *Midway* by board showing all systems on ship, with tiny valve handles for each real one aboard



*Midway's* quadruplicate 40's are controlled by individual directors like this one. In this case it happens to be a Mk 51 director



Inside the big five-inch gun turrets there's plenty of space, and much less noise than on the deck. Note breech in the foreground



For antiaircraft gunnery, the *Midway* carried her own TDD unit, with crew and 15 drones. Drones were catapulted from the deck

# DAMAGE CONTROL

RESPONSIBILITY for safety and security of the *Midway's* 1,750 compartments falls on the shoulders of the damage control department. All hands must be ready at any instant to spot and take immediate measures to stop any indication of fire, explosion, damage to hull, leaks, or misaction of any of the ship's intricate systems.

For one hour every day during shakedown, damage control drill was staged aboard the *Midway* at 0815. All the department's personnel reported to stations. Once or twice a week, a problem was posed—a compartment reported flooded, or a smoke bomb planted. The cause had to be found and the compartment involved sealed or flooded; electrically operated hydraulic valves set to work pumping. One day a week a 20-question quiz taxed the knowledge of the men concerning the ship's system of control.

All men were thoroughly trained in use of the ship's sound-powered telephone system, of invaluable aid in damage control. One man, locked in the double bottom by accident, used it early in the cruise to get help. After fumbling in the dark for hours, he found a plug, threw in his phone and was dragged out a few minutes later.

In the damage control office huge boards show entire systems of pipes and valves for the ship. A magazine board lights up when ammo compartment temperatures rise too high. In a few seconds, the compartment can be flooded by referring to the master board and calling the watch on the proper valve station, via sound-powered telephone.

# GUNNERY

MORE THAN 2000 officers and men are required to handle the *Midway's* three five-inch divisions, three 40mm divisions, and two 20mm divisions. Fire control is directed from the ship's two five-inch plot rooms, four 5-inch directors, twenty-one 40mm directors (one for each quad).

Gunnery department personnel also handle all ammunition. Even the Air Department's ammunition is their responsibility up to the magazine doors. The Air Department carries on from there.

To learn routines involved, daily drills were conducted on the *Midway's* loading machines and guns. During the time at sea, gunners tracked daily; often on sleeves and utility planes. Mistakes and lack of coordination were discussed and corrected in the ship's two training rooms. The *Midway* is the first conventional ship to have such rooms.

During the shakedown more than a score of separate firing runs were made on towed sleeves and drones. The *Midway* is the first carrier to carry her own drone unit, with 15 TDDs, a catapult and operators.

During the first eight days, *Midway* gunnery showed ragged lack of coordination. In half a dozen runs nothing was shot down. At the end of two weeks, three sleeves and two drones were knocked out of the air in one afternoon. Climax arrived off Haiti the third week, when a drone was knocked down after only five rounds from the five-inchers.



GETTING THE REAL "WORD"

# STRIKE!

“ule”, giving YE sectors, nearest land, point option information, weather dope, codes, and other information.

The night before the strike, the hangar and flight decks buzz with activity, as they would have in wartime. All planes participating get a thorough check. Plane captains must approve every plane before it goes up on the elevator. V-4 men load ammunition, bombs and rockets; flight deck men spot the planes according to previously arranged plan. And on the darkened flight deck, gas crews fill tanks.

On the first strike, the *Midway* had 95 planes on the flight deck the night before, ready for launching at dawn. Before the day was over 171 planes took off, including those that returned for re-fueling and re-arming. Pilots were briefed the previous night, and again in the morning. At 0430 GQ sounded, and at 0500 the first flight was catapulted. At 0700 the remainder of the deck load took to the air. Five separate flights took part in the operation.

By the time the second wave had been launched, it was time to bring in the dawn sweep. Meanwhile, the nerve center was busy; C.I.C. tracking with radar the entire time; message center monitoring all pre-arranged frequencies, and Air Plot recording all progress.

The realism of a Culebra strike even extends to chow—sandwiches, coffee and K rations, served up in a modification of battle bill specifications.

*All shakedown photos in this article were taken by the Midway photo lab, and story was prepared by a NANews writer who made the cruise to observe at first hand all the operations*

**G**RIMLY realistic strikes, with live ammunition, are included in every Atlantic shakedown itinerary—carrier or otherwise. The *Midway's* air group hit Culebra Island twice. The mission is designed to give everyone on board a thorough battle problem workout.

Preparations begin days in advance, with photo reconnaissance planes making sweeps of the target area, mapping. The ship's A.C.I. officer makes the operation plan, setting calls and frequencies that will be used. The squadrons supply Air Plot with the plane numbers and pilots who will be used in the operation. Air Plot then makes up the “fly sched-



**During strike** on Culebra Island, radio monitors guard all frequencies that have been previously established for the attack problem



**Culebra strike** includes everything that would happen on a regular wartime combat mission, including laying down of smoke screen



**Live bombs** are dropped on the two-and-a-half-square-mile target area; photo planes record effectiveness. Note pillboxes on target



The *Midway's* huge size is more apparent in this outboard picture taken while ship was anchored in Guantanamo Bay, Cuba. Note

how, unlike CVs, five-inch gun turrets have been moved off flight deck to sponsons, and how island itself is set off on huge sponson



# GRAMPAW PETTIBONE

## An Ounce Was Needed

Upon noticing his engine to be throwing an excessive amount of oil, the pilot landed at an outlying field to wipe the oil from the windshield. Evidently no thought was given to investigating source of the oil. After cleaning the windshield, the pilot immediately took off. At about 300 feet altitude, the engine "conked," resulting in a crash landing in stumpy terrain. Examination of the engine revealed that it had frozen due to lack of oil.

Having noticed an excessive loss of oil, it seems that this pilot should have determined the remaining oil supply and the cause of his oil loss before taking off again. Had he taken these common-sense precautions, the accident, would have been prevented.

## Rendezvous Advice

During division rendezvous at 4500 feet, an F4U pilot took a short cut to get into position. In doing so, he pulled up into the propeller of a plane which



was already in position. The propeller cut off his tail section.

The pilot never got out of his plane.

The following comments are quoted from a ComFAir Alameda Safety Bulletin on this accident:

"Because pilots are constantly urged to make rendezvous promptly, this does not mean that they can take short cuts in the proper rendezvous procedure. In joining up, excess speed *must* be lost prior to reaching proper position and the plane brought in carefully to avoid



overshooting. If it is apparent that you have not lost excess speed, do not cock a wing up to pull into formation, hoping thus to lose speed. Keep out and make another approach.

"It seems possible that this pilot did not realize the condition of his plane and was trying to make a recovery all the way down. After a mid-air collision, make a quick check of the plane. If it is out of control, with surfaces gone—then *get out!*"

## "Famil" Flying

An ISIC made the following comment in his endorsement to a recent accident report:

"There is altogether too much aimless and pointless, time and pilot-killing flying going on in all squadrons, under the dubious guise of 'famil' flying. If the pilot in this report had been properly checked out and briefed exactly as to what he was supposed to do, when and how he was supposed to fly, this accident probably would not have occurred. Commanding Officers are reminded that the numerous young pilots now reporting to squadrons cannot be expected to know all about 'squadron policy'. They must be con-

scientiously and thoroughly instructed and briefed in every phase of the long training program necessary to turn out a fully qualified pilot. Commanding Officers are directed to take positive action to insure that Squadron Flight and Flight Training Officers personally, and adequately brief all pilots before they proceed on any training flight regardless of how routine the flight may seem to be."



**Grampaw Pettibone Says:**  
Read Ye! And heed this man; he has spoken wisely.

The engine of an SB2C suddenly roared into life. Tie down lines parted and the plane jumped its chocks, heading directly toward a row of parked planes. The picture shows the results. Cause: The inexperienced plane captain who was in the cockpit and who had started the engine for warm-up was



unfamiliar with correct starting procedure and was not on the ball! After the plane jumped the chocks it ran amuck for approximately 30 yards before crashing into an SNJ. Brakes were not applied, throttle was not cut nor was the ignition switch touched until after the crash.

► **Comment:** BuAer Manual, Art. 11-101 states:

Under no circumstances shall engines be started without a competent person at the controls. Wheels will be chocked.

## OKINAWA TYPHOON VERSUS NAVAL AIRCRAFT →

WHEN the October 9 typhoon hit Okinawa with six hours of extreme winds heavier than 100 knots, it caught the Navy seaplane base without facilities adequate to withstand a storm of that intensity. Wind velocities as high as 135 knots in gusts were the probable main cause of the damage to aircraft

which could not be evacuated from the base. Flyable aircraft were evacuated as news of the rapidly-growing typhoon was received. Damage suffered by buildings of the base seems to indicate that damage to aircraft was not excessive. Ordinary methods of securing planes against wind were of little use.





## Grim Maintenance:

Fire in the air during the first leg of his ferry flight recently caused an FM-2 pilot some little concern and a few burns but he managed a safe landing at an airfield. A fire fighting crew right on the job quickly brought the blaze under control and an investigation was made as to the cause of the fire. What the investigators found just "shoudden happen to a dog."

The rubber gas hose had two cuts in it that allowed fuel to escape. In an apparent attempt to stop the leak, some "mech" instead of replacing the hose had taped over the two cuts!



### Grampaw Pettibone Says:

If the "mech" in this case who committed "arson", but fortunately failed to commit homicide, had been conscientious and familiar with his job, this near serious accident would not have occurred. However, full blame rests on the inspecting personnel who cleared the plane for ferrying; obviously, the requirements of ACL 84-85 had not been met.

## Safety Ideas

Costly taxiing accidents at a field were reduced 85% by the following corrective action initiated by the C.O.:

1. An inadequate parking area which necessitated taxiing in extremely limited spaces was corrected through construction of a new parking ramp.
2. To insure that established safety policies are observed, a Ramp Officer was appointed. His duties require a constant patrol of the ramp and field area, alert for any discrepancies that possibly could lead to an accident. To aid in this patrol, a ramp control tower has been constructed on top of the operator's hangar from which the operator commands an unobstructed view of the field and parking areas. The tower is connected by a two-way inter-phone with operations and the field towers and is in communication with the Alert jeeps by two-way radio. From his position in the tower, the operator directs the Alert jeeps to stand fire guard and in the parking of aircraft thus assuring most expedient use of their services.
3. Congestion on the ramp and runways further has been decreased by construction of a perimeter road between parking areas, making it no longer necessary for refueling units and crew transport trucks to cross runways and parking areas. The system speeds up service and decreases danger of aircraft collisions with these trucks.

From ATC's "Flying Safety Journal".



### Grampaw Pettibone Says:

My hat's off to that C.O. Accident prevention takes just such smart thinking as he displayed. Before aviation becomes as safe as it can be, aviators are going to have to take full advantage of their experience. They must foresee potentially dangerous conditions. Then the important thing is to take action that will

eliminate or at least reduce these hazards.

I hope that pilots eventually will take their profession seriously enough to make it as safe as possible. Right now there are so many needless accidents resulting in loss of life and equipment, that it makes me wonder if the present-day pilot really isn't a fatalist. Now, the thing I've got against a fatalist is that he's very likely to be careless. This is understandable because he figures that no matter what he does, his time will come at a certain moment and there just isn't anything he can do about it. Well, to my way of thinking this is pure bunk, particularly in aviation where a fier's life, and those of his passengers, depend on his skill, knowledge and judgment. I'll bet you that among the "old" aviators, you won't find a single fatalist—anyway, not a single living one!

## GRAMPAW'S SAFETY QUIZ



ALL AVIATORS should know the answers to these questions. In the air, the penalty for not knowing may prove fatal. If you miss an answer on the ground, penalize yourself by looking up the reference.

1. If, while flying CFR, you encounter weather below that required for CFR, what should you do?
2. If you are lost and faced with a forced instrument let-down over terrain you do not definitely know, what should you do?
3. Jet planes approaching for a landing have the right-of-way over all other aircraft taking off and over all other aircraft landing except those in emergency and those engaged in hospital evacuation. True or False?
4. Beginning at what altitude should oxygen be used: (a) day? (b) night?
5. When oxygen is being used on altitude flights, the air valve on diluter demand regulators shall be turned to what position? (Answers to Quiz on page 40)



### Grampaw Pettibone Says:

I hear about people only when they get into trouble and have accidents. All I can do then is to holler about the mistakes they make, and that sure enough puts me in the kick-in-the-pants department. It isn't that I'm a morbid old duck always seeking out experiences with unhappy endings, as Dilbert thinks. Fact is, I'm trying to air his mistakes so everybody can profit by them. Certainly no one would be more pleased than I to tell about happy experiences. But I don't hear about such experiences. Only accidents are reported. Guess people are glad to forget near accidents. But that's where we're wrong. These near accidents should get as much publicity as do accidents. Perhaps then

we could get that old barn door shut in time to keep some guys from killing themselves later on.

All of us can learn something from the circumstances that contribute to near accidents. And that is where everyone can help everyone else. All you have to do is let me know of these experiences and I'll publish them right here in this column, keeping your communication confidential just the way Dorothy Dix has always done in her "advice to the lovelorn." We want to know of cases where accidents were prevented or made less serious by the smart or lucky action of pilots, crews or others.

To cite an example, let me tell you of an experience of a young friend of mine. . . . In those days when very little was known about stalls in accelerated flight, this young friend was flying a comparatively new seaplane in the fleet. One day, after flying by his ship down-wind at about 150 feet, he pulled up into a power-off, wingover to reverse course for landing.

At this moment, his eye spied a private yacht at anchor in the bay and on this yacht a lovely young thing, sunning herself. Naturally, all thought of flying immediately left his mind until an automatic effort to recover from the wingover brought no results. The controls were sloppy; a quick glance at the airspeed indicator showed over 100 knots. (The normal stalling speed for this plane was approximately 55 knots.) From then on a good emergency reaction to a stall, an immediate response from the engine and an extra five feet of altitude were all that saved his neck.

Back at the ship he got hell for "showing off" but was secretly admired for being a "hot" flyer. Smugly basking in this questionable glory, he never let on that it was anything except damned good flying. But a few months later he had occasion to wish that he had been big enough to tell what really happened: two of his friends were killed in the same type plane and in nearly identical circumstances (sans yacht and beauty) to those that surrounded his own near accident. Thereafter, immediate flight tests were conducted to determine the cause of these crashes and it was concluded that the planes were stalling at speeds considerably above normal stalling speed.

This phenomenon was then called an "incipient spin"; now, of course, we refer to it as a high "g" stall or a stall in accelerated flight. But to get back to my young friend's responsibility and the moral of this story: had he been able to swallow his pride and tell his C.O. what really happened to him, those aforementioned flight tests might have been made in time to save some lives.

Now, I'm not trying to offer an excuse for pilots to withhold confessions from their C.O.'s, but, having a slight understanding of human nature, I am trying to create an outlet whereby valuable experiences will get proper publicity. Again, let me assure you that I promise to keep all identifying matter confidential. Send to:

Grampaw Pettibone  
Navy Dept., Room 1801  
Washington 25, D. C.



# Navy "BATS" got in Jap's hair



PRIVATEER CARRIERS ONE 12-FOOT-LONG BAT SUSPENDED UNDER EACH WING: BATS HAVE 10-FOOT WING SPAN. HOME AUTOMATICALLY

## Sinister Flying Bomb Released Out of Range of AA Could Pick Target Out of a Large Convoy

NAVY PLANES launched the first fully automatic guided missiles used in combat by any nation. Using Navy-developed self-controlled, air-borne homing missiles, land based patrol squadrons of Fleet Air Wing One took a heavy toll of Jap shipping during the final months of the war.

A closely guarded war secret until long after V-J Day, the flying bomb was known only by its code name *Bat*. The Navy's flying bomb had its beginning in the early days of the war long before Japan had used *Baka* bombs or launched its *Kamikaze* attacks. Designed and developed at the request of Bureau of Ordnance, the *Bat* bears the official designation of SWOD Mk 9, Mod 0 & 1.

While it was primarily used with *Privateers*, the *Bat* has also been successfully carried and released by *Catalinas*, *Mariners*, *Mitchells*, *Venturas*, *Corsairs*, *Tigercats*, *Avengers* and *Hell-*

*divers* in actual operations or in tests.

The *Bat* actually is a 1000 lb. bomb mounted in a glider-type airframe equipped with radar transmitter and receiver. Power for the *Bat's* glide is derived from speed of the parent plane and the force of gravity. The flying bomb's low angle of flight makes it possible for the plane to release its missile well out of range of the target's anti-aircraft fire.

While designed primarily for use against sea targets, *Bats* under proper conditions may be effectively used against land targets. They are carried either as weapons of opportunity or for

specific missions against special targets.

In making a *Bat* attack, the pilot of the parent plane locates and selects a target, keeping well outside the enemy's AA range. Through an electronic indicator that displays target data from radar in the *Bat*, the operator in the parent plane is able to set the flying bomb's direction equipment for homing on the selected target. The closest type of cooperation is necessary between pilot and the *Bat* operator.

When radar equipment in the *Bat* is finally set for its homing run the flying bomb is released. From that time on the *Bat* homes automatically on its selected target independent of the mother plane. Guided by the radar echoes its receiver picks up, the *Bat* homes accurately on its target despite visibility or violent evasive maneuvers.

The *Bat* does not restrict flight operations of the parent plane nor does it appreciably affect flight characteristics. The launching plane's effectiveness with rockets, cannon or machine guns is not altered by having *Bats* attached.

Though the *Bat* is already considered obsolescent, some of the principles used in it may be applicable in the future.



STANDARD BOMB RELEASE UNIT IS USED



# FIDO

FOG INTENSIVE DISPERSAL OF



VISIBILITY WAS ZERO WHEN BURNERS STARTED TO OPERATE. TEN MINUTES OF HEAT CLEARED THE FIELD FOR THIS R4D LANDING

## **Fido Can Be A Fog-Bound Pilot's Best Friend Flames Bite into Ceiling Zero at NAAS Arcata**

BEING the foggiest naval air station in the country sounds like a liability rather than an asset, but NAAS ARCATA, California, capitalizing on its worst feature, has become the center of an important experimental program on fog dispersal.

This station on the coast about 300 miles north of San Francisco is located on a bluff which rises abruptly 200 feet from the ocean, a situation contributing to the high incidence of fog over the runways. Since other factors were satisfactory and the fog was available—thick, juicy, and reliable—Arcata was selected by the Navy in December, 1944, as the Landing Aids Experiment Station for continuing the fog dispersal work pioneered by the British and first

used by the U. S. in the Aleutian area.

FIDO. "Fog Intensive, Dispersal of," proved its value in the British Isles during the war when the fog-bound fields were cleared to allow take-off and landing of bombing missions in spite of soupy weather. Hundreds of bombers which otherwise might have been lost in the fog were brought down safely through holes cleared by the heat from gasoline burners outlining the runways. The cost of the gasoline burned was heavy—\$4000 to \$5000 to land one plane—but well spent. In fact, FIDO became so valuable in landing bombers returning from missions over Germany that 15 bomber command airfields were equipped with fog dispersal systems.

The U. S. Navy's interest in this sys-

tem was centered chiefly in the possibility of its use in the Aleutians where bad fogs prevail in conjunction with moderate to high wind conditions. Following a survey of the Army and Navy fields in the area, it was decided to make the first installation on the Army Air Base at Amchitka. Work started on the project in April, 1944, with Seabee personnel installing the equipment, a tough job because of the nature of



CENTRAL CONTROL OPERATES ALL BURNERS

**SOUND**

EAR PLUGS ARE NEEDED AS CLEARING IS ACCOMPLISHED BY SIRENS. HIGH FREQUENCY SOUND WAVES EXPECTED TO CUT THE DIRT

**HEAT**

DIFFERENT TYPE BURNERS TESTED AT ARCATA FOR CHEAP, EFFECTIVE CLEARANCE. DIESEL FUEL UNDER HIGH PRESSURE CUTS COST

the terrain. Enormous amounts of tundra had to be moved to provide a firm and level foundation for burners. Special supports driven through the tundra to rock strata were necessary to carry the burners over small ponds and uneven ground. The burners, based primarily on British design, were constructed right at the site, 100 of them being produced in a five-day period.

**T**HE FIRST aircraft landing to test Amchitka FIDO installation under zero-zero conditions was made on 25 July 1944. The burners were lighted just before dawn, and within about 10 minutes the area over the runway and down wind of the burners had been completely cleared of fog, making the sky visible. A PBV-5A took off in a 15-mile crosswind and disappeared in the fog after passing the limits of the burner line. The plane then made a normal instrument let down and broke out in the clear at about 150 feet altitude at

the down wind end of the runway. This was followed by two successful take-offs and landings by an Army C-47. Both pilots agreed that the landings could not have been made without the use of the dispersal equipment.

In August, 1944, the Amchitka equipment was used tactically for the first time when, in spite of heavy fog, six aircraft were launched with the aid of FIDO to form an anti-submarine screen for President Roosevelt who was in the Adak area.

Although the costs of operating the fog dispersal equipment as used in the British and Amchitka installations are insignificant when evaluated against the crews and aircraft which might be lost in zero-zero conditions without it, nevertheless much remained to be done in refining the equipment and developing better burner efficiency to cut fuel expense. The importance of the program warranted further experimental work both on different types of burn-

ers and on fog dispersal methods other than thermal. The Landing Aids Experiment Station at NAAS, ARCATA resulted from this need. The experimental program is a project of the Landing Aids Section, Maintenance Division, BUAER, under direction of Cmdr. J. P. Lunger and Lt. Cmdr. R. L. Champion.

When the Arcata set-up was approved, the war was still in progress, and the immediate aim was to develop the best possible fog lifting equipment for installation on the islands north of Japan to aid in aircraft operations from that area. With the war pressure removed, experimental work has continued. It is significant that the program has been watched and participated in by the Army Air Force, Royal Air Force, British Petroleum Warfare Department, Royal Canadian Air Force, the National Development and Research Committee, and the Civil Aeronautics Administration. Leading universities have contributed through research projects.



# Many Types of Landing Aids Tested in Project Civil and Military Research Findings Pooled

**F**OG CLEARANCE of airfields at a cost low enough to be practicable is obviously of very great importance to both military and commercial flying. This goal of economical operation is being achieved. Directors of the experimental work estimate that with the progress made so far planes could be landed on fog-shrouded fields at a cost of \$100 to \$200, figuring 10 minutes per plane. And with planes coming in rapidly at a busy airport the costs could be reduced further.

Doing a thorough job of developing and testing low visibility landing aids has called for a variety of installations and research at the experimental station. Besides the thermal systems, which form the backbone of the work, the field is equipped also to test other landing aids: sonic, wind curtain, water screen, high intensity lighting, and radio aids.

Since the British had developed the majority of the fog dispersal systems based on the heat method, it was decided to install the most effective of these at Arcata to be used as a yardstick for evaluating new equipment under development by various agencies.

Thermal installations include the "slot" burner, one of the latest designs used operationally by the British and also installed at Heathrow, a commercial field near London. A Hades-Rapex installation, providing the highest thermal output of any burner system, is also in operation, as is a modified Haigill system using Navy, Army Air

Force, and British experimental designs.

The "slot" (USN Mk-5) burner consists of two one-inch pipes, one immediately above the other a few inches apart. Gasoline feeds through the top and at the end of the line makes a U-turn back into the bottom pipe. The lower pipe is drilled with regularly spaced holes through which gasoline feeds out and burns. This heats the gasoline above until it becomes a vapor and creates pressure. In a few minutes enough pressure is produced to shoot flames about the height of a man. Fuel consumption for 10 minutes operation is 2500 gallons of 60 octane gasoline at a cost of 6.7c per gallon.

The Hades-Rapex (USN Mk-3) burner has 16 vaporizing tubes feeding into a collecting pot. From the collecting pot the gasoline vapor under intense pressure is fed into a single eight-inch burner pipe which, when ignited, throws off an extremely high temperature.

The most promising improvements being worked out to cut costs and increase efficiency are along the lines of atomizing fuel by high pressure rather than by heat. This method involves no smoke and no waste and can be operated with gasoline, kerosene, or diesel oil. Various types of burners developed for the cheaper fuels by the National Development and Research Committee, the British Petroleum Warfare Department, and other agencies are being tested.

Automatic control of the Arcata in-

stallations has been arranged so that an operator in the control tower can press a few buttons and electrically ignite more than 2000 feet of burners, lining the runways with banks of flame. At the same time experts are at their positions on the field gathering data on the experiments. The type of fog, size of its particles, dew point, temperature, temperature of the ocean water, wind velocity, and barometric pressure are all recorded. From the control tower an amplifier allows the officers in charge to speak to any of the men on the field. Walkie-talkies also are used.

**A**MONG the non-thermal systems being tried out, the sonic method has created a good deal of interest. It is based on the principle of changing fog to rain by high-frequency sound wave bombardment. Sound waves bounce the fog particles around, causing them to meet and merge, thus forming units large enough for precipitation as rain drops. The equipment consists of 12 powerful air raid-type sirens with 24-foot wooden horns to direct the sound. Local scuttlebutt has it that farmers in the neighborhood are worried about the effect of the sound bombardment on temperamental flocks of turkeys, but so far the Navy has received no complaints of feathered casualties. Sound wave fog dispersal, if it can be effected with more easily portable apparatus, has possibilities for aiding carrier aircraft. Investigations underway may lead to developments which will allow carriers operating in fog-bound waters to improve their own weather conditions.

The wind current method is still another phase of the work that shows promise. With a crosswind blowing on



**Assembling** collecting pot on Hades-Rapex (Mk 3) installation; Fuel from 16 vaporizing tubes feeds into 8-inch burner pipe



**Slot Burner** (Mk 5) gives 10 minute burn on 2500 gallons gas; British now use this type burner commercially at Heathrow field



the runway a huge blower throws a curtain of hot air at right angles to the wind. This causes the wind to move in a vertical circle, consequently dispersing the fog.

With the advances made in automatic controls for piloting aircraft, it might be supposed that full instrument landings could eliminate the need for fog dispersal projects. Low approach equipment and navigation aids will bring a blind plane safely down within 50 to 100 feet, but from then on the pilot wants to know what he's doing. Even if full automatic instrument landings become possible in the future, the psychological and actual benefits of having the pilot able to see that everything is cleared for the ground contact still will make a certain amount of fog clearance necessary.

**S**INCE using radio glide and localizer beams to direct the automatic pilot will line the plane up with the runway, fog clearance need not be so extensive as most of the test burns have provided; a ceiling of 200 to 300 feet could do the job. The Arcata landing aids include "sliding" beam apparatus used to supplement the work of the weather fixers, not as a substitute for it.

A typical FIDO test flight report shows the results being obtained at the experiment station. When the burners were ignited, the field had zero visibility and zero ceiling. Five minutes after ignition there was a ceiling of 1000 feet near the center of the runway with visibility quite good the full length of the installation. The plane, a PB4-1, took off from a cleared runway, but as soon as the last burner was passed it entered a zero-zero bank of heavy fog. The fog was topped at 2700 feet over the ocean and gradually raised to 3500 feet over the land. FIDO burned a hole through that! Landing was accomplished with use of the radio range station and SCS-51 approach gear, the runway becoming clearly visible at one-half mile and 100 feet. However, the ground could be seen from 150 feet and approximately one mile from the runway. This clearing was due entirely to the FIDO operation, as the surrounding area was still zero-zero visibility and ceiling.

Pilots making the test runs expressed satisfaction with the FIDO operation, reporting that no undue turbulence or floating was noted and that the use of flame is not a mental hazard after a flyer has once seen it working. On some of the test burns the hole cleared was large enough for aircraft to circle the field and land entirely contact. If modern approach gear is used, just a few minutes of heat will give enough ceiling.

Man's control over nature in these



HOME FIRES BURNING THROUGH FOG; EXPERIMENT RESULTS WILL AID ALL PILOTS

experiments, of course, is only a temporary victory achieved for the time needed and then lost again. Lest he become too cocky over his success, the elements immediately revert to their former arrangement, as witness these conditions reported in a test burn. At 0945 visibility was 1/16 mile, ceiling 50 feet, temperature 53° F, humidity 100 percent. The burners were started, and at 1015 the sky became visible through thin strata, with a variable ceiling of 800 feet. Visibility was good the entire length of the installation. An hour after the burn started the maximum surface temperature of 66° F was reached, and humidity had dropped to 66 percent. Large portions of the sky showed through the fog 1700 feet deep. Then the burners were turned off. About fifteen minutes later the ceil-

ing had lowered to 100 feet, the visibility had lowered from the full length of the installation to 1/8 mile, and the humidity had increased to 94 percent.

**W**HEN the Navy made public its program at ARCATA NAAS, the interest evidenced by newspaper and magazine representatives reflected the importance of the experiments to an air-conscious world. Commercial airlines, realizing that zero-zero conditions at only one or two key stations tie up schedules over the entire system, are watching the developments intently. Just as the progress made so far has been the result of combined efforts of the Army, Navy, British, and civilian research activities, so the benefits derived from the Landing Aids Experiment Station will be widely shared.



Although she supported nine invasions, *Essex* took only one Kamikaze, off Luzon, but was launching planes again in half hour



*Essex* pilots check their score against Jap planes following Truk strike. Swastikas at right mark Vichyites shot in Mediterranean

# U.S.S. ESSEX

**'Fightingest Ship' Fought Japs  
in 68 Combat Actions; Was Hit  
Only Once During the Entire War**

THE U.S.S. *Essex*, whose crew claim for her the title of "fightingest ship in the Navy," amassed an impressive two-year record of 68 combat operations, supporting every major Pacific engagement from Tarawa to Tokyo Bay.

During her action in nine major invasions she fought through 357 Japanese air raids and was hit only once—off Luzon when a Kamikaze took out

a 20 mm gun position and tied up flight operations half an hour.

The box score of the *Essex* in the war was outstanding. Her anti-aircraft crews shot down 33 attacking planes. Her air groups destroyed 1531 Jap aircraft, with 800 more probables. They sank 25 Jap warships and 86 non-combatant ships, damaging 419 more. Tonnage sunk totaled 368,770 tons.

Invasions supported by the *Essex*



Anti-aircraft guns on *Essex* got tracking drill during lull while defending Okinawa action for 79 consecutive days without resting



'Fightingest ship in Navy' as she looked to pilot of SB2C as he swung into groove off Okinawa, where *Essex* pilots bagged 307 Japs



# SHORE STATIONS

read like the history of the Pacific war—Tarawa, Marshalls, Saipan, Tinian, Guam, Palau, Luzon, Iwo and Okinawa. She would have supported the invasion of Japan if the Japs hadn't quit. Off Okinawa, she fought 79 days straight without relief, a record unequalled by any carrier. She was 17 months in continuous combat in the Pacific.

While battling the Japs she produced the No. 1 Navy ace, Cdr. David McCampbell, with 34 Japs, nine of which he bagged in the Mariana "turkey shoot." Her squadrons shot down 70 enemy planes off Okinawa in one day, a few short of the Pacific record.

The *Essex* claims many firsts: first carrier to load bombs at sea in a combat area, first of her class to carry Marine squadrons into combat, first of her class to cross the Equator and Panama Canal, first of her class to land and launch planes with three ships alongside, and a unit of the first task group to hit Tokyo and 15 other Jap cities with carrier-based planes.

The *Essex* began her major battle record on Armistice Day, 1943, launching attacks against Rabaul following warm-ups on Marcus and Wake. Her planes bagged 54 Japs over Rabaul in one day, a record at that time. By the time she returned to Leyte Gulf on 1 June 1945 after the Okinawa campaign, the *Essex* had completed the longest combat cruise ever made by a carrier. She had steamed 33,865 miles without once dropping anchor.

Even then she was not finished. She joined a task group that cruised off the Japanese coast for days, daring the enemy to come out and fight. After the surrender the *Essex* brought 1000 extra men back to the states, the first big carrier to return.

WHEN she tied up she had steamed 233,419 nautical miles since her commissioning 31 December 1942. During that time she never had an engine room casualty. Her pilots had flown 99,091 hours, almost a fourth of them in combat, and dropped 4,143 tons of bombs.

During her tour of duty, the *Essex* carried Air Groups 83, 9, 15 and 4 and Marine squadrons VMF 124 and 213. What other ships of the fleet thought of the *Essex* was expressed by the U.S.S. *English*, a destroyer, which sent this dispatch: "What do you mean *Essex-class*?" She is a class by herself."

Another incident in June 1945, added to the crew's pride in their ship. A civilian visitor who came aboard in Leyte Gulf took a look at the ship's battle scoreboard painted on the island, then asked: "Is that the record of Task Force 58?" The ship was proud of its shooting and its flying.

[First of a series on outstanding carriers]

NAS SEATTLE—The Campbells are not coming to Seattle, they arrived en masse! A total of 14 officers named Campbell were on duty aboard the station at one time recently, adding to the confusion of phone operators and mail clerks.

NAAS MUSTIN FIELD—Newest methods of combatting crash fires were demonstrated by the field's fire-fighting crews to a group of more than 300 visiting firemen from municipal companies within 50 miles of here.

ABATU-trained crash crews put on an afternoon of demonstrating aircraft fire fighting and pilot rescue techniques. This was highly interesting to the visitors, who might some day be called on to help save a pilot from the field. Fog, foam and carbon dioxide methods of quenching fires were demonstrated.

NAS BRUNSWICK—Before this station was put on caretaker status it had among its complement the National A.A.U. marathon champion—Charles Robbins, PhM2c. He won the 26-mile marathon run in New York for the second year in a row, finishing in 2 hours, 37 minutes. Last fall he also won the New England cross country championship in Boston, the 25-kilometer race around Cape Ann, the 10-mile marathon in Jamaica Plains and the 15-kilometer race of the New England American Amateur Athletic Union.

NAS HONOLULU—Although James H. McClure, ARM1c, held the world's doubles table tennis championship three times and single champ twice while a civilian he did not play a single game during his four

years in the Navy. At the time of his detachment he was assigned to VR-11. With NATS he was in the first group to fly into Okinawa. His squadron won the Navy Unit Commendation for its work in evacuating more than 9,000 wounded men by air.—*Air News*.

NAS CAPE MAY—After serving many months in the Navy, William Findley, coxswain, became an American citizen only two days before he was discharged.

He was born in Wales and was drafted before he could finish his naturalization routine as a civilian. After he got his final papers in Philadelphia, he misread the English language on signposts and wound up at Atlantic City instead of Cape May.—*Wheel Watch*.

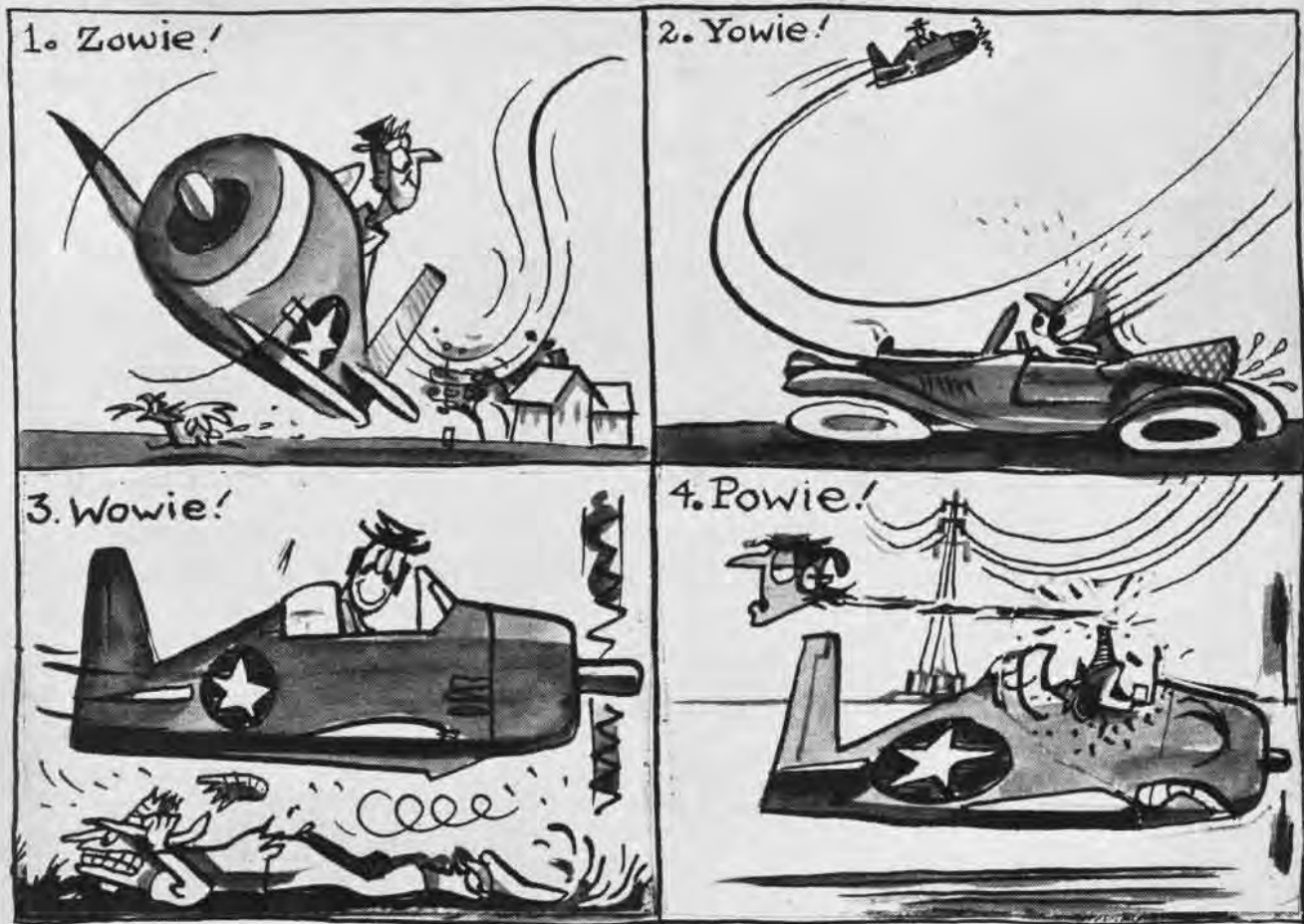
NAS SEATTLE — Naval personnel usually are running high blood pressure by the time they sweat out their final discharges, so it was with unconscious humor that this station assigned the low pressure chamber training rooms for the 13th naval district's Wave discharge center. Also being used are the night vision rooms which also might be interpreted two ways.

MCAS EL TORO—This station's special services school, only Marine organization of its kind in the country, closed recently. Five classes of 250 west coast Marines went through it during its operations, students ranging from private to lieutenant colonel. Members of the faculty left to continue instruction at Quantico where special service lectures will be incorporated into basic officer candidate courses established for the United States Marine Corps.



Honorably Discharged. A long row of war-weary Marine Corsairs, their fighting days over when the Japanese surrendered, stands on the grass at NAS SAN DIEGO awaiting final word on what the Navy has decided to do with its surplus fighting ships and aircraft. The usual glamor gal paintings adorn the cowlings of a few—*Combat Fatigue Cure* and *Ready, Willing and Able*, to quote a couple of their names. Most are anonymous heroes





## Ensign C. MEE

**Moral: Don't Be An Exhibitionist; Be a Safe Pilot.**



EVIDENCE indicates that some pilots cannot overcome the urge to put on low-level flying demonstrations. This love of low-altitude exhibitionism is not conducive to long life. Under these conditions, the odds against the pilot are too great, particularly in a high-speed military airplane. Innumerable things can go wrong; reaction time is reduced to a minimum,

and recovery from unexpected emergencies is practically impossible.

Low-altitude exhibitionism, notably flathatting, caused the following fatal accidents in the past quarter:

1. Plane collided with an unseen cable 65 feet above a bridge.
2. Plane collided with high tension wire at an altitude of 100 feet.
3. Plane collided with a tree during unauthorized low-level flight.
4. Pilot dove on a swimming pool and possibly blacked out in tight turn during attempted recovery.
5. While plane was circling at approximately 300 feet in

a steep bank, it stalled out and crashed to the earth.

6. While engaged in low-altitude aerobatics, the pilot was unable to recover from an unusual position.
7. While the pilot was attempting an unauthorized landing in a field near his parents' home, the plane was seen to stall and spin in during the approach.
8. Pilot attempted to impress his girl friend by doing a slow roll at extremely low altitude. When the aircraft reached the inverted attitude, the nose dropped and the plane struck the ground at a 90-degree angle.

Exhibitionism in the form of low-altitude flying is equally as dangerous over water as over land. It is almost impossible to judge accurately your height above water, particularly when the surface is calm. The propeller or low wing does not knife through water; it hits violently and usually causes the loss of airplane control and subsequent loss of aircraft and pilot.

If you do not value your life or government property and still insist on flathatting, give your dependents a thought. When death occurs from unauthorized flight and the death is determined to be the result of misconduct and not in the line of duty, your dependents lose a sizeable amount of money they would have received if your death had been adjudged as occurring in the line of duty. Under these circumstances, not only does the flathatter pay the extreme penalty, but his loved ones lose the six months gratuity pay and also the government pension.

The only time low flying is authorized is during landing, takeoff, in certain supervised training maneuvers, and in the execution of required combat tactics (strafing, mast-head bombing, etc.). Even in these maneuvers you must look out for power lines and other flight obstructions.

▶ **DON'T FLATHAT: BE A SAFE PILOT**

# DID YOU KNOW?

## SecNav Sets Unit Ribbon Spot

*Enlisted Men Now Can Wear Mufflers*

The Secretary of the Navy has announced that Navy Unit Commendation ribbons are to be worn by enlisted men ahead of their Navy Good Conduct, campaign and Victory ribbons, which follow in that order.

Enlisted men also were authorized to wear blue wool mufflers. Heretofore they were not authorized to wear any type, although some men wore white ones. The new regulation prescribes that the muffler is optional but may be prescribed by the commanding officer when weather conditions require. Chiefs, cooks and stewards may wear white mufflers, or blue ones at sea.

Size of the pin-on star worn by commodores was increased from  $\frac{3}{8}$ " to  $\frac{1}{2}$ ". Admirals' stars will remain at the smaller size. The change was made because the single  $\frac{3}{8}$ " star was difficult to see.

## Squadron Designations Are Set

*Numbers, Letters Tell Training Place*

A new system of designating squadrons under the Naval Air Basic Training Command has been announced. Identifying numbers and letters will enable a person to know the location of the squadron, type of training it offers and naval district.

Squadrons are numbered as follows: Squadron 1, basic N2s; Squadron 2, Basic SNJ; Squadron 3, VB2; Squadron 4, VPB; Squadron 5, CV; Squadron 6, CQTU; Squadron 7, VO/VCS; Squadron 18, Foreign student squadrons followed by alphabetical letters A, B, C etc., to denote various stages of training. Following squadron numbers will be appropriate naval district designations.

Instructors' schools will be referred to by name. To designate squadrons of the same type at Corpus Christi and Pensacola, blocks of letters followed by squadron designations are assigned for use at each base as follows: Corpus Christi—Able through Easy; Pensacola—Mike through Queen.

## Crafts Shop Fills Idle Hours

*Waves Make Gadgets in Jacksonville*

NAS JACKSONVILLE—To help Waves fill their spare time hours while awaiting demobilization, the Welfare department opened a Crafts Shop where the women can indulge in their hobbies.

## RESERVE AVIATORS

Naval and Marine aviators who have been separated are now authorized to solo naval aircraft. The program is under the Naval Air Reserve Command and commenced in January.



The following stations are contemplated for Reserve use:

Atlanta	Minneapolis
Anacostia	New Orleans
Dallas	New York
Glenview	Norfolk
Grosse Ile	Olathe
Jacksonville	San Diego
Livermore	Seattle
Los Alamitos	Squantum
Memphis	St. Louis
Miami	Willow Grove

Until 30 June of this year such flying shall be on a voluntary basis without pay. At the start of the next fiscal year, 1 July 1946, however, it is anticipated that drill pay will be available. The budget for it is now in the making.

A reserve program for ground officers, aircrewmembers and ground personnel who have been separated is also being offered.

The shop is equipped with a wide variety of tools, including a jig saw, power emery wheel and buffer, dutch oven and vibro-tools. Materials are procured by Welfare. The women make out of plexiglas such things as bracelets, fashion trays, cigaret boxes, plates



WAVES' SPARE TIME IS PUT TO GOOD USE

and ornamental gadgets. They make leather belts and wallets, metal watch bands and bracelets, linoleum blocks, shell necklaces and carve wood.

## Photography Goes To DCNO (Air)

*Photo Science Lab Included In Shift*

Consolidation of photographic activities of the Navy under Deputy Chief of Naval Operations (Air) was put into effect 1 January by direction of the Secretary of the Navy. Major photographic operations in the past were under BuAer.

The bureau's photography division was abolished and all personnel, functions and facilities, including Photo Science Laboratory at Anacostia, were transferred to the new agency which was designated under DCNO (Air) as U. S. Naval Photographic Service. It also absorbed the Office of Naval Photographic Services, established in 1944.

CNO may assign to the director of the agency supervision over any related functions now located in CNO. However, functions now assigned to bureaus and offices of the Navy Department, other than those mentioned above, may be transferred only with prior approval of the Secretary.

## Ferry Pilots Have Good Record

*VRF Squadrons Score 99% on Safety*

Squadrons of Naval Air Transport Service Ferry Wing have moved more than 80,000 aircraft with a safety factor of 99.301 percent since the Wing was established two years ago.

More than 700,000 aircraft hours have been flown by Ferry Wing pilots covering a distance of nearly 75,000,000 miles or the equivalent of approximately 3,000 trips around the world at the equator. The bulk of these movements was handled by VRF-1, with VRS-1 and its more than 20 detachments scattered across the United States taking care of the problems of servicing and repair.

The immensity of the ferry job is more evident when it is realized that the majority of aircraft delivered were short-range types, requiring constant servicing along the chain of ferry stops where gas, oil, repairs and crew accommodations were available. Furthermore, alternate routes had to be laid out for use in the event of bad weather.





**New uniforms** for enlisted men now undergoing tests afloat and ashore: work uniform, left, consists of gray twill shirt, dark gray trousers, overseas cap; winter dress, center, white shirt, black tie, overseas cap, unlined fly-front jacket, melton trousers; summer dress, right, white shirt, black tie, conventional white trousers, old style white cap. Baseball cap is worn with dungarees. If changes are made in the traditional uniform it will be only after stores now on hand are exhausted. The pea coat is retained as part of uniform.

### Legion Of Merit Award Goes To Officer Who Created Dilbert

For creating Naval Aviation's two most famous "what not to do" characters, *Dilbert* and *Spoiler*, Lt. Comdr. Robert C. Osborn, USNR, recently was awarded the Legion of Merit.

Lt. Comdr. Osborn, who entered the Naval service 6 March 1942, also illustrated the *Grampaw Pettibone* section of NAVAL AVIATION NEWS and many of the aviation training pamphlets.

To get the pilot's viewpoint, Lt. Comdr. Osborn early in his Navy career went through the paces of primary flight instruction at NAS ATLANTA. It was there the ideas for the first of his more than 1000 Dilbert drawings came to him. "I was a first rate Dilbert my-

self" is the way he describes his Atlanta flight experiences.

Later Lt. Comdr. Osborn served aboard carriers in both the Atlantic and Pacific to gather ideas for his drawings. The Dilbert and Spoiler characters are credited with having been of inestimable value in reducing pilot and mechanical errors in the Navy's aviation training program.

The Legion of Merit award was made by Capt. E. W. Parish, Jr. USN, Head of the Training Literature Section, Office of the Deputy Chief of Naval Operations for Air. The citation stated in part: "... His cartoon characters formed the cornerstone for the highly

successful educational and training programs of Naval Aviation in World War II and his loyal and enthusiastic labors contributed materially to the effectiveness and survival in combat of Navy pilots and aircrewmembers."

### ALNav Unmuzzles Naval Officers

#### Expressions On Merger Are Permitted

In an ALNav issued 31 December 1945 the Secretary of the Navy announced that officers of the Navy and Marine Corps may now express their personal views on the question of unification of the armed services. This ALNav cancels ALNav 447, dated 19 December, which prohibited officers of the Navy and Marine Corps from expressing personal views on the proposed unification plan.

The complete text of ALNav 461 as released by Secretary of the Navy James Forrestal follows:

"When the President was asked at his press conference on 20 December 1945 whether his message to Congress of 19 December 1945, urging the enactment of legislation creating a single Department of Defense, was intended to stop further discussions by Naval officers on the question of unification, he replied he did not intend to muzzle anyone. The President's exact words were as follows:

*I want everybody to express his honest opinion on the subject, and I want to get the best results that are possible. In order to do that, I want the opinions of everybody. And nobody has been muzzled.*

*It will be necessary now, though for all people who are in the services, to make a statement that they are expressing their personal views and not the views of the Administration. I have expressed those views myself.*

All officers of the Navy and the Marine Corps and all others in the naval service shall be guided accordingly."

### Bunker Hill Duty Is Recorded

#### Carrier's Personnel Publish History

Personnel of the U.S.S. *Bunker Hill* in words, photographs and drawings have permanently recorded the story of their carrier's combat action in the Pacific. The story, published in book form by and for personnel of the *Bunker Hill*, covers one full year of the ship's combat duty—November 1943 to November 1944.

The publication's 272 pages are filled with action photographs, pictures of ship and air group personnel, and human interest stories about the carrier and her crew.

A copy of the book now is in the Navy Department Library where it will remain as a permanent record of the *Bunker Hill's* fighting history.





# Maintenance

POSTWAR A&R SHOPS SEE REPAIR OF NAVY PLANES FALLING MORE HEAVILY THAN EVER ON CIVILIAN WORKERS' SHOULDERS



# NORFOLK CONVEYOR SPEEDS PLUG REPAIR

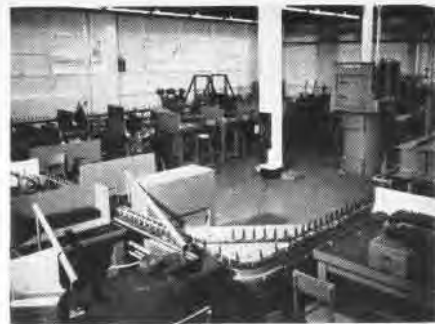
Spark plug overhaul time per plug has been cut in half at A&R, NAS NORFOLK, with a practical conveyORIZED system replacing the batch process. The new shop (see cut), planned for efficiency and speed in handling plugs, has proved highly successful. In the batch process each employee was given a tray of plugs which he overhauled from start to finish. In the conveyORIZED process each man is assigned to one specific operation in the sequence.

For overhaul the spark plugs are divided into two types: mica and ceramic, each group being processed on a separate conveyor. This division, combined with the variable speed provided for on the conveyors (one foot per second to two feet per second, chain speed), furnishes a very flexible production control, as conditions of personnel and work load demand. The spark plugs are carried along on spindles or spark plug holders, four such spindles in each foot of conveyor. This feature gives additional flexibility since the spindles can be loaded consecutively, alternately, or in any other pattern set up by the supervisor. The two roller chain conveyors with individual drives are elevated about 36 inches from the deck, and work tables of the same height parallel the line.

The following stages are set up in the operational sequence for ceramic plugs: 1. segregating, inspecting, and traying; 2. placing on conveyor; 3. degreasing; 4. sand blasting; 5. buffing of barrel; 6. buffing of thread; 7. cleaning of ceramic on barrel with rotating chamois, wet and dry; 8. die-chasing of barrel end and shell end; 9. gap setting and gas leak testing; 10. preliminary inspecting; 11. painting; 12. final inspecting and bomb testing; 13. applying rust preventive and copper gasket; 14. packaging in cardboard, 15. boxing.

A similar series of stages is arranged for mica plugs. Each operator on both the mica and ceramic production lines removes the plug, performs his work, and replaces the plug on the conveyor in a reverse position, from shell up to shell down. This reversing is important because it indicates that the previous operation has been completed or, in cases where two or more operators are working on one stage, that the current operation has been completed.

To increase the efficiency of new employees and quickly train any shifted personnel, visual aids are posted on the operational tables, showing the original position of the plug on the conveyor, transfer to the overhaul equipment, and replacement on the conveyor. These illustrations are drawn in a clear, concise, eye-catching manner so that the



SPARK PLUGS RIDE THE BELT AT NORFOLK

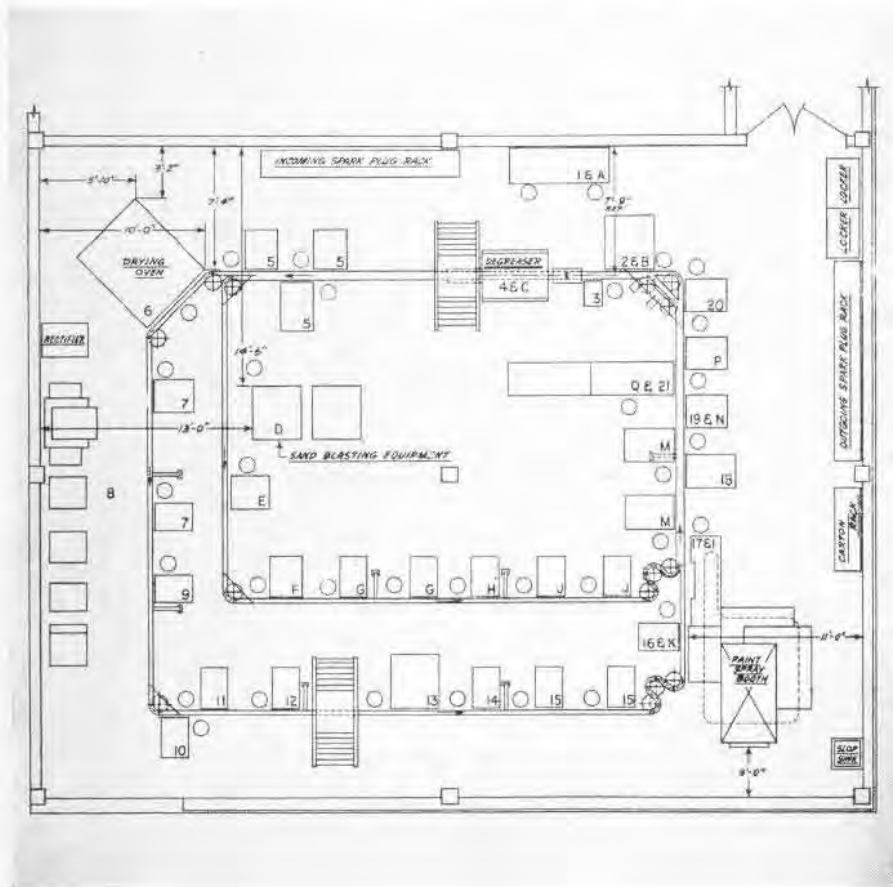
average new, unskilled employee can understand his work quickly.

The conveyORIZED system, giving an orderly sequence of operations which can be followed closely, decreases the percentage of rejected plugs. A spark plug is completely overhauled in 20 minutes, and if there is an accumulation of a certain type of discrepancy at the inspection stage, the error can be traced readily to the operator concerned and the trouble corrected with immediate instruction. In the batch process much closer inspection is necessary and a consistent error being made by one operator might not be discovered.

## SEQUENCE OF OPERATIONS

### Operations on Mica Plugs

1. a. Remove mica plugs from storage boxes. b. Remove mica plugs from cylinder, shell protector, and gasket. c. Segregate into Aero and B. G. plugs. d. Inspect the following parts of plugs: 1. threads 2. hex 3. shielding barrel 4. insulator 5. check gap. Note: If either shell or core is in good condition, place on line. e. Place plugs in tray. f. Supply operator #2 with plugs.
2. Disassemble shell from core and place on assembly line.
3. Clean inside of core with CCl<sub>4</sub>.
4. Degrease.
5. Clean center electrode on speed lathe. Note: If tip is not perfect after cleaning, reject the barrel.
6. a. Punch mark core. b. Oven bake. c. Place shell in box provided.
7. Buff core.
8. Obtain shells from #6 and supply #11 with shells processed as follows: 1. salt bath 2. hot rinse 3. black oxide 4. cold rinse 5. hot rinse.
9. a. Clean track and end of core. b. Clean contact point.
10. Nafetal test pre-dip in H<sub>2</sub>C<sub>2</sub>O<sub>4</sub>.
11. a. Spread electrodes. b. Shell inspection, reject bad hex, threads and points.
12. a. Install copper gasket. b. Apply mica-lube. c. Assemble core and shell by hand and electric motor.
13. a. Torque on B. G. and Aero plugs. b. Gas test.
14. a. Die chase core threads. b. Die chase shell threads.
15. Gap set.
16. Buffing and minor discrepancies.
17. Paint.
18. Inspection—bomb test and plug inspection.
19. a. Rust preventive applied. b. Place copper gasket on plug.
20. Pack in cardboard cylinder and seal.
21. a. Dip cylinder in wax. b. Pack cylinder in box. c. Dip box in wax. d. Wrap box.



## Operations on Ceramic Plugs

- A. 1. Remove ceramic plugs from storage boxes.
2. Remove plugs from cylinder, shell protector, and gasket.
3. Inspect the following parts of plugs and reject if condition is not satisfactory: a. threads; b. hex; c. shielding barrel; d. insulator; e. check gap.
4. Place plug in tray.
5. Supply operator  $\pm 2$  with plugs.
- B. Place plug on assembly line and cap barrel end.
- C. Degrease.
- D. 1. Remove shielding barrel cap.
2. Compound blast (AN-C61). Note: If dark lines are noted on ceramic after cleaning, it is an indication of fracture. (Reject).
- E. Buff barrel.
- F. Buff threads.
- G. Barrel cleaning.
  1. Dip in T25.
  2. Clean with rotating chamois.
  3. Air blast.
  4. Inspect for fracture of shielding barrel.
- H. Die chase core threads, shell threads.
- J. 1. Gap set. Note: Round gage to be used.
2. Gas test.
- K. Buffing and minor discrepancies.
- L. Paint.
- M. Inspection—bomb test and plug inspection.
- N. 1. Rust preventive applied.
2. Place copper gasket on plug.
- P. Pack in cardboard cylinder and seal.
- Q. 1. Dip cylinder in wax.
2. Pack cylinder in box.
3. Dip box in wax.
4. Wrap box.

## Correcting Hose Clamp Failures

Air Force, Pacific Fleet Technical Bulletin No. 252-45 covers the fatigue failures of AN746 hose clamps. Information is so generally applicable to all types of aircraft that the complete bulletin is quoted as follows:

"Many cases of failure of the subject type clamps have occurred due to vibration of the unused extension of the adjusting strap causing fatigue failure at the take-up hole. A recent case occurred where this clamp broke on the fuel line of an F8F-1 resulting in engine failure and the loss of about 70 gallons of fuel in the accessory compartment.

"At not later than the next 30 hour check all units shall inspect all fuel and oil lines for these clamps. The adjusting strap on all subject clamps found shall be cut off with a pair of diagonals at the first unused hole in the adjusting strap."

## Use Newly Revised RUDM Forms

Revised forms for submitting RUDMs, NavAer 4412 (Rev. 11-45), have been issued by BUAER, with an initial distribution of 100 copies to each reporting activity. Additional copies should be requisitioned through regular supply channels. Reports will not be submitted on the old form after 15 March.

The revision changes the plan of distribution of RUDMs in that the original and three copies will now be sent direct to BUAER, in addition to the signed copies forwarded to the Immediate Superior in Command and to the

Cognizant Force Commander. Aviation Circular Letter No. 78-45, under which the new form is issued, cancels the former provision for photographic reproduction of reports in the Bureau. Hence the need for three additional copies from the reporting activity. This ACL should be read carefully for further detailed instructions.

*RUDM Digest* furnishes a monthly summary of trouble reports and gives complete information on the corrective action taken. Checking of this publication plus prompt, accurate submission of reports will result in a system mutually beneficial to all activities.

## Fluid Testing of Defuel Valves

A considerable amount of trouble has been encountered on the Parker defuel valves, series 4136-1, installed on F4U-4 aircraft, because of leakage at the stem seals. Parker conducted an investigation, decreased the stem clearances, and increased the size of "O" ring packings in an attempt to minimize leakage.

In the investigation the manufacturer discovered that a large part of the leakage was due to using Varnoline or Stoddard solvent as the fluid testing medium for the valves. These naphtha base solvents, remove the low temperature plasticizer from the rubber sealing compound, thereby causing subsequent valve leakage.

Parker insists that only aviation fuel be used as the fluid testing medium for these valves. This information has been relayed both to Chance-Vought and to field activities operating F4U-4 aircraft.

## Chute for F7F Radar Operators

Technical Note No. 96-45 has been issued by BUAER recommending that the radar operator in the F7F airplane use a back type parachute. Either the Navy standard back type parachute described in T.O. 18-45 or the Navy quick fit back type parachute assembled in accordance with T.O. 65-45 may be used by the F7F radar operator. Due to production delays the quick fit type will not be available until after February.

## Heater Prototype Installations

A&R, NAS NORFOLK has recently completed a heater prototype installation for TBF/TBM-type aircraft. The installation instructions have been written up in NAS NORFOLK Service Bulletin #197 which has been approved by BUAER. Kits are now being fabricated at NAS NORFOLK for installation by that activity in airplanes designated by BUAER or ComAirLant. This installation incorporates a Stewart Warner 906-A heater which has a rated output of 50,000 BTU per hour. A windshield

defroster and three heat outlets are provided.

BUAER also has authorized heater prototype installations for F4U and F6F type airplanes. This work has been assigned to NAS NORFOLK, in view of their previous experience with the TBF/TBM heater installation. The heater prototypes will be tested under actual operating conditions and will be authorized by BUAER for service installation if the tests prove satisfactory.

## VF's Get Airspeed Indicator

All fighter aircraft will be equipped with maximum allowable airspeed indicators to tell the pilot when he is reaching dangerous speeds which create aerodynamic and structural problems.

The instrument is essentially an airspeed indicator to which has been added a danger pointer responsive to



INDICATOR WARNS WHEN SPEED TOO HIGH

both the airspeed diaphragm and an added altitude diaphragm. The dial is calibrated in Mach number units from .3 to 1.0. This number is the ratio of true air speed to the local speed of sound. A modification of this indicator has been incorporated into the standard 50 to 600 knot airspeed indicator.

The Mach number corresponding to that of the particular model aircraft is set into the instrument from the back and is identified by the number appearing in the window (see cut). When the Mach number is set, the danger pointer will rest at the indicated airspeed corresponding to that number. As the airplane gains altitude, the pointer will slowly fall, indicating continuously the maximum allowable indicated airspeed for that Mach number at all altitudes.

The indicator shows danger due to excessive speed only, not to excessive accelerations. Pilots in a high speed dive must beware of high G pullouts.

In the accompanying photograph, the Mach number setting is 0.9. Since the photograph was taken at approximately sea level conditions, the danger pointer rests at 590 knots indicated airspeed. Sea level maximum allowable indicated airspeed corresponding to a Mach number reading of 0.9 is 595 knots.

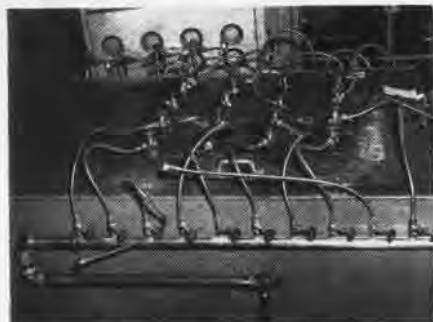


## Manifold Change Speeds Drying

NAS QUONSET POINT—An improvement for drying oxygen cylinders was developed by two employees of the A&R department on this air station under the Navy Employees' Suggestion Program. Their idea eliminates the former semi-rigid manifold which was attached to the cylinders as a unit and had to be removed after the drying operation was completed. Leaks were frequent and difficult to locate.

To overcome these disadvantages an improved manifold has been devised which facilitates drying since the manifold is flexible and is permanently attached outside the oven frame. Vacuum lines can be attached quickly and infrequent leaks are easily located. When a leak does occur, it can be isolated by closing the valve to the defective line, or when 16 cylinders are in the oven, by attaching one of the others already attached to the manifold.

The suggested manifold is made of one-inch pipe having 20 valves, 10 on each side, threaded and silver soldered



FLEXIBLE ARMS ATTACH TO CYLINDERS

in place. Each valve is connected to a suitable length of flexible braided hose capable of withstanding the crushing load caused by vacuum. On the end of each hose is an adapter for easy attachment to the oxygen cylinder.

[SUGGESTED BY JAMES GALLEN, ERNEST PALMER]

## Emergency Exit on N2S Plane

NAS GLENVIEW—To provide an emergency exit in N2S cockpit enclosures installed in accordance with BuAer Service Change No. 27, the A&R shop has designed and installed an emergency escape hatch on the port side of the plane.

The hatch provides a means of removing quickly a panel in each of the sliding cockpit enclosures which will permit exit of the pilot and passenger. Exit is accomplished by a forward push on a handle conveniently located at the forward end of each escape hatch.

The handle is fastened to a metal strip which acts as a lock for a number of pins which secure the escape hatch retainer panel to the cockpit enclosure



INTERNAL AND EXTERNAL HATCH RELEASES

frame. Pushing the handle forward releases these pins and permits the plexiglas panel to be removed easily.

The opening thus provided in both cockpit enclosures will permit pilot and passenger to escape in any emergency either in flight or on the ground. A device also is provided for releasing the mechanism from the outside in case the pilot or passenger is unable to do so.

► **BuAer Comment**—This installation has been approved by BuAer and is to be installed on all N2S enclosures.

## Overhauling of Water Breakers

NAS COCO SOLO has issued a local process specification covering the overhaul of stainless steel water breakers (NAF 1085-1).

The breakers are first steam cleaned to remove alkaline deposits and other foreign material. All repairs are made as necessary, using solder and soldering iron, not gas welding. Excess heat causes scaling, which induces corrosion in stainless steel.

A pickling solution is prepared by mixing 10% sulphuric acid with 10% muriatic acid, or a mixture of 10% sulphuric acid with 10% common salt, with 80% water. Mix the solution by adding the sulphuric acid slowly while stirring the water, after which add the muriatic acid or salt in the same manner. Never add the water to the acid. Pour enough of this solution into the breaker to cover the surfaces to be cleaned. The solution may be agitated by either stirring or gently shaking the breaker to present a new solution every two minutes. Only a few minutes should be required to remove corrosion. The tank liner is constructed of wood or rubber. When working with the acids, personnel should use rubber gloves. After the pickling acid has been removed, the tank should be rinsed carefully with warm water.

All breakers that have been pickled must be passivated also. Passivating cleans the pores of the metal and leaves a protective oxide on its surface. A cold passivating solution is prepared by adding nitric acid (35% to 50% by volume) to water. Stir the solution while adding the acid slowly. Construct

the tank liner to be used for the bath out of wood, rubber, or stainless steel. Immerse the breakers in the passivating solution from 20 to 30 minutes. The breakers should be rinsed in warm water and then steam cleaned again to remove all impurities.

BuAer considers the method outlined satisfactory, but recommends that an inhibitor conforming to specification 51-I-2 be used with the pickling solution. Use of the inhibitor will increase pickling time. It should also be noted that a number of pickling and passivating solutions will give satisfactory results. All hands are cautioned to provide adequate ventilation during work.

## Boom Speeds Work, Saves Money

NAS MIAMI—A boom to facilitate aircraft refueling, which was designed by a civilian at this activity under the Navy Employees' Suggestion Program, has effected an annual saving of \$6000.

Use of this suggestion permits two men to refuel instead of three or four men. The truck driver passes the hose



REFUELING IS MADE EASY WITH NEW BOOM

nozzle to a man stationed on the plane wing who carries the hose over the cockpit greenhouse to the tank.

The suggested refueling boom consists mainly of 1½" galvanized or black iron pipe. An upright stands 12' high from the left sidewalk of the truck, and the boom extends 9' from the upright. A hose, 14' long with a dispersing nozzle is connected to the outer end of the boom. A swivel joint at the top of the upright permits the boom to swing.

Gas flows from the truck to the boom through the 1½" pipe which is attached to the meter outlet and piped along the left side of the truck to the upright. Wear and tear on hose has been eliminated, and stowing away the long gas hose discontinued.

[SUGGESTED BY WILLIAM J. FITZGERALD]

## M-3r Latest Multi-Place Rafts

Activities having a large supply of multi-place life rafts on hand should make certain that their units are equipped with the latest type rafts be-

fore requesting ASO disposition of any surplus material. Multi-place rafts of various specifications are all included under the same stock number. The newest rafts are the M-3r type, which incorporates many improvements over earlier models. M-3r rafts have a vertical as opposed to a horizontal bulkhead and are most easily recognized by the location of the CO<sub>2</sub> cylinder amidships. Earlier the cylinder attached to bow.

M-3r rafts are interchangeable with earlier rafts except in PB4Y aircraft where special packing is required. (See PB4Y Aircraft Bulletin No. 176.) It may be noted that while specification M-3s has superseded specification M-3r, no procurement of M-3s rafts was made.

### AOM Develops Tie Rod Changes

NAAS CECIL FIELD—An AOM has developed a system for modifying 20 mm. aircraft cannon tie rods which will permit faster and finer adjustments.

One man setting this adjustment is far less apt to bind the feed mechanism slide by placing uneven tension on the tie rods. The 20mm. M2 cannon must be free of all binding influences or short recoils will result. The full recoil of the cannon is necessary as each recoil rewinds the feed mechanism.

The modification of the tie rods allows the clearance between the rack operating lever and the rack roller to be set quickly and accurately by one man on the wing, working through the access doors immediately above the gun. This operation formerly required the efforts of two men, one man on the wing and the other below the wing where the cannon passes through the center section beam.

As the clearance between the rack operating lever and rock roller play such an important part in the feeding of the cannon, this clearance should be checked, and adjusted, if necessary, prior to each gunnery flight.

[SUGGESTED BY BAYNE H. KIRWIN, AOM2/C USNR]



TIE RODS MODIFIED TO ALLOW ADJUSTING



NAVY'S NEPTUNE IS ARMED DYNAMITE, WITH SPEED AND MANEUVERABILITY DOMINANT

## NEW SEARCH PLANE PACKS PUNCH

### Lockheed P2V Patrol-Search Bomber is Twin-Engine Plane With Four-Engine Performance

THE NAVY'S newest present to the nation was revealed recently as the fastest, most far ranging and heavily-armed search plane ever devised. Known as the *Neptune* p2v patrol bomber, the plane has been ordered in quantity from Lockheed Aircraft Company.

Powered by two 2800-horsepower Wright engines, the plane has a top speed in excess of 300 miles per hour with a normal range of 3500 miles and a maximum range of 5000 miles with the addition of bomb-bay tanks.

It carries two aerial torpedoes and has a nose studded with six 20mm. cannon. The *Neptune* also boasts eight five-inch high velocity rockets under each wing. Under another set of loading conditions, the *Neptune* can carry 12 325-pound depth charges or eight 1000-pound bombs or 16 500-pound bombs. Racks will also carry four 2000-pound bombs. Top and power turrets each carry twin-mount .50 caliber machine guns.

Able to fly out of any field that a fighter can, the *Neptune* has a seven man crew consisting of pilot, co-pilot, radioman, navigator-bombardier, radar operator and two gunners. Facilities for crews comfort include an all-electric galley and sleeping accommodations.

The gross weight of 58,000 pounds includes a ton of radar equipment and the new Varicam tail. This tail is a mechanical device for varying the curvature of the horizontal tail surfaces.

Facilitating trimming and allowing for shifts in plane weight, the tail is creating great interest in engineering circles.

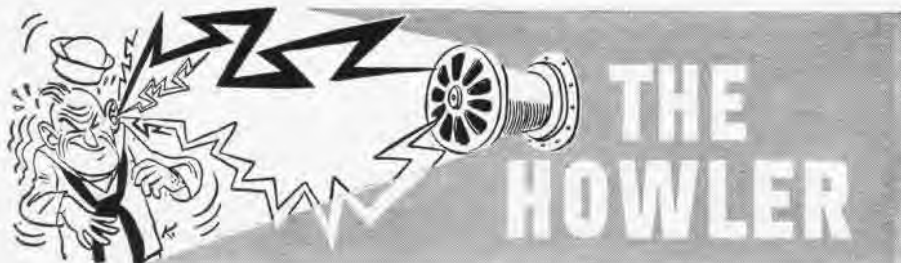
Self-sealing fuel tanks are afforded extra protection by a new nylon plastic shell. The *Neptune* is the first Navy landplane conceived and built strictly as a search and patrol bomber and incorporates all the experience and equipment gained by the Navy's patrol bomber squadrons during the war. To date landplanes used for this type work had been modifications of other craft.

WHEN fully loaded the *Neptune* will cruise at 200 miles per hour and has a service ceiling of slightly over 23,000 feet. *Neptunes* based on Guam, for example, could cover on a routine search, Wake Island, Tokyo, Manila, and Rabaul on New Britain. Operating out of Manila, *Neptune* airplanes fully loaded could cover Singapore, Shanghai, and Hanoi in French Indo-China. The first *Neptune* has already been completely tested and delivered to the Navy and additional planes will be delivered soon.

So far, the *Neptune* has proven more efficient per pound of gross weight than some four-engined planes. An example of this may be found in the newly-designed engine nacelles. These nacelles are much smaller than those which house the same engine as on the B-29.

Though a twin engined plane the *Neptune* is large, its fuselage being 75 feet long, wing spread 100 feet and the vertical fin being 28 feet tall or almost the equivalent in height of a three-story dwelling above the ground.





ertheless the plane had passed inspection.

It was the sole job of inspection personnel to see that aircraft was in all respects airworthy and ready for flight. They bungled their job and were removed. An additional item has been entered in the flight line work book to the effect that all accessible fuel and oil lines will be checked for proper installation of all hose clamps.

### High Temperatures in F4U-4 Hydraulic System.

BUAER has received numerous reports of hydraulic pump cavitation with attendant unloader valve failure and high temperatures causing melting of the plastic dip stick. (See January NANews, p. 34.) The following summary of an aircraft maintenance field representative's investigation will aid maintenance personnel in correcting this trouble.

The F4U-4 aircraft reported on showed continued evidence of high fluid temperatures during repeated tests made to isolate and eliminate the cause of the undue temperature rise. When the unloader valve was replaced because of failure of the ball check retainer seat, fluid temperatures in the reservoir stayed within allowed range during limited tests in flight.

However, when the landing gear and flaps had been cycled 20 times each, using pressure from a portable hydraulic test stand, the main return line to the hydraulic reservoir was found to be overheated to a point where it was uncomfortable to touch. All other lines were cool. With the source of excessive heat rise thus located, subsequent check revealed that the nut, P/N AN924-82, was finger tight and the gasket, P/N AN902-16, had carried away at the point of attachment to the fitting, P/N AN926-16D, at the bottom of the reservoir.

This lack of sealing action admitted air to the suction side or intake part of the hydraulic pump, causing cavitation, generating heat, and eventually causing failure of the unloader valve, which further aggravated the condition. After replacement of the gasket and proper torquing of the nut on the fitting at the bottom of the reservoir, fluid temperatures rose no higher than 135° F during two hours of continuous cycling of the landing gear and flaps. In this check, again using the portable test stand, all lines remained cool. On subsequent test hops all operations were normal with no evidence of cavitation or abnormal heat rise.

A contractor's representative in commenting on severe cavitation which resulted in numerous failures of the Electrol unloader valve seat, pointed out that the condition may be caused by a leak in the pump suction line or by a low fluid level resulting from slow leaks and failure of maintenance personnel to check the level. Service activities should take extreme care to maintain proper fluid level by keeping external leaks at a minimum and assuring that the fluid is at the proper level prior to each flight. Pump suction line must at all times be free of air leaks.

Aircraft maintenance field representatives are available, upon request, to continental service activities to assist in solving maintenance problems of this nature.

**Hydraulic Sleeve Fitting Failures on PB4Y-2.** An activity servicing PB4Y-2 aircraft has reported the failure of Parker hydraulic sleeve fittings, P/N 100-V2991-43, running from the pressure side of the electric switch at the "T" connection to the starboard accumulator, and P/N 100-V2001-66 running from the port accumulator to the brake system. The sleeves are steel (AC-811T-CS) used with aluminium nuts and fittings. The activity reports that the condition was found on several PB4Y-2 aircraft serviced at that point. The failure, a splitting of the sleeve with resultant loss of hydraulic fluid, may be due to over-torquing, vibration or shock loads on the hydraulic system.

Field activities handling PB4Y2 aircraft are asked to check for this trouble. Information as to causes or remedial measures employed should be forwarded to BUAER, Maintenance Division, Airframes Branch, Accessories Section, Washington, D. C.

**Shearing of CVC-133-4-71 Bolts.** Two failures have occurred at the base of the threaded portion on this bolt, located in the vs-10911 center section flap lever, on F4U-1 and FG-1D aircraft. In one case the bolt worked out of the flap lever, causing the lever to drop down and cut into the vs-16101-9 hydraulic tube.

Local units are advised to check the bolts and replace any found loose. Over-tightening of the nut is the probable cause.

**Check Landing Gear Operation.** Overhaul inspection and maintenance inspection together shared 80 percent of the blame for a recent B2M-1C accident in which retracting wheels dropped the taxiing plane on its belly, with damage to wings, prop and fuselage and sudden engine stoppage.

The pilot had preflight-checked the aircraft, finding no discrepancies. After he started the engine, the warning horn began to blow continuously. The plane captain made an adjustment to the micro-switch that is actuated by the throttle control push-pull rod in the cockpit, and the horn stopped blowing. Believing that the trouble had been overcome, the plane captain pulled the chocks and directed the pilot to taxi. The plane had moved about ten feet when the wheels retracted.

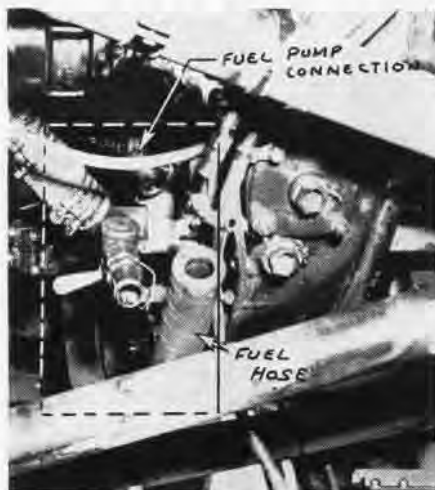
Investigation showed that an overhauled landing gear selector valve had been installed in the aircraft while it was parked on the line. Operation of landing gear had not been checked after this installation, and when the aircraft was hoisted after the accident, the operation was found to be reversed. This was due to the shaft

Electrol part No. B2311 in the landing gear selector valve being turned 180° from its proper alignment, thus reversing the flow of fluid and causing retraction of landing gear when pressure was applied, although control lever was in down position.

Maintenance personnel are warned to check out landing gear with the plane on jacks or sling whenever selector valve is replaced. Check of the installation only is not sufficient.

**Inspection Misses Missing Hose Clamp.** The pilot escaped with third degree burns this time, but he was lucky. He managed to get his F7F-3N down on one engine and got out of the burning plane. The trouble, 100% power plant, fuel system, failure, was the direct result of lax inspection procedure.

The aircraft was being test flown for the first time after modification. Take-off was normal, but the pilot noticed gasoline



UNCLAMPED FUEL HOSE CAUSES ACCIDENT

fumes in the cockpit immediately after leaving the ground. Then the starboard engine started missing and cut out completely. Observers watching the plane come down saw fire in the vicinity of the starboard engine nacelle, and by the time the plane stopped, its starboard side was in flames.

Post accident inspection showed that the fuel hose from the engine driven fuel pump to carburetor was completely disconnected from engine driven fuel pump. An intensive search was made for the missing hose clamp, which simply was non-existent. Careful examination of fuel hose revealed conclusively that a hose clamp never had been installed on this section of hose at the fuel pump end. Nev-

# FINISHING MAGNESIUM

This is the final article on working magnesium alloys in a series of four based on Dow Chemical Co. technical data. See October NAVAER MAINTENANCE magazine and December and January NAVAL AVIATION NEWS for articles giving information on forming, joining, and machining magnesium.

## Cleaning

▶ **Solvent Cleaning.** Oily matter can be removed from magnesium surfaces by washing with organic solvents or by vapor degreasing. Chlorinated solvents, petroleum spirits, alcohol, lacquer thinners, and similar grease solvents which exert no harmful action on magnesium may be used.

Another type of solvent cleaner, known as an emulsion cleaner, employs a low cost mineral distillate and an emulsifying agent. Immersion time in emulsion cleaners will depend upon the amount of surface contamination on the work and upon the operating temperature. While the bath ordinarily may be operated at room temperature, penetration is more rapid if heated to 140 to 160° F. Three to five minutes usually is sufficient to permit penetration of the solvent, after which the work is rinsed in or sprayed with hot water.

Solvent cleaners are used to remove superfluous amounts of oily matter prior to alkaline cleaning and as a pre-cleaning step prior to painting. Alkaline cleaners should be used prior to chemical treatment if the surface has been previously chrome-pickled by the producer.

▶ **Alkaline Cleaning.** The most satisfactory method of degreasing magnesium is by alkaline cleaning, since it removes not only oily matter, but also previously applied chemical treatments. Proprietary cleaners of the strongly alkaline type like those commonly used on steel are the most desirable for magnesium. The milder type of aluminum cleaners are satisfactory in some cases but should be tested before using. An alkaline cleaning solution should have a pH value of eleven in order to give best results.

A satisfactory bath which can be used as a soak cleaner or as an electrolytic cleaner can be made up according to the following formula:

Trisodium Phosphate ( $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$ )... 4 oz.  
Sodium Carbonate ( $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ )... 4 oz.  
Soap\* ..... 0.1 oz.  
Water..... to make 1 gallon.  
\*An equivalent amount of suitable wetting agent may be substituted.

The solution should be operated at 180 to 212° F. If the bath is operated below the boiling point, some form of agitation should be employed. An immersion time of five to 15 minutes is usually satisfactory. When used as an electrolytic cleaner, the bath is operated at 160 to 180° F. No agitation is required since gas evolution from the surface will physically dislodge oil and dirt. If the bath is to be operated

solely as an electrolytic cleaner, the soap should not be added. The work is made the cathode, and a direct current of 10 to 20 amperes per square foot of cathode area is applied for one to three minutes. A longer time of treatment may be used if required.

Rinsing after the alkaline cleaning must be very thorough to avoid contamination of the chemical treatment baths immediately following. For instance, adherent soap carried over into an acid bath will form an oily layer on the surface of the bath. This oily film contaminates the work as it is being immersed or removed. Steel tanks adequately ventilated are satisfactory for alkaline cleaning solutions.

▶ **Acid Cleaning.** Oxide layers, certain chemical coatings, burned-on drawing and forging lubricants, and other water insoluble or non-emulsifiable substances cannot be removed by solvent or alkaline cleaning. Cleaning in a solution of chromic acid is the preferred method of removing these materials. This acid does not attack magnesium but readily dissolves the oxide and hydroxide which are usually present. To remove burned on graphite-base forming lubricants, calcium or magnesium nitrate is added to the chromic acid solution in the ratio of four ounces per gallon.

## Protective Chemical Treatment

▶ **Chrome-Pickle** (Dow treatment No. 1; BuAer No. AN-M-12 Type 1) is primarily a producer's treatment which is applied to protect parts during shipment and storage. It is used by the consumer, however, where a paint base coating with low electrical resistance is required for bonding purposes. It is also used to remove flux after gas welding. When permitted, the chrome-pickle can be used for touch-up on areas from which the chemical treatment has been removed, as well as for brush application on parts too large to be immersed.

▶ **Dichromate** (Dow treatment No. 7; BuAer No. AN-M-12 Type 3) provides good salt water resistance for all magnesium alloys except Dowmetal M. This treatment effects no appreciable dimensional changes and normally is applied after machining and before painting. Brass, bronze, cadmium plate and steel are unaffected by the dichromate treatment; hence casting and other parts containing bearings, studs, and inserts of these metals may be treated without damage.

▶ **Galvanic Anodize** (Dow treatment No. 9; BuAer No. AN-M-12 Type 4) is used on Dowmetal M instead of the dichromate treatment which is not suitable for this

alloy. It can be used also on other alloys. It causes no appreciable dimensional change and is applied normally after machining operations. The process makes use of the relatively high potential difference existing between magnesium and the steel tank.

▶ **Sealed Chrome-Pickle** (Dow treatment No. 10; BuAer No. AN-M-12 Type 2) is most suitable for wrought alloys. It is an alternate for the dichromate treatment where dimensional loss can be tolerated. The process can be used on Dowmetal M. If magnesium castings are to be treated, they should be given a preliminary dip in a hydrofluoric acid bath.

## Painting

Proper surface preparation and the choice of priming materials are two of the major factors that influence the satisfactory painting of magnesium. Most common paint troubles have their beginning at the point of contact between the primer and metal surface, but finish coats also must be chosen with care. Magnesium parts for aircraft use should be finished in accordance with approved Army and Navy methods for cleaning, chemical treatment, and protective finishing as covered in Army-Navy Specification AN-M-12 and Navy Aeronautical Specification SR-15D.

## Refinishing Procedures

The choice of technique for refinishing magnesium parts and structures will be governed by the size of the article to be refinished. If parts are small enough they can be immersed in a paint stripping bath, chemically treated, and repainted with the original system. The following procedure is recommended for structures too large to be immersed.

If the old finish is exhibiting good adhesion, complete removal is neither necessary nor advisable. The old finish needs only to be sanded, care being taken that the finish is not sanded through to the underlying metal.

Any loose paint should be removed, however, and the metal underneath sanded until bright. If the general condition of the old paint job is poor enough to make complete removal advisable, a good quality paint and varnish remover of the waxless, solvent type may be used. Burning off of the old surface is not recommended. Sandblasting may be used on castings and heavy sections, but should be used with care on thin sheets to avoid distortion. The chrome-pickle (Dow treatment No. 1) should be applied by the 'brush-on' method to all areas of exposed metal. This technique consists of generous application of the following freshly prepared solution:

Sodium Dichromate ( $\text{Na}_2\text{Cr}_2\text{O}_7 \cdot 2\text{H}_2\text{O}$ )	1.5 pounds
Concentrated Nitric Acid (Sp. Gr. 1.42)	1.5 pints

Water.....	to make 1.0 gallon
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The solution should be brushed on, allowed to remain about one-half minute, and then should be thoroughly washed off with running water. Hot water, hot air or some similar method of promoting drying is recommended to speed up the process.





# SUPPLY NEWS

FROM ASO AND SUPPLY DIVISION BUAER

## Wing Flaps Not Interchangeable

Confusion has arisen regarding interchangeability of wing flaps for SB2C-4 and SB2C-5 aircraft because of the release of conflicting information and the similarity of part numbers. ASO advises that none of the flaps is interchangeable between the two planes. The correct part numbers are listed below:

### SB2C-4

Lower Outer 84-08-2001-1 L/R  
Lower Inner 84-08-2001-2 L/R  
Upper Outer 84-08-2001-3 L/R  
Upper Inner 84-08-2001-4 L/R

### SB2C-5

Lower Outer 84-08-2001-100 L/R  
Lower Inner 84-08-2001-200 L/R  
Upper Outer 84-08-2001-300 L/R  
Upper Inner 84-08-2001-400 L/R

The SB2C-5 flaps have a different flap interlock plate and flap interlock plunger; the plunger on the lower outer flap is cable actuated instead of spring locked as in the SB2C-4. These differences are a part of the SB2C-5 Rocket Panel Modification.

## Lacquers for Instrument Dials

General Instrument Overhaul Bulletin #0-1, 31 August 1945, orders discontinuance of use of green luminescent material as markings on aircraft instrument dials and calls for the use of yellow lacquers. Request yellow luminescent lacquers, fluorescent, Spec. AN-L-1A, Type I, s/n R52-L-2000, or radioactive, Spec. AN-L-13a, Type I, s/n R52-L-2500. Do not request green luminescent lacquer, radioactive, Spec. TT-R-58, Grade 22 M, s/n R52-L-3325, which is no longer being procured. Since this material is subject to rapid deterioration, no stocks will be maintained. Request from ASO, allowing about 90 days for delivery.

## Windshield Wipers Semi-Critical

The following windshield wiper assemblies manufactured by Marquette are semi-critical. All activities should use judgment in issuing these assemblies.

Model	Drawing No.	Plane
14V4	K14053	R5C-1
29V10E	K13545E	PB4Y-1
50V7*	K14986	R4D-6,-7
50V29	K15926	same
50V10**	K14993	R5D-2,-4,-5,-6
50V28	K15927	same

\* Superseded by and interchangeable with 50V29.

\*\* Superseded by and interchangeable with 50V28.

## F4U-1,4 Arresting Hook Critical

F4U-1 arresting hook, P/N VS-11900, used on the F4U-4 and for reconditioning of the F4U-10 is highly critical. Salvage wherever possible. Six hundred are still due as B

List material on Contract NOA(s) 2720, and an order has been placed for an additional 750 to be supplied on D List, allocated to ASA OAKLAND; NAS, JACKSONVILLE; and NASD, NORFOLK. This item will remain highly critical for an indefinite period.

## Standard List Issued for Rivets

ASO Circular Letter #136, October 1945, includes a list of recommended rivets for maintenance overhaul. The number of rivets to be carried in the future has been reduced to about 350.

## Termination Inventory for PV-2

Lockheed PV-2 termination inventory has been screened and the following action taken: Lockheed-Burbank: No airframe items available, but eight vendor items accepted, allocated to ASA, OAKLAND. Goodyear-Litchfield Park: 87 airframe items accepted, allocated to NASD, NORFOLK. These include major surfaces such as wing tips, tabs, ailerons, rudders, stabilizers, outer wing panels, and limited number of components of some assemblies. With PV-2 stocks on hand and delivery of the above material, it is estimated that there should be adequate spares to maintain PV-2's for approximately 8,000 plane months of operation.

## Revise Instrument Tool Catalog

Class 88, Section 8810 of ASO Catalog will be distributed soon. This is a second and much more complete edition on Instrument Tools and Test Equipment.

## New Life Jacket Available Soon

ASO has received numerous requests for the new Mk 2 life jacket described in December NANews. This jacket, s/n R37 V-710, is not yet in stock but is on order and should be available in February. There is an adequate supply of the old type AN-V-18 jacket, s/n R37-J-150-75, at most major supply points.

## F8F High Usage Items Increased

High usage of four F8F items has resulted in increase of these spares on order on Contract NOA(s)-4799 as follows: Oil cooler shutter assembly, P/N 55521 L/R, order increased to 117 L/R to be supplied, 5 each L/R per B List effective B List #4 and subsequent. Plate assembly (side exhaust), P/N 55200-1 supersedes trough assembly, 55025-1 and panel, A/N 55200. Order increased to 331 L/R to be supplied, 12 each L/R, effective B List #2 and subsequent. Landing gear door cylinder assembly, P/N 56218, order increased to 602 to be supplied, 22 per B List effective B List #4 and subsequent. Exhaust manifold,

P/N 55334 and P/N 55325, order for each increased to 1502, to be supplied 50 each in B List #3 and subsequent.

## Accessories Work Sheets Ready

Interchangeability and requirements estimating work sheets as listed below have been distributed recently to the field. Others will soon be in publication. If additional copies are needed, write to Materials Identification Division, Technical Group, ASO, PHILADELPHIA.

Auxiliary Power Units—Homelite, Lawrence; Pumps—Chandler Evans Pesco, Thompson Products, Romec; Carburetors—Stromberg, Holly; Magnetos—Edison Splittorf, American Bosch, Scintilla; Generators—Electric Autolite, Leece Neville; Starters—Breeze.

The following work sheets are expected to be issued to the field before long: Goodyear Brakes, Ignition Harness, Andover A.P.U.'s, General Electric Generators, Eclipse Generators, Vickers Pump, Eclipse Pumps, Eclipse Starters, Jack & Heintz Starters. ASO will issue the sheets.

## PUBLICATIONS

The following Flight Safety Bulletins, Aviation Circular Letters, Technical Notes and Technical Orders have been issued since 1 December 1945. Copies are available on request to Publications Division, Bureau of Aeronautics.

### FLIGHT SAFETY BULLETINS

- 19-45 *Defensive Weave Tactics.*
- 20-45 *Slipstream Accidents.*
- 21-45 *Piloting Procedure Following Structural Damage in Flight.*

### AVIATION CIRCULAR LETTERS

- 141-45 *Designation of Combat Types as First and Second Line Aircraft.*
- 142-45 *Aircraft Clocks.*
- 143-45 *Bureau of Aeronautics Standard Airplane Inventory Logs—Disposition of for stricken or salvaged aircraft. (Joint Letter)*
- 144-45 *Jet Propelled Aircraft, Take-off and Landing Instructions for Control Tower Operators.*
- 145-45 *Aircraft Clearance—Filing of Instrument Flight Plans.*
- 146-45 *Log Books—Retention.*
- 147-45 *Outfitting and Replenishment with Aeronautical Material and Equipment of all vessels tending or having Aircraft Assigned.*
- 148-45 *Aircraft Clearance Form 423 (Revised).*
- 149-45 *Airborne Coordinating Group Field Technicians—Activities, Coordination of.*

### TECHNICAL NOTES

- 100-45 *AN/ARC-1 Guard Channel and Main Channel—Elimination of Interference Between.*

### TECHNICAL ORDERS

- 98-45 *One-Man Parachute Rafts, Carbon Monoxide Cylinders for—Charging of.*
- 99-45 *Magneto Low Tension Circuit Filter, Installation of.*
- 100-45 *Lubricating Oil Drain Interval.*
- 101-45 *Elastic Shock Cord, Exerciser Cord, Bungee Rings and Parachute Pack Opening Elastics—Deterioration and Renewal of.*
- 102-45 *Painting of Radomes.*



THIRTY-SIX SPEAKERS MAKE UP UNIT WHICH CAN BE TRAINED TO DIRECT THE SOUNDS

## 'PROJECT POLLY' LULLS JAPS

**Privateers Sold War Bonds from Skies after Psychological Warfare Flights in Italy, Pacific**

A BIG-TAILED Navy *Privateer* droned over bomb-ruined Tokyo a few days after the Japs surrendered. From a king-sized loudspeaker near its tail boomed the strains of some American popular music which probably was 'lost' on the populace below. The piece was "I Surrender Dear."

This was *Project Polly's* initiation to the Japanese campaign, cut short by the surrender. First use of planes to fly over enemy lines dropping leaflets, playing nostalgic music and inviting the foe to quit was in Italy. PV's were used there and later in the Pacific. Because the *Privateer* had more electrical power and could carry the 1500-pound equipment as well as protective armament, the Navy switched to it in the Marshalls and Marianas.

Units consist of an announcing station complete with microphone, wire recorder, amplifiers and loudspeakers. There are 36 individual speakers mounted near the tail. This unit can be trained from the horizontal to almost straight down and 15° fore and aft. Since sound is highly directional, the loudspeakers work best when pointed directly at the "target." The higher the plane, the more area "covered."

*Polly* had enough power to be heard

from 10,000' aloft. The PV's had to fly lower and absorbed some AA fire. Two operators run the unit, which can deliver 2000 watts of audio power to the projector, compared to 2 watts which a console type radio delivers when playing loudly in a living room. Football public address systems have up to 100 watts to make themselves audible.



ANNOUNCER USES LIP MIKE AT AMPLIFIERS

### Ozolid Paper Harmful to Photo Prints

It was discovered recently that exposed and developed Ozolid prints will cause fading and discoloration of ordinary photographs with which they come in contact.

This effect was first noticed under normal storage conditions. Attempting to duplicate the effect, it was found that the action took place within two to 14 days. Photographs used in memorandum reports and other publications should not be placed in contact with Ozolid prints.

### Cumulative Edition of Tech Bulletins

Distribution of a cumulative edition of Photography Technical Bulletins has been made to all photographic activities. The edition includes Bulletins Nos. 1 through 74.

It is believed that this edition will serve as valuable reference material to all photographic establishments. Use of the edition will be enhanced by an alphabetical index of subject matter at the back of the book.

The cumulative edition is bound and punched to fit into the regular Technical Bulletin binder. All previous issues through No. 74 may be destroyed and replaced by the new edition. The balance of the binder may be used for single Bulletins appearing since 1 June 1945.

### Factory-Loaded Gun Camera Magazines

Due to cut-back in pilot training and elimination of film requirements for combat recording, adequate factory-loaded film for gun cameras is now available to meet all needs of the training program. The practice of local loading of gun camera film magazines, which has never proven entirely satisfactory, now is to be discontinued.

All activities concerned are directed to use the following factory-loaded film in 50-foot magazines: Standard stock numbers 18-F-32005 (Speed Group 50) and 19-F-32014 (Speed Group 100). A six-months' supply of the above loaded magazines should be procured from the nearest photographic supply activity listed in Nav-Aer 453 Quarterly Report and Photographic Stock List. Requests should contain usage of corresponding types of film not in magazines and should also reference BuAer letter AER-PH-20-wwc, Serial 302699 dated 16 November 1945.

On hand "in-dated" and "out-dated" film, stock numbers 18-F-32000 and 18-F-32010, is to be returned to the nearest photographic supply activity and the following equipment for loading gun camera film is to be disposed of as obsolete material: Standard stock numbers 18-M-470-200, 18-S-200, 18-T-495-100 and 18-S-1566.

Empty magazines Type A-6 and C, after expending film, will continue to be returned to photographic supply activities as requested in BuAer letter AER-PH-20-wwc, Serial 280265 dated 20 Sept. 1945.



# SERVICE TEST

## INTERIM REPORT DIGEST

**Directional Gyro Indicators.** Two failures of this type F.S.S.C. No. 88-1-970 gyro indicator, located on starboard side of pilot's instrument panel, occurred during 571 hours' operating time. First failure was after 451 hours, and instrument was replaced by another which failed after 119 hours. All connections to and from instruments were correct. Both units failed internally.

Two later failures of the indicator located on the port side of instrument panel were traced to friction caused by chafing of rotor pivot on retainer ring of the bearing. A groove was worn on the ball track of the right hand rotor pivot from lack of lubrication.

### PBY-6A (798 Hours' Test)

**Pilot's Sliding Window Panel.** Panel cracked through the button screw hole along the full length of the panel for third time.



Method of fastening the button to the panel should be changed to avoid stress.

**Hydraulic Leaks.** "Down" line on port actuating cylinder, main landing gear, leaked from chafing with the flex line which connects return valve to the downlock jack. "Up" line on starboard actuating cylinder main landing gear, leaked from strain at bolt swivel coupling on return valve. Rubber diaphragm, P/N 5939, sealing oil chamber from air chamber in five inch hydraulic system accumulator, leaked at high pressure. Both lines and accumulator were replaced.

**Suction Relief Valve Nipple.** Nipple connecting vacuum regulator to engine driven pump was cracked on both engines, third failure. Nipples were replaced, and vacuum relief valve supports were left off to determine if strain put on nipple by supports causes failure.

**Spark Plugs.** Six spark plugs were broken off in removing from cylinders on last 60 hour check. All c34s spark plugs used in these

engines had been installed in accordance with G. E. BULLETIN #49 which calls for cleaning threads of imperfect plugs by threading into a die and cleaning bushings by threading a tap into them before each installation. Continued use of tap and die with resulting loose fit of plugs is believed to contribute to seizing. New plugs installed in the cylinders with original bushings in them were difficult to remove after only 60 hours. Lower threads were half filled with carbon, indicating loose fit of plug. New plugs in new, replaced bushings came out easily and had no carbon deposits.

**Water Tight Landing Gear Seals.** Seals, P/N 511148, on main landing gear have proved very satisfactory during 723 hours with 435 runway landings and 82 water landings. No special precautions have been taken to prevent rust and corrosion in brake area except to replace worn seals. No excessive corrosion has been found.

**Switch Adjustments.** Nose wheel down switch, found defective at 661 hours, had been adjusted too tight at factory and tension caused pivot post to break off. Nose door open switch failed for same reason, tension breaking case and permitting switch to fall apart.

**Directional Gyro.** Fifth failure of gyro, type F.S.S.C. NO. 88-1-920, occurred at 798 hours. All five failures have been caused by rust in left rotor bearing assembly. Rust, which wore groove in rotor pivot, was result of improper lubrication. *Recommend* that more positive means of lubrication for rotor bearings be provided.

**Sperry Auto Pilot.** Bank and climb control unit, type F.S.S.C. NO. 88-4-110, failed 3 times during 798 hours. Connections were checked and found normal. Units failed internally.

**Nose Cowl Cracks.** Nose cowl, port engine, cracked in two different places. Six-inch crack was discovered in lower left part of cowl at 638 hours and three-inch crack in upper right part at 798 hours.

**Brake Hose Lines Chafed.** Flex lines carrying hydraulic fluid to brake assembly in starboard wheel were chafed and torn, by taxiing on water, with wheels down, into submerged manila outhaul lines. Brake lines are located on leading edge of forward strut of side mount assembly. *Recommend* relocation of lines on aft strut.

**Oil Pump Failure.** Main engine oil pressure dropped to 20 lbs. in flight at 104 hours. Aluminum metal particles were found in accessory section oil strainer. Oil pump was removed and found to be wiping. Main engine sump was clean. This is first oil pump failure.

**Brake Liners.** Special brake liners furnished by Ryan factory have operated satisfactorily for 33 hours with slight wear. Life of old type liners averaged 15 hours.

**Exhaust Valve Seat.** Buttress type seat in #6 cylinder carried away at 173 hours, tearing threads out of cylinder and badly damaging piston. New cylinder was installed.

**Fuel Tank Liquidometer Switch.** Fuel was being pumped over the side at the rate of about 60 gallons per hour when operating main engine off droppable tank. Switch in main fuel tank liquidometer failed to cut off fuel when tank became full. *Recommend* investigation of inclusion of a check valve in this system.

**Booster Coil.** Eclipse booster coil for jet unit was not getting current because of loose quick disconnect splice on lead J8A-18 to booster coil from disconnect plug 2085-23 terminal P. Splice was loosened by vibration.

### FR-1 (217 hrs.)

In this interim the 25-hour check on the jet unit was completed. At this time the tail pipe insulation was found to be badly



burned and the tail pipe was replaced. Large cracks were also found in the nozzle diaphragm in three places and a new unit is on order to replace the damaged one. The drain block was bench tested and replaced inasmuch as it did not meet manufacturers specifications.

**Self Sealing Droppable Tank.** Subject tank has now been installed for a total of 143 hours. During this period approximately 20,000 rounds of ammunition were fired and minor damage was done to the tank by ejected shell cases. However tank is still serviceable and tests will continue. *Recommend* flat headed bolts now being used on filler cap cover be replaced with Dzus fasteners in order to expedite serving of this tank.

**Radio Equipment Transceiver.** This unit was found to be gathering moisture from rapid condensation. Traces of carbon residue from 100-octane gasoline were present in both the transceiver and rack connections. Rack was corroded beyond repair. The exact cause is undetermined but a strong

# SCREEN NEWS

belief exists that heat from the jet unit is being drawn back inside the fuselage around the tail pipe and gathering above the forward portion of the jet unit where the radio equipment is located. Rapid changes in temperature causing this condensation are attributed to too small a clearance at the slip joint of the jet unit shroud.

**IFF equipment.** Location of this unit is unsatisfactory because no adjustments can be made in the plane and no positive ground is present. Too, there is insufficient clearance from the right wing fuel line. Removal time now exceeds general specs by twenty minutes.

**Panel Cabling.** This cabling in the starboard jackscrew access panel is becoming chafed due to using improper clamps. These clamps are becoming loose allowing the tubber to drop out and the edges chafing on the cables. All cable in aft section of fuselage shows evidence of chafing.

## PBY-6A (812 Hours' Test)

**Flex Hose Hydraulic Lines.** These lines to the brake assembly on the starboard wheel were damaged last interim when plane was taxied into a submerged line. As a result of this accident it has been decided to relocate the hydraulic lines. Lines which originally followed the leading edge of the forward Vee-strut to the leading edge of the main oleo strut and the forward torque arm to the brake drum were re-routed via the trailing edge of the main oleo strut and the aft torque arm to the brake drum. Since this change in routing the system has operated satisfactorily.

**Port Actuating Cylinder.** The main landing gear developed a leak at the top of the barrel cylinder after 801 hours of operation. Investigation showed that doughnut packing ring seal was damaged. The ring seal was replaced and no further leakage occurred.

**Wrong Screws Puncture Fuel Hose.** Failure of self-sealing fuel hose between the No. 1 and No. 2 fuel cells on a PBY-6A has been traced to the use of AN 52-6-DD1032-14 screws instead of the proper screws, P/N 82-CVC-28W5192, in securing the access door, P/N 82-CVC-2-8W5064. The extra length of the wrong screws was enough to penetrate the hose in two places. Indications were that the screws had not been removed since installation at the factory. Activities operating PBY-6A aircraft should inspect for this condition.

**Let the Paint Dry.** BUER has received a report that paint from life raft oars comes off onto the fabric of the raft itself when the raft is packed. Apparently the paint was not completely dry at the time that the oars were packed. This is the first report of such trouble, and BUER wants RUDMs from any other activities finding the same condition. Major overhaul activities that repaint oars should take steps to insure that their drying period is long enough to prevent deterioration of surface.

**Anti-AWOL** To discourage any tendency for Navy men to go over the hill while waiting for discharge, Bing Crosby and Bob Hope have made this latest film in their long series of "road" pictures:

MN-5075a *Road to Home*—Unclassified, 13 min.

This time Bob and Bing are sailors who have just accumulated the necessary number of points for discharge. When Bob sees a cute young thing swish past he knows he'll never be able to sweat out the separation center. He is all for taking off for home immediately. Bing argues that it naturally takes a bit of time to demobilize over two million men. He reminds Bob of the benefits which he would lose if he should go over the hill, such as mustering-out pay, back pay, insurance coverage, and benefits under the G. I. Bill of Rights.

The film is liberally spiced with scenes from all the Hope-Crosby "road" films. Nearly every line brings some excuse for a flashback to *Road to Morocco*, *Road to Singapore* or even *The Princess and the Pirate*.

**Fire!** Remember the chilling scream of the crash siren at a naval air station? Remember the immediate coordinated activity aimed at getting the crew out safely? In the peacetime Navy safety will be stressed to a greater degree than was ever possible



VB-10 CREW QUENCHES PV FIRE IN ICELAND

under wartime conditions. A new film shows the latest methods for fighting crash fires:

MM-5892 *Crash Fire Rescue* — Unclassified, 23 min.

We are reminded that fire is made up of three elements—fuel, heat and oxygen. One of these must be removed in order to extinguish fire. Three extinguishing agents are used in fighting crash fires: water (either as a solid stream to blast burning gasoline away from the plane or as fog to cool the cockpit area and protect the crew), carbon dioxide and foam.

Various types of nozzle equipment and fire truck equipment are demonstrated. Crash fire rescue crews are constantly reminded that their first duty is the rescue

of personnel. All equipment is designed and used with this in mind. It is pointed out that each crash fire poses different rescue problems, but a film like this will give a clear understanding of the basic problems involved and the best methods of combatting them.

## Other Films Shipped:

- MN-4049 *Plaque Control*—Unclassified, 20 min.
- MN-4370a *Blimp Air-Sea Rescue—Military Blimps* — Restricted, 21 min.
- MN-4360 *The Negro Sailor*—Unclassified, 26 min.
- MN-4330a *Voyage to Recovery*—Unclassified, 30 min.
- MN-5878 *The Navy After the War*—Unclassified, 17 min.
- SN-4394 *Series—SNA—SB2C and 5 Airplane Maintenance*
- SN-4394a *Adjustment of Flaps*—50 frames
- SN-4394c *Introduction to Hydraulic System*—52 frames
- SN-4394d *Checking & Inspecting Hydraulic System*—64 frames
- SN-4394e *Removal & Installation of Fuselage Fuel Tank*—57 frames
- SN-4394g *Removal & Installation of Tail Wheel & Arresting Hook*—57 frames
- SN-4394h *Operation of Surface Control System*—48 frames
- SN-4394j *Removal, Installation & Adjustment of Aileron & Aileron Tabs*—64 frames
- SN-4394j *Removal, Installation & Adjustment of Elevators & Elevator Tabs*—27 frames
- SN-4394k *Removal, Installation & Adjustment of Rudder & Rudder Tabs*—40 frames
- SN-4394l *Operation & Replacement of Flaps*—39 frames
- SN-4394o *Removal & Installation of Quick Change Unit*—51 frames
- SN-4394q *Introduction to the Electrical System*—64 frames
- SN-4394r *Maintenance of Electrical System*—60 frames
- SN-4394t *Operation, Replacement & Adjustment of Slats*—34 frames
- SN-4394u *Loading the Guns*—40 frames
- SN-4394v *Loading the Bomb Racks*—68 frames
- SN-4394w *Operation, Adjustment & Servicing of Landing Gear*—46 frames

**Where to Get 'Em:** Central Aviation Film Libraries and Sub-Libraries are listed below:

## NAVAL

NAMTD, NAS Memphis	NAS Navy #116
CASUs 2, 4, 31, 32 (F)42	NAS Navy #117
ComAirPac	NAS Navy #720
ComAirSubComFwd Area	NATB Pensacola
Hedron TWO	NATB Corpus Christi
NAB Seattle	NATEC Lakehurst Navy #3233
NAMC Philadelphia	TAS, NOB, Norfolk
NATTC Jacksonville	
NAS Atlanta	MARINE
NAS Grosse-Ile	MCAS Miramar
NAS Kodiak	MCAS Cherry Point
NAS New York	MCAS El Centro
NAS Patuxent	MCAS El Toro
NAS Quonset	MCAS Navy #61
NAS San Diego	MCAS Parris Island
NAS Navy #115	MCAS Quantico
	MCAS Santa Barbara



# AVIATION ORDNANCE

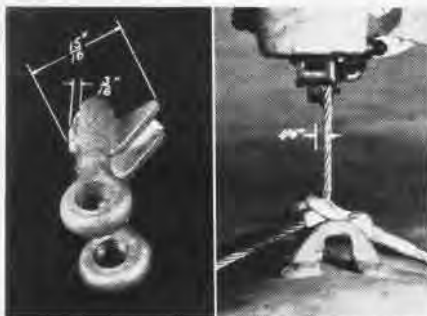
INQUIRIES SHOULD BE ADDRESSED TO THE CHIEF OF BUREAU OF ORDNANCE

## Bomb Hoist Cable Makes Hoisting Sling

Use of a bomb hoist adapter permits the Mk 7 bomb hoist cable to be used as a hoisting sling. This adapter was developed by ComFair West Coast and is recommended by BUREAU OF ORDNANCE.

The adapter consists of a  $\frac{3}{8}$ " shackle to which is welded a piece of half tubing, to prevent the bomb hoist cable from being kinked. (For further information see BuOrd drawing 562470.) Tests conducted with this adapter indicate that seldom will a cable have to be replaced because of wear caused by this device.

To use the adapter, the looped end is placed around the cable with the cable end attached to the adapter by use of a  $\frac{5}{16}$ " toggle pin. The cable is placed around the bomb, forming a hoisting band as shown. Added pressure on the cable at the adapter does not exceed the safety load prescribed for the Mk 7 portable bomb hoist and makes loading and unloading of bombs on Mk 51 racks and Mk 8 shackles easier. With the cable in position for hoisting the



ADAPTER MAKES CABLE INTO HOIST SLING

bomb, the adapter should be off center approximately 1" for ease in latching bomb to rack.

The bomb hoist adapter, Mk 1 Mod 0, has been procured and will be included on future allowance lists. However, it is pointed out that the bomb hoist adapter, Mk 2 Mod 0, shown in the photograph, is preferred to the Mk 1 Mod 0 inasmuch as the latter type can be used for hoisting bombs to Mk 51 type bomb racks.

Also, the Mk 2 Mod 0 adapter has a 1000-lb. capacity, compared to 500 lbs. for the Mk 1 Mod 0 adapter. The Mk 2 Mod 0 will not be procured by BuOrd but it does recommend the device for manufacture and use by interested activities.

## Tie Rods for 20MM AN-M2 Gun Modified

The line section of Central Ordnance, Marine Aircraft Group 41, has suggested a change concerning the 20mm AN-M2 type E aircraft cannon tie rods.

The purpose of the tie rods which extend from the magazine slide group to a flange mounted in the wing of the plane, is to make the magazine slide a stationary group. Another purpose of the tie rods is



TIE RODS MAKE SLIDE GROUP STATIONARY

to allow one to make a clearance of  $1/16$ " between the rack operating lever and the rack roller on the feed mechanisms.

Previous to this modification the adjustment was made on the forward end of the tie rods through the medium of two lock-nuts. The forward end of the tie rods where the adjustment is made is inconveniently located, consequently this necessitates two men in a restricted space.

The proposed modification is the incorporation of two turnbuckles, one on each tie rod. The turnbuckles are located in the middle of the tie rods. This allows one man to make adjustments with ease.

Central Ordnance of Group 41 has constructed two tie rods with the proposed modification and has found them to be satisfactory after conducting varied tests.

## Effectiveness of 20 mm Aircraft Guns

Information from a former combat area has indicated a marked improvement in efficiency and performance of the 20 mm aircraft gun AN-M2. Marine Air Group Twenty Two established an excellent record in combat operations in the Ryukyu area flying the F4U-1C airplane equipped with this weapon.

During the operations 134,877 rounds were fired at enemy targets with 107 stoppages—for an overall combat efficiency of 93.5 percent of rounds fired per rounds loaded, as compared with a training average of 96.6 percent, made under ideal conditions. The air combat operations consisted of air-to-air combat, strafing



F6F EQUIPPED WITH 20 MM AND 50 CALS

missions and close support work in cooperation with the ground forces.

During the period in the Ryukyu area, 14 kills were confirmed, with one probable, including *Tonys*, *Oscars*, *Zekes*, *Vals*, *Sonias* and *Bettys*. With the exception of one airplane, all the enemy planes were flamed and typical comments such as "the plane disintegrated," "large pieces broke off the tail," and "the right wing broke off" are tributes to the firepower of this gun and the HEI projectile.

Effectiveness of the gun in strafing attacks was especially noteworthy. In high steep strafing runs, the divergence and drop was extremely small, enabling pilots to pinpoint the target easily. As expressed by pilots, it was easy to get "right on." Trees and shrubbery, as well as buildings in the immediate vicinity of the target, were ignited readily by the incendiary projectile. Small boats and coastal shipping proved to be extremely vulnerable to 20 mm fire, and AA batteries were observed to be completely knocked out with personnel killed or wounded about the emplacement.

Reports such as received from Marine Air Group Twenty Two are gratifying in view of comparatively recent development and operational use of the weapon. It appears to present an excellent future for greatly increased firepower and reliable performance.

## 500-1000 Lb. Practice Bombs Released

The Mk 65 and 66 practice bombs, weighing 500 and 1000 lbs. respectively, recently were made available for training purposes. These bombs have the same dimensions and modified bomb tails as the corresponding AN standard GP bombs and are consequently expected to more closely approximate the flight characteristics of the AN bombs.

The following type of construction is common to both the Mk 65 and 66: 1. Light case; 2. Two suspension lugs, 14" apart welded to the case; 3. Threaded recesses at the center of gravity for either single or double hoisting; 4. Threaded recesses for trunnions; 5. External attachments are shipped with the tail crate.

Bombs are loaded in a vertical position, nose up, through a nose-filling cap with either sand or water. The Mk 65 and 66 weigh 388 and 834 lbs. respectively, when sand filled and 220 and 474 lbs. when water filled. In addition, the Mk 66 may be loaded in a horizontal position through a side filling opening.

Target marking is accomplished by strapping a Mk 6 Mod 0 practice bomb signal to the tail of these bombs. An arming wire is inserted through the jump out pin and the container of the signal. When released armed, the arming wire is withdrawn and a blank .38 cal. cartridge fires on impact, igniting the black powder in the bomb signal. The cotter pin must not be removed from the practice signal until the arming wire is inserted.

Both the 500 and 1000 lb. bombs are safe for all types of service usage including catapulting, take-off, and arrested landings. Further information on operation and installation is included in OTT AV3-45.

## Ammo Oiler-Calibrator Is New

NAS JACKSONVILLE—Designed to eliminate feed jams occurring as ammo belts entered the feed ramp, a new combination oiler-calibrator has reduced this trouble and increased the number of rounds fired per rounds carried by each plane.

The machine has been constructed so as to be usable in ready magazines where ammunition is stored in quantities to meet daily gunnery requirements. Before ammunition is checked out of the ready magazine each belt is cranked through the calibrating machine and as each round passes it is positioned exactly in the links and brushed with an oily wick. This oiling aids the extractor in withdrawing the ammunition case from the firing chamber of the gun.

The machine is operated by one man who inserts the leading cartridge into the machine and simply cranks the belt



MOBILE AMMO CALIBRATOR IS PRACTICAL

through into a magazine can placed below the truck on which the calibrator is mounted.

► *BuAer Comment*—This machine is useful wherever SB2C's and F4U-1C aircraft are still firing this ammunition. Despite intensive tests and research, 20 mm. ammo must still be oiled or gun won't work. No cost for materials is involved. Entire development shows good appreciation of the problems involved.

## Softer Parachute Seat Cushions

Good news for flying personnel is the replacement of the wartime mohair parachute seat cushions by sponge rubber seats. The new sponge rubber seats are of a design that is even more comfortable than the pre-war variety.

The Naval Aircraft Factory is turning out the sponge cushions at the rate of 6000 per month. This quantity will be augmented by commercial sources. It is hoped that enough sponge cushions will be available to replace mohair cushions now being used by March.

# TECHNICALLY SPEAKING

**P**ILOTS and other operational personnel will find November, 1945 TO's and TN's summarized here. This information as listed here does not relieve pilots and other aviation personnel of responsibility of reading and studying these TO's and TN's in their entirety.

## TO 96-45

Instructions included in this TO deal with the de preservation, maintenance and preservation of all flyable aircraft idle from one month to six months and intended for carrier use or for pool storage. These instructions include only complete aircraft and in no way affect wings, elevators or component assemblies.

This TO is detailed and covers all phases of disassembly, preservation, maintenance and de preservation while specifying definite



Demand Oxygen system. Only BuAer approved standard aviator's breathing oxygen equipment shall be installed in Naval Aircraft. Only exception to this ruling being made for Navy aircraft procured under Army contracts complete with the Army type oxygen systems. *Cancels and supersedes TO 18-44.*

## TN 95-45 (to be read by all VF pilots)

This TN contains a summary of stall and spin characteristics of F4U model aircraft. The flight tests were conducted by the contractor. The results showed that it cannot be emphasized too strongly that either normal or inverted spins in F4U aircraft are dangerous. Recovery is difficult yet possible of course. Voluntary spinning is prohibited in this type aircraft. *Supersedes and cancels TN 54-44.*



## TN 96-45 (to be read by all VF pilots)

Recommendations contained in this TN state that the Navy Standard Back Type parachute or the Navy Quick-Fit Back Type parachute be used by the Radar operator in the F7F airplane. This recommendation is based on tests of various parachute assemblies which were tested extensively in the back seat of the F7F.

## TN 97-45

This TN states that in the areas where severe corrosion of iron plated antennas has occurred, a copper plated type be ordered for replacement. This refers to mast antennas only. *Supersedes and cancels TN 57-45.*

## TN 98-45 (to be read by all pilots)

The error and operational limitation of the G-1 Automatic Pilot used as a flight instrument is dealt with by this TN. Because this error occurs as an error in indication after a maneuver in which the airplane has banked in excess of 45° this same error will not affect the use of the automatic pilot for flight control inasmuch as plane is flown within banking limits of 30° when on automatic pilot.

## TN 99-45 (to be read by all pilots)

Deals with covers for pitot static tubes. These tubes should be covered at all times when airplane is not flying. Dirt and dust find their way into a pitot tube with little trouble and only alert and preventive maintenance will save the pilot embarrassing moments in the air. Cover them!

## T.O. & T.N. Quiz



ALL NAVAL and Marine aviators should be able to turn in perfect scores on this quiz if they have completed their required reading in BuAer TO's and TN's for November.

- 1 Why is it mandatory that pitot and pitot static tubes be protected from moisture?
- 2 Can more than one crew member breath from a single oxygen cylinder?
- 3 In F4U aircraft what happens to a spin under light load conditions?
- 4 What is average number of recovery turns required in an F4U after a four-turn spin?
- 5 What is the maximum degree of bank at which automatic pilot bank and climb instrument may be used as flight instrument?

(Answers on page 40)

processes and giving complete breakdown data for all sections of the aircraft. *This TO supersedes and cancels Aeronautical Specification SR-148.*

## TO 97-45 (to be read by all pilots)

The information contained in this TO deals with flight information on the Diluter

# DON'T BE A DILBERT



DD can mean destroyer or Dead Dilbert  
Save the Headache. Read TO's and TN's

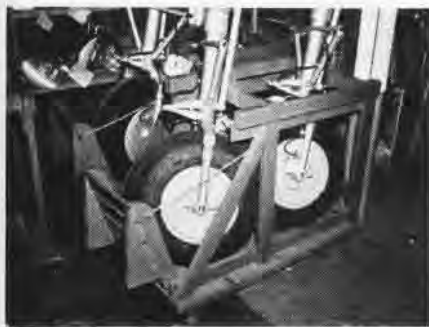


# LATEST BULLETINS ENGINE, AUXILIARY POWER PLANT, ACCESSORY, PROPELLER Dated 1 January 1946

ENGINE	BULLETIN	DATE	SUBJECT	EXPLANATION
<b>PRATT &amp; WHITNEY</b>				
R-985	—	—	—	—
R-1340	—	—	—	—
R-1830	403	12-6-45	Supercharger Clutches—Periodic Shifting and Flushing of	Increases allowable pressure for flushing clutches and to insure proper clutch operation
	Rev. 1	—	—	—
	425	11-16-45	Fuel Feed Valve Assembly & Related Parts	Incorporates recent modifications, clarify existing instructions and include R-2800 "C" Series Engines
	Rev. 1	—	—	—
	442	11-30-45	Adapter-Accessory Drive Shaft	Provides information on galled accessory drive shaft adapters
	445	11-27-45	Harness, Ignition Cast Type—Mounting of	Provides method for aligning the subject harness on the engine
	446	11-30-45	Spark Plug Bushing Holes—Rework of	Provides information on cracks in inner end of spark plug bushing
R-2000	101	12-6-45	Supercharger Clutches—Periodic Shifting and Flushing of	Increases allowable pressure for flushing clutches and to insure proper clutch operation
	Rev. 1	—	—	—
	118	11-16-45	Fuel Feed Valve Assembly & Related Parts	Incorporates recent modifications, clarifies existing instructions and includes R-2800 "C" Series Engines
	Rev. 1	—	—	—
	129	11-27-45	Harness, Ignition Cast Type—Mounting of	Provides a method for aligning harness on engine
R-2800	55	12-10-45	Double Threaded Crankshaft Bolts—Plating of	Authorizes tin plating of applicable crankshaft bolts
	Supp. 2	—	—	—
	89	11-30-45	Crankshaft, Secondary Counterbalances—Propeller Shaft & Related Parts—Rework of	Provides additional information
	Rev. 1	—	—	—
	120	11-21-45	Water Injection Equipment for Combat Power Used with P.&W R-2800 engines	Provides information on pipe plugs in clutch selector valve
	Supp. 1	—	—	—
	180	11-16-45	Fuel Feed Valve Housing and Spring Corrosion Prevention	Incorporates information on current anti-corrosion measures
	Rev. 1	—	—	—
	195	12-10-45	Crankshaft Bolts—Use of Improved Design	Prevents crankshaft bolt lock failures, identifies acceptable and unacceptable type locks
	Rev. 1	—	—	—
	198	11-16-45	Springs—Fuel Feed Valve	Provides for a nominal fuel pressure of ten pounds at discharge nozzle to improve performance at high altitude
	206	12-6-45	Supercharger Clutches—Periodic Shifting and Flushing of	Increases allowable pressure for flushing clutches to insure proper clutch operation
	211	11-4-45	Impeller Thrust Plates—Change in Design of to Prevent Improper Installation	Corrects application of original bulletin
	Supp. 1	—	—	—
	214	11-16-45	Fuel Feed Valve Assembly & Related Parts	Incorporates recent modifications, clarifies existing instructions and includes R-2800 "C" Series Engines
	Rev. 1	—	—	—
	239	11-16-45	Intermediate Rear Cases	Provides information on new type intermediate rear cases
	234	11-16-45	Flexible Lines for Water Injection Equipment Installed on Pratt and Whitney R-2800-8W, -10W, -18W engines—Manufacturing of	Furnishes instructions for local manufacture and installation of subject lines
R-2800	261	11-28-45	Hydraulic Coupling—Rework of	Improves lubrication and reduces possibility of bleed holes becoming fouled or clogged with sludge
R-4360	3	11-28-45	Valve Clearance—Information and Change of	Informs activities of the change in valve clearance and applicable engines
	4	11-23-45	Plug, Accessory Housing—Replacement of	Prevents high oil pressures with corresponding high oil flows in accessory drive case
	7	11-29-45	Springs and Seals, Fuel Feed Valve—Replacement of	Describes change in fuel feed valve springs and seals
	9	11-23-45	Crankshaft Front Plug	Prevent possible loosening of crankshaft front plug
	10	11-28-45	Diffuser Seals—Replacement of	Provides a more satisfactory diffuser seal
	12	11-21-45	Screws, Hydraulic Coupling Cover	Provides for shorter hydraulic coupling cover screws
<b>WRIGHT</b>				
R-1820	386	12-7-45	Shipping Box Assemblies, Engine—Description and Part Number Data of	Insures that all removable parts of shipping boxes are properly utilized and prevents shipping damage to engines because of improper packing
	Rev. 1	—	—	—
	397	11-28-45	Oil Pressure Relief Valve—Acceptable Types	Provides information on acceptable type oil pressure relief valve designs
R-2600	166	11-28-45	Deflectors—Rear Cylinder, Air—Incorporation of Buffer Button	Prevents interference between air cylinder deflector and cylinder head fins
R-2600	179	12-7-45	Shipping Box Assemblies, Engine—Description and Part No. Data of	Insures that shipping boxes are properly utilized and prevents shipping damage to engines
	Rev. 1	—	—	—
	182	12-5-45	Cover, Governor Adapter—Machining and Assembly of	Eliminates oil leakage
	183	11-28-45	Oil Pressure Relief Valve—Acceptable Types	Provides information on acceptable type oil pressure relief valve designs
	184	11-28-45	Carburetor, Stromberg Injection, Models PR-48A1, PR-48A3, PR-58A1 and PR-58A3 for Incorporating No. 43 Poppet	Eliminates possibility of leaning out in case of ruptured poppet valve diaphragm
R-3350	30	12-7-45	Shipping Box Assemblies, Engine—Description and Part No. Data of	Insures that shipping boxes are properly utilized and prevents shipping damage to engines
	31	11-28-45	Oil Pressure Relief Valve—Acceptable Types	Provides information on acceptable type oil pressure relief valve designs
<b>GENERAL ENGINE BULLETINS</b>				
	85	11-16-45	Stromberg Injection Carburetor—Checking Air Section for Leakage of	Eliminates the difficulties encountered on an engine if air section of carburetor leaks
<b>POWER PLANT ACCESSORY BULLETINS</b>				
	57-45	10-16-45	Fuel Pumps, d-32	Advises activities that only Chandler-Evans, Thompson Products, and Pesco Products engine-driven fuel pumps are to be installed in Naval Aircraft
	58-45	10-26-45	Air System Accessories, e-11	Prevents failure of coupling assembly, P/N 207-16D, installed in Pesco Models 3P-207-JA vacuum pumps
	59-45	11-1-45	Miscellaneous Accessories, f-22	Prevents malfunction of hydromatic propeller feathering systems
<b>MISCELLANEOUS</b>				
<b>Aeroproducts Propeller Bulletin</b>				
	1	11-28-45	Aeroproducts Propellers—Overhaul Period for	Establishes and qualifies permissible time between routine overhauls
<b>General Propeller</b>				
	14	10-25-45	Camfield Test Club Blades—Selection of	Permits proper matching of Camfield test club blades

### Landing Gear Dolly Finds Favor

NAS CORPUS CHRISTI—The handling of SNB landing gear assemblies has been facilitated by development of a wooden dolly mounted on rollers. This dolly has



WOODEN DOLLY PROVIDES GEAR STORAGE

a hinged gate at one end. Lowering the gate will provide an incline to roll the gears onto the dolly. By rolling one gear into dolly and placing a wooden separator in position a definite compartment is provided. Another complete gear then can be rolled on and the gate raised. It is secured by a chain.

Use of this dolly permits handling of gears in sets and makes storage in a minimum amount of space possible.

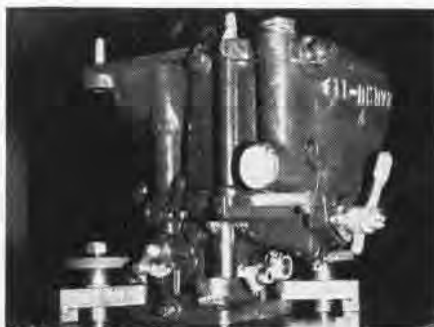
Previous to this development gears were allowed to lie on deck, thus creating the possibility of damage from personnel or moving objects.

Developed under the Navy Employees' Suggestion Program this dolly has reduced delivery time for a set of gears from about thirty minutes to five minutes and has resulted in an estimated annual saving of \$1500.

[DESIGNED BY DENNIS BROWN]

### Carburetor Jig Saves on Time

NAS PENSACOLA—A machinist at this station has developed a jig that provides a fast and efficient method of securing carburetors while removing or



JIG HOLDS CARBURETOR DURING REPAIR

installing fittings. Use of a vise often damages parts, as a moderate pressure on the throttle valve body prevents it from closing properly.

One man can perform work formerly requiring two men. Base of the jig, made of boiler plate, supports four dowel pins spaced to fit four holes in top of the carburetor. Two studs opposite each other and threaded for heavy knurled nuts are anchored to the base.

Two clamps swivel on the studs and fit the spotfaced portion of the carburetor. Compression springs are placed on the studs under the clamps to raise them and self-locking fiber nuts are placed over the knurled nuts to prevent them from running off. One turn of the speed nuts will tighten or loosen the clamps on the carburetor.

## BEST ANSWERS

### Thinking of Regular Navy?

PICK THE BEST choice to complete the statements below, then check your answers on page 40.

- Officers selected for transfer will
  - a—be assured of maintaining their present rank in the permanent appointment
  - b—be given the rank in which they were originally commissioned in the Navy
  - c—be given a rank determined by authorized strength of the Navy and number required in each rank of the postwar Navy as determined by Congress
  - d—be assigned a rank to be determined after all graduates of the Naval Academy have been assigned permanent rank
- In regard to transfer of Reserve Officers to the Regular Navy, it is true that—
  - a—Officers selected will be on equal footing with their contemporaries now in the Regular service
  - b—those now in the Regular service will be given preference for sea duty billets
  - c—Naval Academy graduates will be given first consideration for promotion and assignment
  - d—only those Officers who need no further training will be selected
- A reserve or Temporary USN Officer who has submitted an application for transfer to the Regular Navy—
  - a—may not withdraw his application prior to acceptance or refusal of permanent appointment
  - b—may not, if accepted, resign for any reason other than physical disability
  - c—may, if accepted, automatically resign by 1 January 1947
  - d—may resign at any time at the pleasure of the Secretary of the Navy
- Retiring Officers are entitled to three-fourths of the base pay plus longevity for their rank, if they—
  - a—have reached the statutory age limit of 60
  - b—have served twenty-five years in the Naval Service
  - c—are being retired for disability incurred in the Service
  - d—are below the rank of Lt. Comdr. on retirement

Succeeds List of 1 December 1945

1 January 1946

#### LIST OF NUMBER AND DATE OF LATEST ISSUE OF AIRCRAFT SERVICE CHANGES AND BULLETINS

Airplane	Bulletin	Date	Change	Date
F6F.....	131	11-29-45	94	9-29-45
F4U-F3A-FG.....	258	12-7-45	236	12-10-45
F7F.....	28	11-6-45	28	11-28-45
F8F.....	5	12-7-45	3	11-27-45
FR.....	11	11-7-45	5	12-10-45
GH-NH.....	13	12-13-45	22	6-15-45
PV.....	174	11-27-45	182	11-14-45
PBM.....	158	12-7-45	178	12-10-45
PBY.....	137	11-15-45	187	10-19-45
PB2Y.....	74	10-19-45	156	8-9-45
PB4Y.....	209	11-21-45	180	12-7-45
R5C.....	68	11-21-45	155	12-13-45
R4D.....	52	10-31-45	48	10-3-45
R5D.....	83	11-1-45	138	10-15-45
RY.....	85	11-27-45	32	12-7-45
SB2C-SBF-SBW.....	228	11-14-45	153	9-19-45
SC.....	95	11-27-45	46	12-10-45
TBF-TBM.....	217	11-28-45	247	12-5-45
TBY.....	19	10-15-45	6	10-26-45

For complete list of Aircraft Service Changes and Bulletins, see Naval Aeronautics Publications Index, NavAer 00-500 and supplement 00-500A.



# LETTERS

SIRS:

Horrors and shades of John Paul Jones. I didn't believe it could happen, especially in NAVAL AVIATION NEWS. On Page 11 of the December issue there is a swell shot of a plane in the groove for the deck of the *Ranger*. It is an excellent picture and so realistic it gave me that old feeling but how could you call it an F6F?

The cowl flaps are the tipoff and besides who would have taken the picture if it were a *Hellcat*? A gremlin no doubt.



If you check again, I think you'll find that it is a TBM-3D.

That was a "stomp down" good issue and seems that the "mag" gets better all the time. We have a little trouble getting it and I was wondering if it is possible to mail copies to individuals. I can't think of a better way to keep up with the latest dope, besides being darned interesting reading.

L. M. MEANS, ARM 2C

V-5, Wooster College  
Wooster, Ohio

¶ Inspection by BUAER experts corroborates NANews' statement that the plane was an F6F. The picture was taken with a movie camera behind the pilot's head in a modified cockpit installation. NANews cannot send copies to individuals because transfers come too fast but it can increase total copies to an activity if requested.

Sms:

In keeping with your policy of giving a word of praise to the deserving, you will be interested, I am sure, in an opinion picked up in an interview recently.

Lieut. Comdr. Rollo G. Russell was describing his 42 months as a ferry pilot. He has flown almost a million miles, delivered 400 planes, added 4500 Navy flight hours to his civilian 2000, has never scratched an airplane and has been commended by the Secretary of the Navy for outstanding performance of duty in the safe and expeditious delivery of aircraft.

In describing his 200 trips from coast to coast, Lieut. Comdr. Russell said, "I think Navy maintenance is tops. I have great faith in those boys on the line. I've never had to jump out of a plane, never had one quit and I've always been able to make my scheduled stops."

I thought this was a great tribute to the little-publicized, hard-working enlisted men of the Air Ferry Wing of the Naval Air Transport Service.

E. C. SCULLY, LIEUT. COMDR. USNR  
VRF-1

SIRS:

I believe that I can match the "whopper" appearing in the August 1 issue of NAVAL AVIATION NEWS, and the enclosed picture should prove me correct. It was run down by a 24-foot boat, and while partially stunned a rope was tied around its tail and one of the boys cut its throat with a belt knife.

The ensuing struggle lasted several minutes and the whale would have won, but due to loss of blood the battle soon was over. While towing it back to the pier the other fish in the vicinity (mostly sea bass) were attracted by the blood, and a very nice string were caught using a bone gig.



The whale measured 14 feet, was coal black and evidently a specie of what is called a killer whale.

It was run down off the southern tip of San Clemente island while minding its own business.

ROBERT CORDES, AMM2C  
NAAS SAN CLEMENTE



**The Cover** The LSO has just given the cut to an F4U pilot landing on the USS *Midway*, CVB 41. LSO is Lt. Comdr. J. E. "Windmill" Thomas, with two years of Pacific duty, and one of highest LSO records

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## ANSWERS TO QUIZZES

### ● GRAMPAW'S QUIZ (p. 14)

1. Either continue flight by altering course so that *minimum weather for CFR* will be met, or land at the nearest airport permitting contact flight. If *currently* qualified to proceed on instruments, an IFR clearance may be obtained in flight. Ref: CAR 60.470.
2. Bail out. Ref: Par.4 (g) of *Flight Safety Bulletin* 10-45.
3. True. Ref: ACL 144-45.
4. (a) Day—10,000 ft. (b) Night—5,000 feet. Ref: T.O. 95-45.
5. "On" or "Normal Oxygen" position, except whenever the presence of excessive CO or other noxious or irritating gas is present or suspected. Then, regardless of the altitude, the valve shall be set at "Off" or "100% Oxygen" until danger is passed. Ref. T.O. 95-45.

### ● BEST ANSWERS (p. 39)

1. c 2. a 3. c 4. c

### ● RECOGNITION QUIZ (Back Cover)

1. P-80 2. F8F 3. Spiteful 4. Firebrand 5. Warwick 6. F7F 7. FR 8. C-69 9. YAK-9 10. LA-5

### ● T. O. & T. N. QUIZZ (p. 37)

1. To prevent moisture and bad instrument readings. 2. Yes. 3. Tends to flatten out. 4. 1½ turns. 5. 45°



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# *BUTCH of the MONTH*

**To Numerous Line Chiefs and  
Inspectors NAS Navy #40000**

## *The ORDER of the PASSING BUCK*



### **Nut Tighteners & Wrench Twisters Earn this Award**

**H**ERE'S one awarded to all hands for sheer and unadulterated buck passing. No conspicuous gallantry here. Just a conspicuous waste of time.

Engines being returned for overhaul when all that actually was needed were minor adjustments easily made on the airplane, do not make for efficiency. As witness the case of an engine recently returned to

overhaul. A hasty decision to change engines without being absolutely certain of the causes of malfunctioning means huge waste of time, money and effort. Don't be passing that sort of buck! These men did not know and were too proud to ask. So this month's award lands on their not so proud chests. Members of Award Boards are hopeful that these awards are the last.



**RECOGNITION QUIZ**

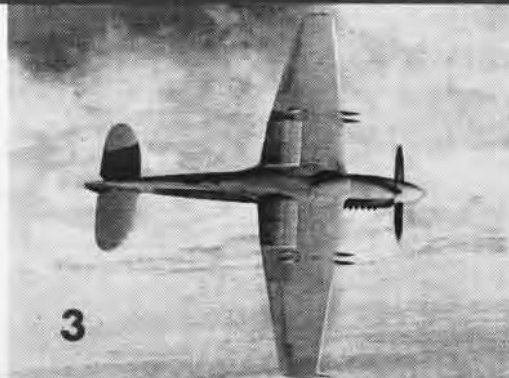
**AMERICAN, BRITISH AND RUSSIAN AIRCRAFT**



1



2



3



4



5



6



7



8



9



10