NAVAL AVIATION NEWS

Guam—A P.I. Study
Blast Survival
Fatigue Failure

Dec. 15, 1944
RESTRICTED

A "GIFT" FOR ANY SEASON

From one friend

AA GUNNER

to another

PILOT

IF you fail to — **Identify**

WHEN APPROACHING FRIENDLY SHIPS!

GUAM INSTALLATIONS

As our forces in the Pacific move closer to the heart of the Jap Empire we learn more and more about the nature of the enemy, the way he fights and the equipment he uses. As we capture new Jap-held bases we are able to study and photograph his installations and arrive at important conclusions as to his methods of military defense. Photo interpreters whose job it is to get as much miltiary information as possible from photographs of enemy territory and activity have found that defense installations follow certain definite patterns, and that these patterns recur in Jap bases in various parts of the Pacific theater. It is highly important that pilots and their crews who fly the bombing attacks against these enemy bases become familiar with these patterns and able to recognize typical installations from the air. Guam offered the Japs every opportunity for favorable fortification against attack. In the north half of the island every seaward approach is obstructed by cliffs 300 to 600 feet high. There are no harbors and shallow bays are filled with reefs.

The south half of the island has the large harbor of Apra and several minor harbors, but there are the same hazards involved in passage over the reefs. The beaches are obstructed by reef-shelf varying in width from 20 to 1,000 yards. Besides the cliffs surrounding possible landing beaches,, a ridge running across the waist of the island offered primary defense positions. But the Japs were unable to hold this base, equidistant from Yokohama, Formosa, Manila and Port Moresby.

Boat obstacles at Ylig Bay, Guam, photographed at low tide, show the varied use to which the Japs put local materials to build barricades against attack. Coconut logs weighted by coral and stones form pyramids which are mostly covered by water at high tide

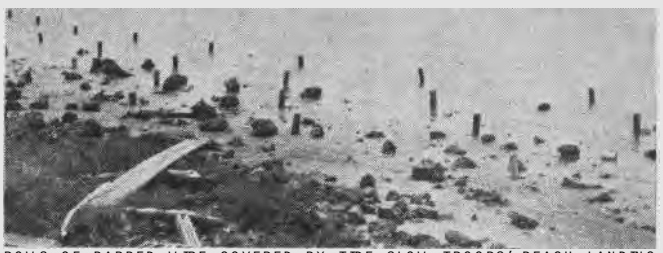
BARRICADES

PHOTOGRAPHS on this page show the variety of different ways the Japanese have found to make use of simple natural materials to build barricade defenses on their island fortresses in the Pacific. Landing boats must run the gauntlet of boat obstacles made of coral and stone piled inside logs and other types of under-water barriers built of coconut logs weighted down by coral to give added strength.

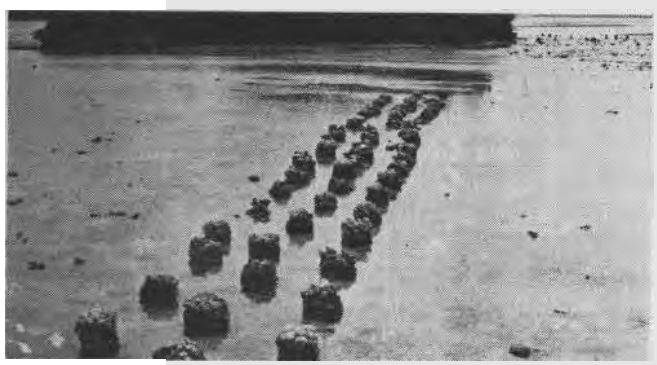
Once inside these boat obstacles, landing troops still must make their way through rows of barbed wire arranged to slow up landing and direct troops toward positions heavily protected by machine gun and rifle fire. Zig-zag lines of barbed wire supported on short sticks just above the ground are hidden in the low underbrush to impede progress. Sharpened bamboo sticks projecting from the ground add to the effectiveness of this type barricade.

Interpretation of pre-invasion photographs has made it possible for allied bombers to blast a path through natural and man-made obstacles with. which the Japs have surrounded their island fortresses, greatly lessening loss of life.

COCONUT LOGS FORM TANK BARRIER WITH LOW SHRUBS FOR CAMOUFLAGE



ROWS OF BARBED WIRE COVERED BY TIDE SLOW TROOPS' BEACH LANDING



ROWS OF CORAL AND STONES IN SHALLOW WATERS IMPEDE LANDING BOATS

BARBED WIRE INTERSPERSED WITH SHARP BAMBOO STICKS SLOWS TROOPS

Concrete strong point at roadside has open slots for firing against troops on the road. Concrete is reinforced to protect snipers

View Of strong point on Dadi Beach shows large cave dug into rock and covered artillery emplacements formed with concrete

STRONG POINTS

IN ANY attack against a Jap-held island fortress the enemy has the advantage of shelter offered by carefully prepared foxholes, pillboxes and strong points of various types. He has expected invasion and has prepared a system of barricades, trenches and tank ditches designed to slow down the American invader, while Jap snipers and machine gunners harass him from well-defended positions. It costs many American lives to crack through natural and man-made obstacles to tackle and overwhelm strongholds of AA and machine gun positions and exterminate the enemy.

On Guam the Japs applied careful planning and workmanship to building a series of strong points protecting possible landing beaches. Pictures on this page show conversion of Adetegan Point into a highly fortified defense position. A large cave with a 30-foot diameter had been dug into the rock and covered artillery emplacements adjacent built of stone and concrete blend with the surrounding rock. An underground trench served as communication between gun emplacements and the cave used as barracks.

VIEW OF **PILLBOX** AND THREE GUN POSITIONS OF MASONRY BLENDED WITH CLIFF: LARGE CAVE DUG IN ROCK COVERS ARTILLERY AND SERVES AS QUARTERS

U. S. Marine stands beside a 25 mm. high velocity AA gun captured from Japs on Guam. Position is partly hidden by crude revetment

Jap 4.7" gun near coast east of Agana. Japs have tried to make scarred earth less conspicuous by palm fronds. Note ammo storage

GUN POSITIONS

THERE were no fixed defenses and no mobile artillery at Guam when the Japanese occupied the island. Prior to 1922, when Guam was disarmed in accordance with the Washington Naval. Treaty, Apra Harbor was defended by six 6-inch guns, but after this time the only defenses of the island consisted of two 3-inch antiaircraft guns of obsolete design on the USS Penguin, which was sunk off Orote Point to prevent capture. The USS Barnes, also at anchor in Apra Harbor, had two 50-caliber antiaircraft machine guns.

But as soon as the Tans moved in thev began strenuous defense of the island to bring its strength to a level commensurate with its size and importance as an air base dominating: the lines of communication between the Empire in the north and the Mandates and the south Pacific area.

Although as large as all the other Marianas combined, Guam never was fortified to the extent that Saipan and Tinian were, but rapid progress was made by the enemy between 10 December 1941 when they occupied the island and the day of its recapture by American forces. The entire civilian population was at once evacuated from Sumay and the Orote Peninsula, and defenses were concentrated in this area including a new airfield.

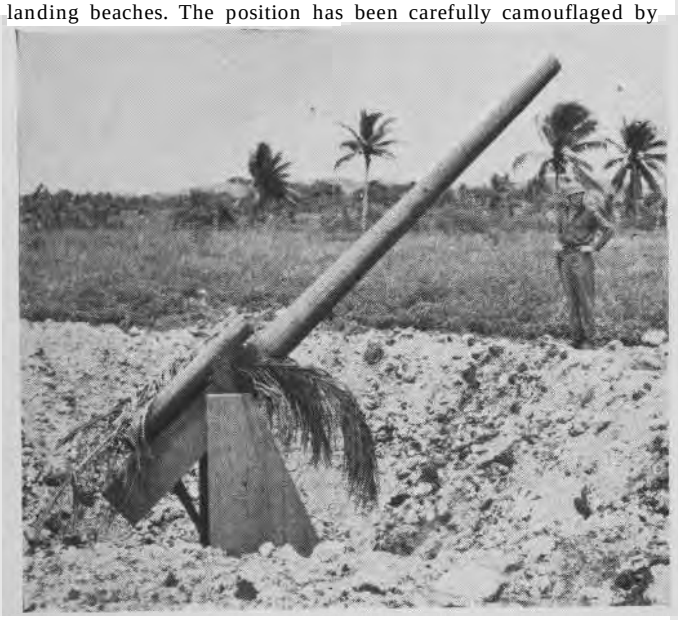
Fairly continuous reefs, few good beaches or bays offered excellent natural hazards for any attack on the island and extensive coastal cliffs offered excellent positions for protecting guns. Two such positions are shown in the group of photographs on this and the following page. These are short 20 cm. guns in camouflaged positions.

The reinforced concrete shelter of the gun opposite has been made to blend into the surrounding terrain, while the position below, dug into the side of the coastal cliff, has been camouflaged with branches and straw matting hung from the beams. Evidence that the Japs wished to conceal their strength are the dummy guns opposite-one in a bomb crater, the other in an old U.S. gun emplacement.

Straw sand bags reinforce revetment of this 25 mm. AA gun at edge of Agana airfield. Shell clips rest in framed enclosure, right

Position for 20 cm. gun dug into side of cliff overlooks Agana Bay. From camouflaged positions such as this Japs harassed invaders

This short 20 cm. gun emplaced at Asan Point covered one of the landing beaches. The position has been carefully camouflaged by Japs to look like part of rocky point, and reinforced concrete protecting gun is hardly distinguishable from surroundings



Dummy gun with barrel of canvas-covered wood painted grey was one of four placed by Japs in bomb craters near Agana airfield

This dummy gun was installed on old U.S. emplacement overlooking the sea. Japs take great pains to confuse estimates of strength

Marine holds up canvas cover of ammunition rack built into side of earth-covered revetment for 4.7" gun. Note log reinforcement

Japanese stores consisting of food, candy and rice wine were found on Guam stacked in crates under protection of wooded areas

STORAGE

ONE OF the most important secrets to know about the enemv is where he keeps his vital war supplies and what these supply dumps or areas look like from the air. In some cases' supplies are stacked in piles in a central transportation point from which they are distributed, or they -may be hidden from view under the protection of wooded areas or coconut groves.

Explosive materials usually are given extra protection of heavily reinforced concrete' structures or even caves dug into sides of hills. Guam offered excellent sites for this type underground storage, and one of these storage caves dug deep in a hillside is illustrated below. Even ready ammunition supplies were given the protection of earth covering, shells being stored on wooden racks built into the sides of revetments around gun positions. These revetments were reinforced with coconut logs and stones and the mounds of earth camouflaged with palm fronds.

Supplies of a nonexplosive non-combustible nature were found stacked in crates under protection of wooded areas. In the photo at right above: Marines are investigating crates of food, candy, and rice wine found on Guam. One of the important functions of photo interpreters in their analysis of aerial reconnaissance photos is spotting Jap supply dumps which are number one targets in a bombing attack.

ENTRANCE TO CAVES FOR JAP SUPPLY STORAGE IS MARKED BY CONCRETE-LINED TUNNEL AT FOOT OF GUAM HILLSIDE. VITAL STORES WERE INSIDE

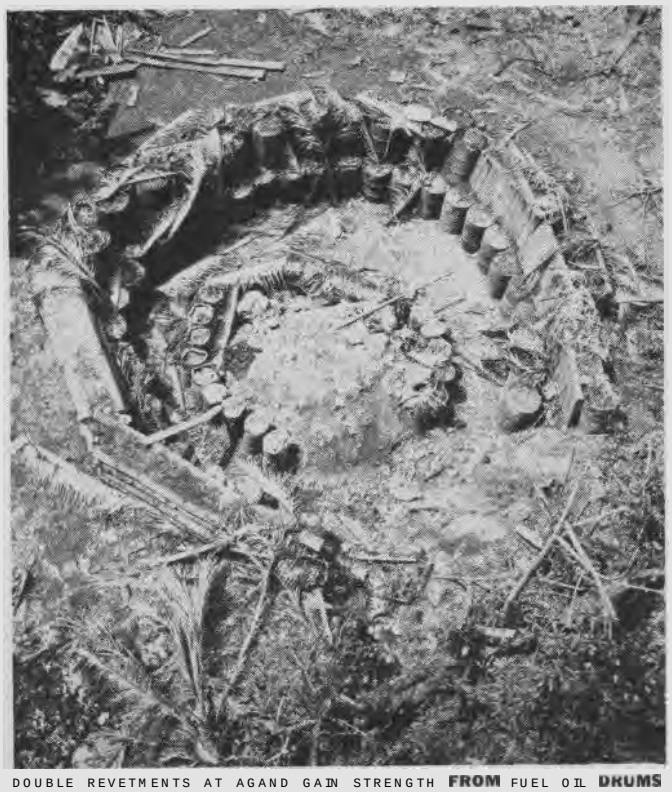
Palm fronds laid across bamboo sticks camouflage a slit personnel trench that connected a gun emplacement with an ammunition storage dump on Guam. The hilly terrain of the island offered many sites from which the Japs could defend themselves favorably

REVETMENTS

BEFORE an attack is launched against the enemy we must know where to expect the greatest opposition, where he has built his strongest defenses and gun positions. Reconnaissance photographs can supply this vital information, but even though interpreters may point out enemy installations in a report on the area, it is up to pilots and bombardiers to be familiar enough with the appearance of these installations to recognize them at the crucial moment.

It usually is fairly easy to recognize gun positions from the air and in photographs, as their revetments make a distinctive pattern and are arranged in a definite relation to one another. Even though these positions may be camouflaged, the scarred earth of the revetments and the shadows which they throw make them conspicuous to the observer.

Evidence that the Japs had devoted a great deal of time and care to their defenses of Guam is the construction of revetments shown on this page. In the case of the double revetment at Agano airfield an outer ring of two rows of coconut logs filled wtih earth and crushed stone is backed up by an inner ring of fuel drums also filled. In the case of the roadside defense position, a concrete crenellation with slots for firing rests on top of fuel drums firmly embedded in the earth. These positions were tucked away among the foliage, adding to the difficulties of our attacking forces.



DOUBLE REVETMENTS AT AGAND GAIN STRENGTH **FROM** FUEL OIL **DRUMS**

CONCRETE GUN **CRENELLATION** RESTS ON DRUMS IN ROADSIDE **POSITION**

GRAMPAW PETTIBONE

Hold Your Fire

During the course of a regular gunnery practice, the pilot of the tow plane flew beyond the range limits. The accompanying fighter pilots, apparently engrossed in their practice, failed to notice that they were out of the prescribed area. As a result, the government received a claim for damage to private property caused by bullets fired from one of these planes.

Grampaw Pettibone says:

It was just dumb luck that no one was killed in this case. There were people very close to where those bullets struck.

Granted, it is up to the tow pilot to stay within the boundaries of the firing range, but nothing he does ever excuses the pilot of the attacking plane from firing on a foul range. Remember, the man who fires the gun is responsible for where the bullets go.

Carelessness-Enemy of Old Age

An enlisted man detailed to check gasoline pits was struck by the propeller of an SNB which was returning to the parking area, BECAUSE:

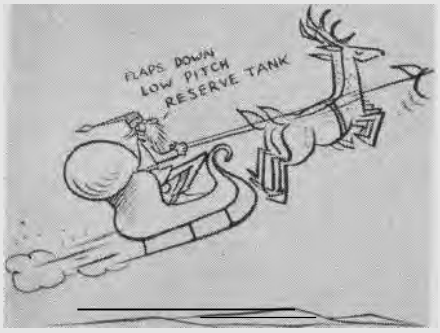
1. He failed to keep a lookout while on a busy taxiway.
2. The pilot failed to insure that the taxiway was clear, and also failed to comply with the station order requiring a wingman on all planes being taxied in congested areas.
3. The crewman in the co-pilot's seat did not keep a sharp lookout on his side. (Pilots should insure that anyone sitting in that seat is fully aware of his lookout responsibilities.)
4. The wingman assigned to guide the plane left his station before the aircraft was safely out of the congested area.

Comment-Any one of these men could have prevented this fatality by proper performance of duty. Safety regulations mean nothing unless they are enforced.

The Instructor Who Wasn't There

While practicing acrobatics, an instructor flying from the rear seat, promised to show his student something new after they had completed several snap rolls. He certainly did!

At approximately 4,000 feet, the instructor started a right slow roll, during which he *fell* out. The plane went into a spin. The student thought it was part



of the course and did nothing until he saw the plane heading for the pilot's blossoming 'chute. Then he took the controls and levelled off at 800 feet.

Here is the instructor's description of what occurred: "It happened so quickly that I was unable to catch anything to try to keep from falling. After pulling the rip cord, I looked up to see the plane coming toward me-right on me. My 'chute was just starting to open. The leading edge of the wing hit my shroud cords and jerked me around severely, even to the extent of jerking my helmet off, jerking the 'chute shoulder straps down below my waist and ripping my pants off. My leg straps went down below mv knees and I descended hanging by'my knees until I reached up and grabbed the straps leading to the shroud lines and hooked my arms through. Just before reaching the ground, I pulled myself up as best I could and lit in a sitting position with my knees up.

"The plane was equipped with narrow belts and shoulder straps. I don't know when the belt opened. I usually check my belt after any snap maneuver and assume that I did so on this occasion."

Investigation showed the leg straps were too long, owing to' improper adjustment. At the hospital, it was found the pilot suffered four broken vertebrae.

As a result of this accident. two training bulletins were issued at the station concerned, in order to stress:

1. Safety belts should be checked carefully: a. prior to leaving the line and, b. frequently during flight, particularly before and during acrobatics.
2. Correct adjustments of parachutes are necessary if they are to fit and operate as intended.
3. Instructors should ask students frequently during acrobatic flight to check their safety belts.
4. A loose safety belt becomes unfastened more readily than a snug one.

Danger Areas

An instructor was giving his student an acrobatic check in the assigned area. The SNJ was just being pulled into a loop at 9000 feet when it collided with an SBD. The SBD was attached to a near-by station and was cruising through the area in level flight. All occupants of both aircraft were killed.

The two pilots were considered equally responsible for this collision. The SNJ pilot for not insuring that the area was clear and the SBD pilot for entering a Danger Area without special authority and for not keeping a sharp lookout for other aircraft.

The investigating board made the following recommendation for eliminating accidents from this cause:

That when communicating with transient and itinerant aircraft, control towers advise them of the condition of air traffic and other invisible hazards that exist in their flight path.

Comment-In addition to emphasizing the necessity for constant alertness in the air, this accident also shows the need for pilots being more familiar with Danger Areas. Activities are responsible for insuring that their files contain only the latest aeronautical charts, kept up to date from information received through Weekly Notices to Airmen, Hydrographic Office Memos to Aviators and the Minutes of IATCB meetings. Pilots must be familiar with the Caution and Danger Areas indicated on all of these up-to-date charts.

Maintenance work at flight schedules goes on 24 hours a day at many naval air stations, keeping transport planes in running order to carry supplies of war to the fronts

How Is YOUR Judgment?

A careful analysis of formation accidents led a Corpus Christi squadron to conclude that the pilots were poor at judging angles and distances. Training along these lines was given by arranging: airplanes on the ground and requiring all pilots to sit in the cockpits and see what the planes looked like when properly spaced.

The initial theory about poor judgment in this matter was largely proved when numerous pilots, including instructors, were so incredulous that they personally measured distances and angles before they were convinced that the spacing was correct.

Pin Feather Wonders

Just prior to finishing their primary flight training, six cadets were scheduled for formation practice. The students took off in their respective sections and 30 minutes later were observed at low altitude, "chasing tails" over rough terrain, outside of the designated training area. Shortly thereafter, two of the planes collided, "resulting in destruction of one aircraft and damage to the other. Both pilots escaped uninjured.

All six students were found guilty of

"gross violation of air discipline" and were dropped from training.

Late To Class .

A TRM pilot allowed his fuel tank to run dry while operating at low altitude. He immediately shifted tanks and started his auxiliary fuel pump, but since there was insufficient altitude to regain suction, he was forced down at sea.

The pilot's statement included the following: "A good lesson I learned is to switch gas selector valve at a higher altitude. There is too little time to act at 75 feet."

Grampaw Pettibone says:

I refuse to get mad at this pilot -I'm glad he finally got the word. But it's tough to have to watch pilots learn everything the hard way. In this case, a little serious attention to Flight Safety Bulletins 7-44 and .25-44 would have taught him the same thing and at a much cheaper rate, to say nothing about the danger involved.

Taxi accident: "He taxied too fast and didn't look where he was going."

Careless Inspection

An SB2C-3 had just landed aboard a carrier and was taxiing up the deck when the starboard landing gear gave way, resulting in serious damage to the plane. Subsequent check showed that a piece of line had been left in the wheel well which, when the wheels were extended, fouled in the locking pin.

Grampaw Pettibone says:

It's easier to sweep out your plane before flight than to sweep it up later.

Correction

Three suggestions of a cv squadron were included in the article, "Cockpit Tips For Combat," in the 1 September issue. These were: 1. That goggles be worn to minimize the danger resulting from shattered glass. 2. That whenever an aircraft is on fire, oxygen masks with diluter valve turned to *off*, be worn as a defense against breathing smoke. 3. That oxygen masks with diluter valve turned to *off* be worn at all times within range of enemy AA, as a general protection for the face and as a defense against breathing smoke, should the aircraft catch on fire.

Items 1 and 2 are considered sound, but item 3 is considered impracticable owing to the danger of depleting the oxygen supply. If desired, the oxygen mask may be worn, but the diluter valve should not be turned *off* unless smoke actually is present in the cockpit.

GRAMPAW'S SAFETY QUIZ

All aviators should know the answers to these questions. In the air, the penalty for not knowing may be death. If you miss an answer on the ground, penalize yourself by looking up the reference.

1. When in doubt about the presence of icing conditions, should you use alternate air?
2. How much alternate air normally should be used?
3. When landing or maneuvering in preparation to landing, which aircraft have right of way?
4. How long does it take a pilot to check his idle mixture?
5. When should the idle mixture check be made?

Answers to Quiz on Page 48

It Didn't Have To Happen

While at low altitude, the engine of an FM-l cut out, necessitating a forced landing in a stumpy field. The aircraft was demolished in the ensuing crash. The pilot's seat gave way, allowing him to be thrown forward so that his head struck the gunsight, causing a compound fracture of the skull.

An examination of the crash showed that the pilot had been wearing his shoulder harness and that it was properly locked, However, the straps were not over the reinforcing bar as they should have been, but were led directly over the top of the seat. This caused the top of the seat to give way during the crash, and undoubtedly was the main factor in its ultimate failure. Had the shoulder straps been passed over the reinforcing bar in accordance with Technical Note #28-43, there probably would have been no seat failure, and the pilot would have been injured only slightly or not at all. This opinion is based on the results of numerous similar crashes in which shoulder harnesses were properly used.

Comment-It is recommended that pilots review Technical Note #28-43 which shows pictorially how shoulder straps should be passed over the reinforcing bar. A visual check should be made by pilots when entering the cockpit. Plane captains also should be cautioned to include this item in pre-flight inspections.

Three Points on Landing

On coming in to land, an SNJ-4 pilot recently dropped his plane in and went into a ground loop. The Trouble Board was unimpressed by his excuse of "oil on the windshield." They pointed out that his was not the first oil-spattered windshield. In their opinion, his trouble was "100 percent carelessness."

For the benefit of such careless pilots, they pointed out that "no airplane yet invented will land itself" and offered the following definition of a three-point landing: "One in which both front wheels and the tail wheel touch the ground at the same time-not one wheel, one wing tip and the tail wheel."

25 YEARS AGO THIS MONTH

Naval Aviation in December, 1919

December-The problem of housing and preserving the NC-4 was being considered by the Navy. It would cost about $65,000 to place the exhibit in the Smithsonian Institution, since roofing would have to be placed over a court large enough to accommodate the plane. The Naval Academy estimated that $35,000 would be necessary to supply housing facilities.

December-Inter-communication between airplanes was solved temporarily at NAS Anacostia. Twelve volts instead of six were applied to the microphone transmitter. The addition demanded a disconnecting device to alleviate the danger of burning out the microphone due to excess current flow.

December-Lt. A. S. Dietrich and Ensign W. E. Blackwell left the Rockaway Naval Air Station in an F-5-L flying boat with four mechanics who were urgently needed at Hampton Roads. Flight was made in five hours.

December-Preliminary tests of an adjustable pitch propeller for airplanes were made recently at the Aeronautical Engine Testing Laboratory, Washington Navy Yard. The propeller was fitted to an Hispano-Suiza 150 hp. engine and operated at various speeds up to full power. The adjustable mechanism, designed to give variable speeds without throttling engine, worked satisfactorily.

December I-Secretary Daniels had estimates prepared which he planned to lay before the House Committee on Naval Affairs asking appropriations of $3,000,000 for lighter-than-air ships. The Navy was prepared to build one or more dirigibles of an improved type with any available funds. Navy officers strongly urged a policy of original development, feeling sure the Navy was capable of turning out larger and more advanced types of dirigibles without being instructed overseas by builders of these ships.

December 2-At the suggestion of Captain Thomas T. Craven, director of aviation in the Office of Naval Operations, aeronautics was incorporated into the Naval Academy curriculum.

December X-Secretary Daniels informed Congress that 217 aeroplanes and 448 engines owned by the Navy were to be sold; 50 DeHavilland fours and 100 spare motors were to be transferred to the Air Mail Service. At that time the Navy owned 1,797 planes, 1.68 balloons, 17 dirigibles and 4,057 engines. Ninety-eight new planes and 79 engines were built for the Navy.

December 20—To accommodate the ill-fated R-38 [it burst in two while on a eight in England], the Navy was erecting a hangar of unprecedented size at Lakehurst, N. J., for both assembly and housing purposes. Specifications called for a building 804 feet long, 318 feet wide and 200 feet high. The frame was to be of structural steel built on the three-hinged arch truss principle, each arch supported on steel towers 62 feet high. When completed, the hangar, with open portals, would provide a windbreak nearly 600 feet wide, insuring a large degree of safety in landing and releasing ships.

Magnitude of these doors can be grasped better by imagining that a 12-story building, with a frontage of 135 feet, could have been placed within the hangar through the space covered by both leaves of the door. The hangar was expected to be in service by the summer of 1920.

December 26-NAS San Diego cooperated with California Fish and Game Commissioner by supplying seaplanes" for aerial fish patrol. This was an effort to aid fishermen by sighting schools of fish and reporting their location by radio to the central office.

December 27 — Army Air Corps agreed to train Navy pilots in landplanes at March and Carlstrom Field. This was to prepare them for carrier shipboard operations.

December 30-A joint Army and Navy Board was created "for the purpose of co-ordinating various helium gas activities and requirements of various government bureaus, including full control over operation of the present and future government-owned helium production plants, disposition of helium products, conduct, or supervision of conduct, of further experiments undertaken with a view toward increasing the efficiency of production plants and controlling further steps for conservation of helium as deemed expedient."

LAKEHURST AIR CIRCUS THRILLED MANY BEFORE TREMENDOUS HANGAR

HELIUM TANKS STAND READY FOR SHIPMENT AT FORT WORTH PLANT

SKIPPER HELPS OLD SANTA WITH THE PRESENTS

TURKEY DRUMSTICK PLUS ONE HUNGRY LITTLE GIRL, EQUALS SMILE

CHRISTMAS On a Naval Air Station

ORPHANS AND OTHER CHILDREN FIND A GLAD CHRISTMAS AT AIR STATION

ASHORE or afloat Navy people remember Christmas in traditional fashion. Even in wartime the season is observed as well as circumstances permit. At shore stations a time-honored naval custom illustrates in large measure the true spirit of giving. At such stations Navy personnel dig deep into their pockets and scour gift shops of surrounding cities. Then, on Christmas, wide-eyed children from orphanages or from less fortunate homes are brought to the station to see Santa Claus and receive such marvelous gifts as would gladden the heart of any youngster.

Typical Navy Christmas was the one featured at Norman, Okla., last year. There was no cost to the Navy because the personnel of NATTC gave freely and generously. One appeal published 'in the station paper brought in a flood of more than $6,006 in a day's contribution. This meant that $30 could be spent on each child. Volunteer shoppers toured the department stores of nearby cities, after al complete list of *children invited. showing 'both names and clothing sizes, had been drawn UP.

Then came the question of securing; a Christmas tree. An ordinary tree would not fill the bill. so shops were scoured until a towering giant of a tree was found. It fitted into the decoration scheme beautifully. Sallying forth to buy the decorations for their auditorium the station personnel took over the ornament stock of two big five&d-ten-cent stores. In short order the big station auditorium was transformed into a scintillating Christmas fairyland.

ON THE great day, three of the station trailer buses brought excited youngsters to the party. NATTC had a 6' 6" man weighing 300 pounds who played Santa. Aboard a tinseled, beribboned jeep, Saint Nick rolled into the big auditorium on a wave of wild excitement. When all the gifts had been distributed. the young guests were escorted to the station chow hall for a tremendous turkey dinner with all the trimmings. When every child had eaten his fill, guests were taken home. It was a Christmas in naval tradition.

MALE VOICES HARMONIZE CHRISTMAS CAROLS OVER CARRIER SPEAKER

ABOARD A CARRIER MEMBERS OF CREW SOMETIMES HAVE A REAL TREE

Aboard a Navy Flattop

EVEN THE NAVY AFLOAT MANAGES TO KEEP FAITH WITH CHRISTMAS IN SPITE OF WAR

ALTHOUGH war's grim stress may cause "Peace on Earth' to seem a hollow and meaningless phrase, the Navy afloat to the best of its ability observes the season and remembers the Child in the Manger on His 'natal day. On many ships crews rigged up Christmas trees and at mess, tables groaned under a load of Yuletide food, with King Turkey headlining the bill of fare. There were even gifts which crew members lucky with the mail had stowed away for opening. Aboard one carrier, Santa Claus came aboard in a dive bomber (see *cover*) with six torpedo planes named after "Dancer," "Prancer" and all the rest of Santa's reindeer leading the way. Wardrooms rang to old Christmas carols as the Navy afloat observed the Yuletide season. Christmas of 1944 will follow out the same pattern as far as circumstances permit and fighting Americans from afar will remember other Yules,

ALTHOUGH AT SEA NAVY COOKS STILL CAN WHIP UP CHRISTMAS DINNER

AEM AT JACKSONVILLE NATTC POLISHES EXTERIOR OF AIRCRAFT SEARCHLIGHT INSTALLED ON 'BLACK **CAT.' VETERAN** OF MANY ACTIONS IN PACIFIC

AIRCRAFT SEARCHLIGHT

Spots Enemy in Night Action

AVIATION electrician's mates are being trained to handle the Navy's airborne searchlights which have proved so successful 'in night patrol work in the Atlantic and Pacific. They aid in spotting subs, barges and ships.

The school, located at Naval Air Technical Training Center at Jacksonville, gives two weeks of training to AEM's from the fleet or graduates of the AEM school. After finishing, they go to CASU's. Patsu's, Hedrons, and Fairwings to install and maintain the powerful big searchlights which are on PBY's, TBF's, PB4Y-1's, PBM's and PV's. The lights cast such a powerful light that newspapers can be read in the beam a mile away. (See Aircraft Searchlight film, MN-3382, at aviation film libraries.)

Planes equipped with the lights played a major part in sweeping the English Channel prior to D-Day and have been valuable in spotting the Japs.

Highly polished reflector of huge searchlight shows intricate gear for positioning carbon arcs which generate tremendous candlepower

Gear installed in forward cockpit of Catalina enables aircrewman to track and train searchlight and pick out targets in the dark

DID YOU KNOW?

Sea Squatters Now Have a Club

Society Includes *Life-Raft* Survivors

A new "club" has been launched for air personnel who have come down at sea and have taken to rubber life rafts—the Sea Squatters Club. It joins the ranks of other service societies, such as the Caterpillar Club and the Short Snorters Club.

The latest addition to the ranks, conceived by a company which produces compression gas devices to inflate rubber life rafts and Mae West vests, already has two women marines as members. They were forced down in a Navy Liberator off the California coast and did a four-day Robinson Crusoe on an island with 11 men. The club's emblem is a miniature raft and a rider.

Report May Assist New CASU's

***Unit Outlines* Functions in Memorandum**

CASU-7-New CASU's formed for duty can obtain valuable information concerning material and supply functions from a memorandum report recently prepared by this activity. Request for the CASU 7 memorandum report should be addressed to CASU 7, FPO, San Francisco.

The report contains information on functions of CASU 7 as well as a summary of existing policy governing distribution of aeronautical material and equipment. Use of lists in outfitting squadrons and air groups is explained.

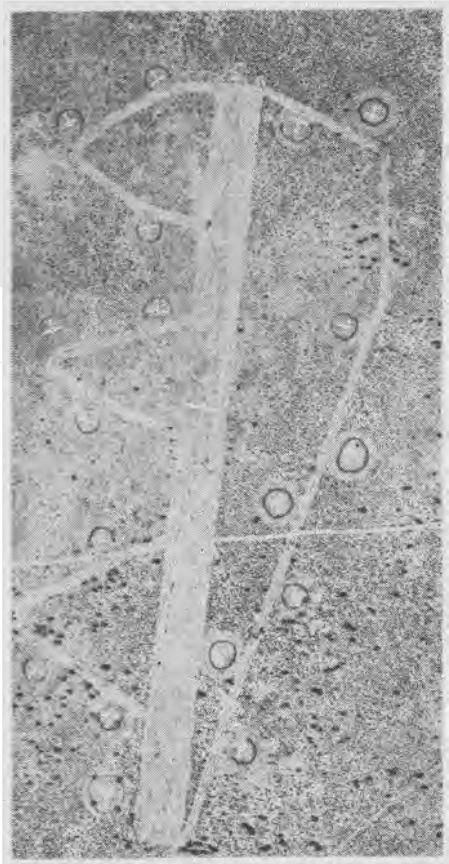
Realism Helps In Combat Training

Model *Jap* Airfield Used for *Target*

VMF 451—Aimed at providing an element of realism in their combat training syllabus, this fighter squadron constructed "Sackamanura Airfield," a model Japanese airfield on the heavy bombing range.

The complete target was designed and constructed by officers and men of the squadron. The plan was staked out on the ground by the Intelligence Officer and three pilots, and the project completed in three days, employing twenty-eight men with hand tools and two trucks. A bulldozer was used on the last day to clear off the airstrip and taxiways.

The individual target planes were outlined on the ground to a depth of several inches according to the actual dimensions of Japanese aircraft, and filled in with white lime. Red "meatball" insignia on the wings were circles of red cloth. At points where gasoline tanks are located on planes, three pairs of ammunition cases with metal liners were placed and filled with used engine oil and surveyed gasoline. The target then was ready to use and, when hits were registered, . the ammunition cases



SIMULATED JAP AIRFIELD MAKES NOVEL TARGET

flared up, giving off black smoke and leaving no doubt that the target was hit in a vital spot.

Pilots of the squadron were enthusiastic about working this target on live strafing missions and other squadrons on the station are planning to use it.

Aerial Bombing Becomes Selective

Natives* Are *First* Removed From *Atoll

That aerial bombardment can be made selective as well as effective, has been demonstrated by a strange incident which took place recently during the Marshall Islands campaign. American planes bombed the Jap-held fortress of Wotje atoll until the enemy garrison was "'punch-drunk," after which naval warships slipped in at night and "lifted" virtually the entire civilian population of that atoll from under the Japs' noses. Thus the natives were spared sharing punishment being dished out to the enemy.

More than 700 native Micronesians were liberated from Jap oppressors in this daring operation. The carefully engineered rescue was staged at night. Two small American warships slipped into a lagoon of Erikub Atoll about six miles from the Jap fortress, carrying several natives who had previously escaped from Wotje without assistance.

The natives were lowered silently from the warships in their outrigger canoes, spread their tablecloth-sized sails and skimmed away toward Wotje. Landing quietly on the native beach they began slipping from hut to hut, arousing their kinsmen with word that rescue was at hand.

Quickly and silently the' 700 rolled up their mats, gathered their pigs, chickens and children and dumped them into outrigger canoes. Not long afterward the flotilla drew up to the waiting warships.

At dawn, women, children and the infirm were taken aboard the warships and the outriggers, tied together in a long line, were towed out to sea. After a long journey, the 700 rescued Micronesians arrived at another and safer atoll to be welcomed by other natives rescued earlier.

Japs Bury Their Damaged Planes

Tell Natives Nip Fliers Are Invincible

Finding it increasingly difficult to convince Pacific natives that their fliers are invincible, the Japanese, on at least one occasion, buried a plane which a Navy pilot knocked out of the air. A technical air intelligence officer examined the concealed wreckage of a Jap *Val*, and made this report:

"The wings and entire fuselage, minus rudder, vertical fin and engine, were buried by the Japs to save face with the native population. Japanese officials in the past had told natives that their aircraft never were shot down. Immediately after this *Val* had crashed, a Japanese guard was placed around the area and word was passed that the plane was American. Remains of the plane then were buried in a nearby well entrance and bulldozed over. The rudder and fin were overlooked by the enemy and were picked up by the natives."

PUBLICATIONS

Usage of Contractor's Service Bulletins

Contractor's Service Bulletins are not distributed to naval air activities without prior approval of BuAer.

When the need for a change or modification to delivered equipment is recognized, the contractor is requested to submit to the Bureau a service bulletin establishing procedure for retroactive incorporation. If satisfactory to the Bureau, the bulletin, or the information contained therein, is relayed to the naval establishment in a Bureau Change or Bulletin. It may be issued in any one of the following forms :

1. Service Bulletin, complete or in part, as enclosure to Bureau Change or Bulletin.
2. Pertinent information from contractor's bulletin written into a Bureau Change or Bulletin with reference only to the former.
3. Service Bulletin printed and supplied by contractor, stapled to a Bureau Bulletin approving same.

W. . . parts kits are furnished by the aircraft contractor in compliance with a Bureau Aircraft Service Change, he will pack one copy of his approved bulletin with each kit for shipment in accordance with allocation previously furnished by BuAer. The copy of the bulletin which is packed with the kits of parts will be stamped, "This Bulletin has been approved by BuAer as covering the installation provision of BuAer Model---Aircraft Service Change No.-----."

Activities therefore are requested not to requisition Contractors' Service Bulletins. The applicable Bureau Change or Bulletin will, however, be supplied upon request to Chief, BuAer (Attn: Publications Branch) on form NavAer 140.

IMPORTANT NOTICE

A.C.L. 90-44 was forwarded to the field only after much consideration and study. Furthermore, the policy it prescribed was developed-as the result of many requests from air activities as well as consultation with many cognizant officers-as the best and most desirable plan for distribution of technical information.

To provide to all air activities the maximum benefits this letter offers, it is essential that all activities return encl (B) to this letter, with complete information filled in as requested. So' far, comparatively few activities have returned this enclosure as directed in A.C.L. 90-44.

It is strongly urged that all establishments that have not prepared and submitted this important information do so as soon as possible. Care should be exercised to make sure that the activity's proper mailing address is included. Also, in indicating material desired, request only that which is essential, though BuAer desires to send all items needed by an activity.

Field Map Aids Visiting Aircraft

Directions Are Prominently Displayed

MCAS EL TORO — Visiting aircraft should have little difficulty in orientating themselves at this Marine station. A giant map of the field now is displayed on the tower of the operations building. Newly completed concrete runways, parallel to the old blacktop. are shown on the map in white, as contrasted with the old runways in black.

MAP OF FIELD PROVES HELPFUL TO VISITORS

The map is easily visible from planes taxiing past the operations building.

CVB's Perpetuate Sea Battles

Larger Planes Will Base on New Ships

Two crucial sea engagements of World War II, the battle of the Coral Sea and the battle of Midway, are being perpetuated by the Navy a's names of two new 45,000-ton aircraft carriers. These two CVB's which were already under construction in October are thk largest known ships of their type.

In the Coral Sea battle during May 1942 the Japanese were effectively checked in their southward advance. This also marked the end of the period during which the United States was totally on the defensive. The Battle of Midway in June of 1942 was the first decisive defeat suffered by the Japanese navy in 350 years and restored the balance of naval power in the Pacific.

Earlier in the "war the names *Coral Sea* and *Midway* were assigned to two escort carriers that were renamed Anxio and St. Lo. The St. *Lo* since was sunk in the second battle of the Philippines.

Eggs, Gum Drops Help War Effort

Photographer's Idea Assists Shortage

A person does not think ordinarily of eggs and gum drops as vital war materials, but such a strange omlet, concocted by a Navy enlisted man, helped photographic intelligence function efficiently during recent operations in the Central Pacific when a shortage occurred.

Egg albumin, it seems, is an essential ingredient used in lithographic plate making. None was available at the advanced island position on which VD-4 was based, nor was any available at Pearl Harbor or on the Pacific Coast. Dried albumin was not available either, nor was photographic gelatin. Yet some vital intelligence reports had to be made.

A photographer's mate, in civilian life a lithographer, devised a chemical which did the trick. Base of his new material is gum arabic-the ingredient that makes gum drops that way and that puts the creamy head on beer.

[IDEA BY GEORGE A. CARDASCIA, PHOM3c]

BuAer Comment-Against some future emergency, put the following lithographic plate formula in your notebook: 1 oz. gum arabic (dry), 11 oz. water, add 160 grains potassium bichromate and 1 oz. ammonium hydroxide 28%. Procedure: 1. Counter etch. 2. Desensitizing etch. 3. Coat plate. 4. Expose. 5. Develop with developing ink and dry. 6. Wash with water.

Sextant Cage Shuts Out Insects

Mosquitos Make Shooting Sighh Difficult

NAS BANANA RIVER-A sextant cage has been designed by this station's navigation department for shooting

NOW MOSQUITOS CAN'T GET AT THE NAVIGATOR

sights during the mosquito season. A standard astro-dome is inserted in a hole cut in the top of an easily constructed screen box.

During summer months, taking star sights became virtually impossible because of mosquitos. Only through use of the sextant cage was it possible to carry on with navigation training.

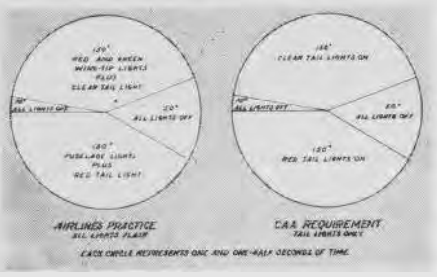
Flashing Lights Aid in Safety

Exterior Lights on Transports Valuable

Flashing exterior lights on today's commercial and some military transport airplanes have aroused the curiosity of many observers and have even led some to make such comments as, "'Hm, won-

der if the pilot of that airplane knows he has some loose wiring to his lights," or "Oh, yeah, that's the new blinker scheme for flashing position in degrees longitude and latitude."

Here *is* the real story: Before the war, even when commercial planes had little competition for air space, airlines desired to make transports easier to "spot" when approaching a field. The advent of war and consequent increase in air traffic soon made it necessary that airliners be seen more easily, not only from the ground but also by other planes in the air. Near-collisions were reported, and it was pointed out that exterior



TWO CHARTS SHOW TIME FOR FLASHING LIGHTS

lights continuously "on" blended with stars and ground lights, especially over large cities where a myriad of ground lights forms the background.

To make commercial transports easier to spot in the air, CAA required that the two tail lights (one red, one clear) be flashed throughout all night flights. By means of an electrical device, lights are flashed at the rate of 40 cycles per minute, where each cycle is the equivalent of a circle as shown above. The difference in "off" intervals is to give a sharp definition between the red flash and the clear flash.

The airline operators took this requirement and applied it by flashing all exterior lights on their transports. The red and green wing-tip lights are "on" at the same time as the clear tail light, and the two fuselage lights, both clear, flash with the red tail light. There are some variations, but all add up to flashing exterior lights.

In the operation of its transport airplanes the Navy concurs, where practicable, with the safety advantages of flashing the exterior lights. Development is continuing to obtain flashing mechanisms lighter in weight and with greater utility than the present flasher.

Don't Request Pilot's Information File from Army Air Forces Copies

Pilot's Information File published by AAF has not been approved for Navy use, and individuals should not request copies from Army Air Forces.

Training Literature Section has obtained a limited supply of PIF and can furnish a single *reference copy* to squadrons and larger units that specifically request one.

Address *official* request for single reference copy to: OFFICE OF CHIEF OF NAVAL OPERATIONS, OP-33-J, TRAINING LITERATURE FIELD UNIT #1, ONE PARK AVENUE, NEW YORK #16, N. Y.

FLIGHT SAFETY

"Three new pilots are scheduled to report today, Commander."

The skipper of a fighter squadron cheerfully reported this news to the air group commander aboard Carrier X. He really needed those three aviators.

Later in the day the skipper's hopes were dashed. Questioning the trio, he found one was a veteran with months of experience on another carrier. That was fine, but the other two had not practiced landings aboard a carrier in the six months since they had been checked out during training. One had made only nine carrier landings aboard the U.S.S. Wolverine back on Lake Michigan and the other had only ten to his credit. These two could not be used even on routine patrol sweeps. When a strike was ordered on a major Jap naval base, they stayed on deck.

The Captain of Carrier X cited the incident in his official report of the air attack. So "the word" got to Washington. The difficulty was presented to the newly organized Flight Safety Council for action.

SAFETY FIRST

The council also heard reports from Carrier Y telling that when its composite squadron was expanded only one of 12 new aviators was an experienced pilot and reports from Carrier Z that six new pilots reporting aboard had never been on a carrier before.

The council took up the matter with the Training and Aviation Personnel Divisions under DCNO (Air). Both checked into the problem. The pilot replacement program was tightened up and improved. All hands concerned were alerted to the difficulties of a repetition of such carrier duty assignments for green aviators. As the Flight Safety Council was informed at its next meeting, "It is believed that this matter has been satisfactorily solved."

▶ This incident shows the current coordination of flight safety activities.

Two of the more important and recent developments in this program are the establishment of the Flight Safety Council and a Flight Safety and Air/Sea Rescue Section in the Flight Division at the Navy Department.

Aviation safety is a matter of more than passing interest to the enlisted draftsman working over engineering blueprints and the rear admiral in charge of a carrier task force, as well as the pilot and rear seat gunner in a dive bomber over Manila. It concerns everyone connected with the Navy's aeronautical organization, Such a subject can not be handled in its entirety by any one section or division of the Navy Department. Hence a Flight Safety Council was set up to supervise and co-ordinate matters being handled through various units.

SAFETY FIRST

▶ In addition to the chairman, who also is head of the Flight Safety and Air/Sea Rescue Section, council members include representatives of the Air/Sea Rescue Agency of U. S. Coast Guard; Naval Medical Research Institute; Aviation Medical Research Division of Bureau of Medicine and Surgery; Air Intelligence Group; Engineering, Maintenance, Military Requirements and Special Devices Divisions of BuAer; Training, Flight Divisions of DCNO (Air).

A part of the Flight Division, the new Flight Safety and Air/Sea Rescue Section has administrative responsibility for the naval aviation safety program. The new section grew out of activities formerly assigned to the Flight Statistics Section, which maintains a central file of all aviation accidents, details of their causes and recommendations made for their elimination or reduction. Responsibilities of this new section include:

a. Increasing safety in naval aviation through promulgation of standard safety procedures and initiation of indicated research projects.

b. Supervising flight safety education.

c. Furthering the air/sea rescue features concerned with naval aviation.

d. Promoting maximum efficiency of various flight safety. and air/sea rescue functions and preventing overlapping in their operation.

e. Analyzing aircraft accidents and, where indicated, dispatching its own investigators to the crash scene.

f. Maintaining liaison with other government and civilian agencies engaged in aviation safety.

Both these new agencies, like all others concerned with aviation safety, are seeking to prevent or reduce avoidable accidents in naval aviation. To do this, it is necessary to know what causes accidents. These causes may concern deficiencies in training, equipment, maintenance or personnel capabilities. Only by systematic and thorough investigation can causes be determined.

THIS IS THE SECOND IN A SERIES OF REPORTS ON WHAT THE NAVY IS DOING IN AVIATION SAFETY

SQUADRON NOTES

Polices By-passed Islands. Search plane squadron VB-144 has completed eight months of duty in the Central Pacific, finishing its assignment of watching over certain Jap-held islands by-passed by our drive toward Tokyo. Operating from the Gilberts and Marshalls, this land-based squadron inflicted its heaviest damage to the enemy by bombing and strafing assaults against Nauru, Wotje, Taroa, Jaluit, Taongi and Kusaie. The squadron dropped 26 carloads of high explosives on these islands with more than 80 percent of them causing damage within the target area. In addition the Ventura's machine guns expended 170,000 rounds of ammunition in eight months.

New Training Method. VMSB 254 has been training a number of junior pilots (whose previous training was primarily in torpedo tactics) as dive bombers. A spotting sheet permits a close check on the accuracy of dive-bombing and the progress of each pilot. The sheets are filled out at the completion of each flight and are kept on file for the correction of bad scores. The sheet records hits within the 100-foot circle as "direct hits," within the 200 circle as "bits," and all other drops as "misses."

Catalinas Pack a Wallop. Although Navy *Catalinas* were never designed for that sort of business, the stately old girls have proved they pack a "Sunday Punch" when it comes to raiding Jap shipping out in the Pacific. Recent press reports from that war theater credit the leisurely flying boats with remarkable exploits. One lone PBY sank three Jap vessels in Davao Gulf with only four bombs in a single bombing run. The p-boat caught a seaplane tender and two destroyer escorts while they were refueling and attacked without hesitation. Shortly afterward, a Catalina sank an 8,500-ton Jap freighter-transport in Tiworo Strait on the southeastern coast of the Celebes. The Catalina scored four direct hits, putting two 500-pound bombs in the center of the ship. The same night other *Catalinas* damaged a lO,OOO-ton tanker and a 300-ton freighter in Basilan Straits in the southern Philippines.

Teamwork Pays Dividends. Although expert Japanese pilots can handle their planes with remarkable dexterity and sometimes' give showy acrobatic exhibitions good enough for the state fair circuit, their skill has proved no match for the teamwork of Navy pilots. Proof of this fact can be drawn from two brief but highly spectacular scraps between Navy pilots and Jap Zeros in the region of the Marianas.

The first Jap flying exhibition occurred when five Hellcats teamed up on a fleeing Zero. Just as the Navy pilots would get into firing position the Jap would pull up into an extremely fast climbing turn, duck for the water, zig-zag back up and then go into another violent turn. His maneuvers were perfectly timed for a while but at last he missed, lining himself into the sights of a Hellcat pilot. The Zero exploded in mid-air.

Shortly afterward another Hellcat quintet sighted a second Zero and gave chase. The Jap was only 300' from the water when he sighted his pursuers. He began his show with 15 consecutive slow rolls, next dived to within five or 10' of the water and bounced his plane up and down in an effort to coax a Hellcat into striking the briny, then pulled into a half loop several times and flew along on his back wagging his Zero from side to side. At last he completed a full loop at less than 500' and found the Navy team calmly waiting for him. The Jap's "state fair" show ended abruptly with a well directed burst from Navy guns.

"It was like trying to catch fleas on a hot griddle," remarked a *Hellcat* pilot.

Reluctant Raiders Return. Hard-hitting VB-109 has returned from seven and a half months in the Pacific, during which the big PB4Y's became a dreaded scourge of the Japs. Specializing in bombing from treetop and masthead level, the squadron attacked 147 enemy ships, sinking 43 and damaging 91; destroyed 20 enemy planes on the ground and four in the air and probably destroyed or damaged 70 more planes on water or ground. VB-109 made 1,141 operational flights for a total of 12,153 combat hours. When other squadrons in the Pacific dubbed VB-109 "Reluctant Raiders," it was meant as a tribute.

Pilot Saved His Plane. Fanning out a fire in your plane wing by side-slipping is no mean feat but the pilot of a carrier based Navy dive bomber did it recently and saved his *Helldiver*. While diving on his target which was on a Jap held island, the pilot ran into ack-ack and one shell set off the ammunition box behind the wing machine gun. Deciding he still had time to complete his dive, the pilot streaked down to bombing position, released his bombs and pulled away with flames licking closer and closer to the cockpit. At 2,500 feet he told his rear seat aircrewman to bail out and the crewman later was rescued. Then the diver began side-slipping his plane so that the airstream would pull flames away from the fuselage. At length the fire was blown out. Though fire had burned out hydraulic fluid so he could not get his landing flaps down and a Jap shell had shot away a right wheel locking pin, the pilot landed successfully on his carrier with only a right wheel buckled.

Both Bagged Their limit. Two pilots of a carrier-based night fighter squadron in the Pacific went out hunting one morning not long ago and shot down eight Jap seaplanes before breakfast. The first pilot was strafing shipping in a harbor when he bagged his first Jap. Two others attacked him from the rear, so he radioed the second Navy pilot to be ready, led the Japs over to him and let his friend shoot them down. More *Rufes* appeared, more expert target practice took place and more *Rufes* tumbled into the drink. One Jap flew into a cloud, so a Hellcat went in to shoo him out while the other stayed on top of the cloud to nip the Nip. When the eighth Jap had tasted salt, the hunters went home to their ships for coffee.

Nightmare By The Numbers. "Flying Nightmares," as the airmen called themselves, were the first Leatherneck twin-engined bomber crews to see action. Plastering the Japs with monotonous, deadly precision, they have established the PBJ's continued value to Marine air arm.

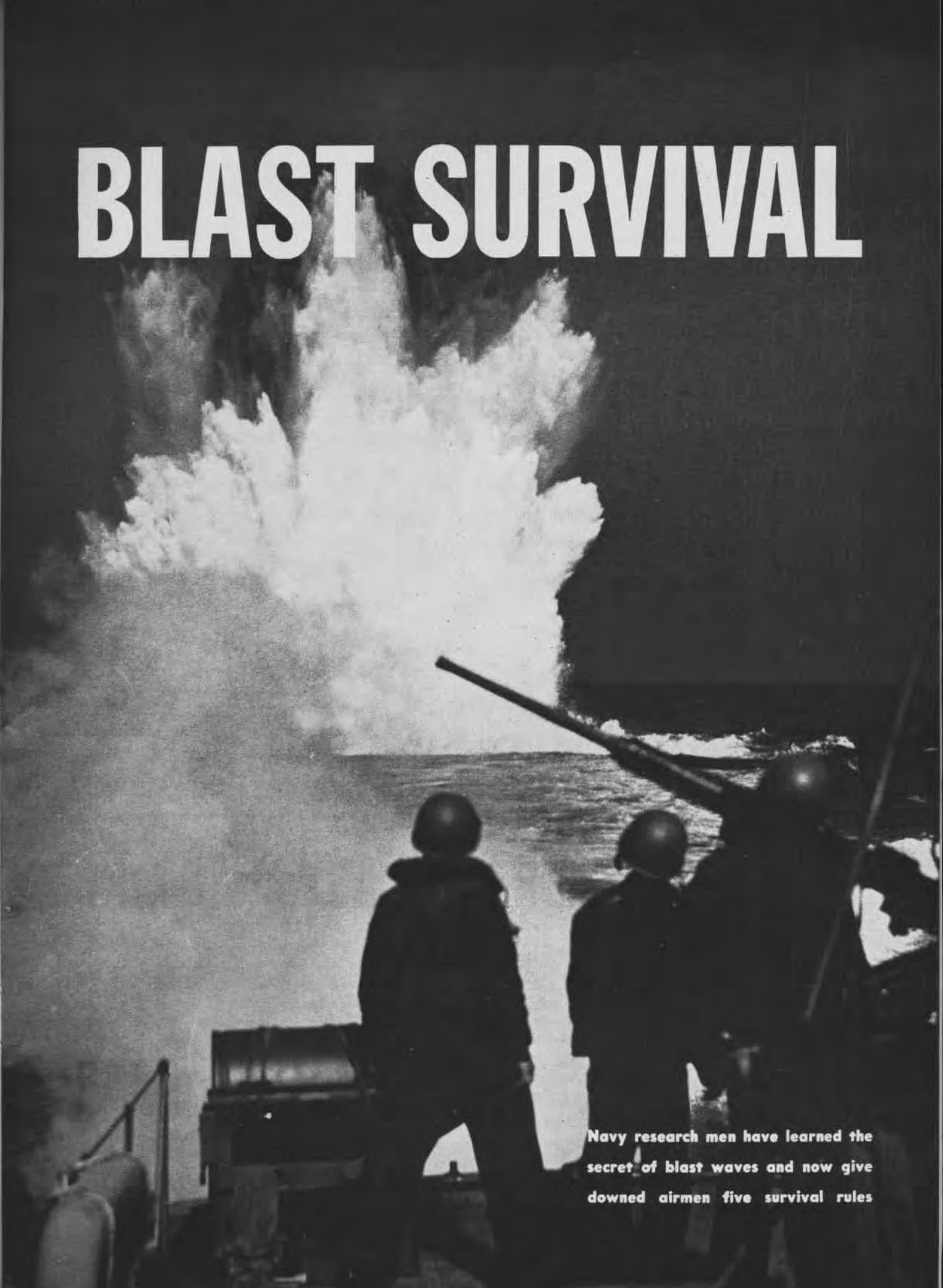
In March of 1944, the outfit began playing for keeps. Their initial combat mission got underway in the South Pacific-a daylight haymaker at hotly defended Takabar Mission, supply dump and labor camp ten miles from Rabaul. As a squadron new to combat, they had an understandable right to a good percentage of misses; however, they dumped their load on an assigned area of 500 by 150 yards, and out of 84 bombs dropped, 82 had smashed home in the small target.

After several daylight familiarization strikes over Rabaul and Kavieng, they were pronounced ready for tedious, hazardous night heckling operations. Their role was part of an Allied tactic which after knocking out the enemy's airpower, avoided direct assault on his strongholds, substituted by a by-passing maneuver, and kept the Japs pinned down.

During the day, the Nipponese were under constant attack by single, twin- and multi-engined bombers. The Flying Nightmares followed the day strikes.

The squadron's efforts were recognized in a letter of commendation from the Commanding General, 13th Army Bomber Command: "You have developed the dangerous, tiresome mission of night heckling to the highest perfection it has attained in the 14 months in which I have been working under Commander, Aircraft, Solomons."

BLAST SURVIVAL



Navy research men have learned the secret of blast waves and now give downed airmen five survival rules

CORRECT DITCHING IS ONE OF THE FIRST GUARANTEES OF A SURVIVAL IN EVENT OF A PLANE CRASH AT SEA. THESE AIRMEN KNOW ITS PROCEDURE

NAVY PIONEERED BLAST RESEARCH

DEAD men with no visible marks upon them had been found on the battlefields of earlier wars, but prior to the Spanish civil war and the evacuation of Dunkirk the sustained curiosity of medical science had not been provoked by this strange phenomenon. When the Reuben James sank late in 1941, men struggling in the water again were slain by a strange force. That tragedy spurred research on this side of the Atlantic.

Naval medical men have pioneered this research in the United States and nearly all that is known today about the invisible death-dealer has been discovered since December of 1941 through experiments made in the Potomac area and at Pearl Harbor. Under the observation of BuOrd and BuMed experts, high explosives by the ton were fired. In some- experiments bombs fabricated from laboratory test tubes were used, while in other tests the explosive ranged up to 2,000 lbs. Navy doctors who exposed laboratory animals to an explosion did not hesitate in taking the same risks themselves.

THEY climbed into diving suits and descended into the ocean to learn what a blast would do to them. They listened to the vibration rumble through their viscera and moved closer for another explosion. Today a naval airman downed during a sea battle and exposed perhaps to depth charges or other underwater blasts is a far better insurance risk because naval medical men have learned the facts about blast, the strange killer.

TESTS INDICATE AN AIR BLAST IS NO MAJOR MILITARY PROBLEM

In the summer of 1942 the first air blast experiment to be made in this country by the Navy took place at the Explosives Investigation Laboratory, Stump Neck, Md. The term "laboratory experiment" was a misnomer, for that day men of BuOrd went out into the wide open spaces and set off 1,700 pounds of TNT. Primarily the blast was fired to test a new concrete shelter, but BuOrd invited medical men of the Army and Navy to participate. Control animals were used. The test indicated air blast was not nearly as dangerous as had been supposed.

Rabbits fully exposed to the concussion at a distance of only 100 ft. were not injured and went on nibbling grass. More air blast experiments followed. Then came the Norfolk explosion. Research men from BuMed hastened to the scene to observe for themselves what a terrific air blast had really done to humans. Their conclusions were surprising. Men so close to the explosion that they were severely. burned by the flash were examined painstakingly. Not one showed any trace of injury from the invisible force of the air blast.

Returning to Stump Neck, Md., the Navy research doctors began new tests to prove out their Norfolk conclusions and formulate policies. The Norfolk findings were borne out by these experiments. To be hurt by a blast in open air a man must be close enough to the flash area to burned, or he must be struck by flying debris.

An air-borne blast is a shell of compressed air that moves outward in all directions from the explosion center. In cross section this air shell is a steep-fronted wave of compression, followed by a negative or suction phase. Since the negative phase can never exceed a perfect vacuum, which is 15 lbs. to the square inch, it is not regarded as being of major military importance. The compression phase lasts from .005 to .008 of a second while the suction phase endures about .025 of a second. Air-borne blast waves travel in a straight line at about 1,000 ′ a second, and intensity of a wave decreases with square of the distance. Reflectance is shown by a blast; that is, the waves bounce back from a flat surface intensified almost 100 percent for a short distance.

Air blast from explosion at NAS Norfolk shattered this building which stood inside the immediate disruptive area of explosion

Flash from the same explosion caused fire, increasing the damage from this blast. Men who were singed showed no concussion injury

This battle scene illustrates how an air blast taking place in a confined space, such as this Jap tunnel, becomes more damaging

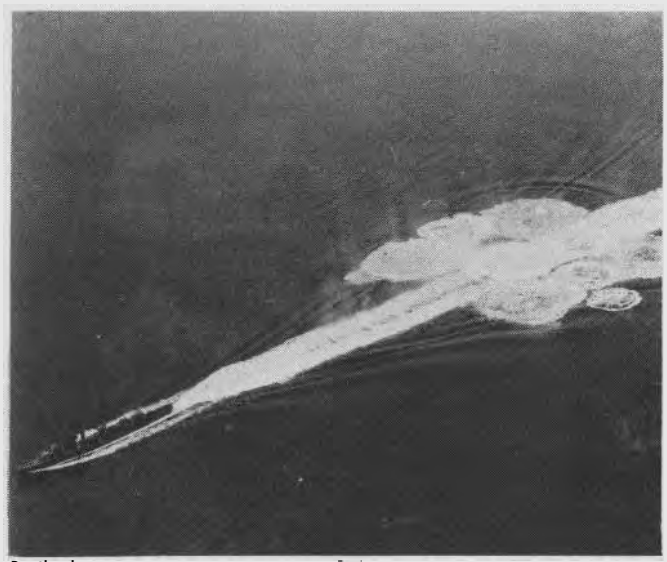
From crater torn out of the earth at Norfolk in immediate area of explosion, debris was hurled widely, aggravating blast effect

THAT MEN IN BATTLE GEAR CAN WITHSTAND MORE UNDERWATER SHOCK THAN DIVERS WAS **PROVED** BY EXPERIMENTS MADE AT FORT PIERCE. FLA.

FIRST WATER BLAST EXPERIMENT WAS MADE IN OLD LAUNDRY TANK

ALTHOUGH naval research men by this time were convinced that concussion damage from open air blasts was not of major military concern, they had ample evidence gained from Dunkirk alone that water-borne blast waves were a grave hazard which thousands of Navy men, including airmen, as well as general fleet personnel, might face.

So, early in 1943 with the assistance of BuOrd officers they moved their experiments to the Naval Medical Center at Bethesda. There, in a parking lot, they constructed a pint-sized ocean by sinking an old laundry tank 70" by 48" by 42" into the earth, tamping it securely with mud and filling it with water. This crude pool was destined to become the scene of exhaustive tests, meticulously made.



Depth charges cause their damage by a silent compression wave. A subsequent phase of turbulence is harmless. It results from gas

Needing depth charges to fit their miniature ocean, the experimenters knew also that the charges must not shatter and injure partially submerged, animals, since such injuries would upset correct conclusions from the experiment. So they turned to glass test., tubes as the ideal container because glass will pulverize under heavy impact. Into the test tubes they poured tetryl. This explosive was chosen because it could be measured minutely down to the split gram. So with dry cell batteries to furnish the juice, the experimenters fashioned miniature detonators from ordinary bell wire and tipped it with chrome wire. They sealed their "Mk. Nothing" depth charges with cotton and paraffin to keep out water.

DAY AFTER day the searchers set off their home-made depth charges, using varying amounts of the explosive and firing them at varying distances and depths. When they were through, a great many new facts had been ferreted out. They knew the lethal dose and the deterrent distance where the invisible shock waves would not kill. They knew any air-containing part of the body is vulnerable to the blast, first of all the lungs, then the intestine and even the head due to air-containing mastoid cells in the cranium.

Though air-borne blast waves travel only about 1,000 feet a second, blasts travel through water at 4,800 feet a second, losing intensity in inverse ratio with the distance. Underwater explosion has a compression phase traveling in a wave through the water like a huge expanding doughnut five feet thick, and a disturbance phase. The latter is caused by the gas bubble. Months after the Bethesda experiments a Navy submarine captain backed up research conclusions that damage was done by the first silent wave. "No damage is done while your submarine is rocking and shaking from a blast," he said. "A clicking sound has already done it."

GOATS PROTECTED BY KAPOK JACKETS WERE FIRST PLACED IN THE WATER

FLOATING ANIMALS CAN BE SEEN IN FOREGROUND, AS A CHARGE IS FIRED

BILLY GOATS IN KAPOK JACKETS SURVIVE TESTS IN DEEP WATER

FROM the Bethesda experiments research men had 'concluded that an air-containing covering such as non-saturated kapok or sponge rubber might shield an animal or man from water blast injury, providing it fitted snugly about the subject. The time had come to prove out this theory using something larger than guinea pigs. Goats'were in order and a goat cannot be submerged in an old laundry tank. So the medical men again turned to their friends in BuOrd asking asistance. BuOrd made available the old mine layer, U.S.S. Wassuc to be used as the experimental base.

For hours staid scientists sat up with their needles and thread tailoring the goats' little kapok jackets to fit each animal snugly. "It was a devil of a job," said the chief research man. "I would make a jacket to fit the goat just right; then he would sneak out, gorge himself on tin cans or something, and the jacket would be too small. Goats sure do swell up." No pains were spared in fitting out the jackets.

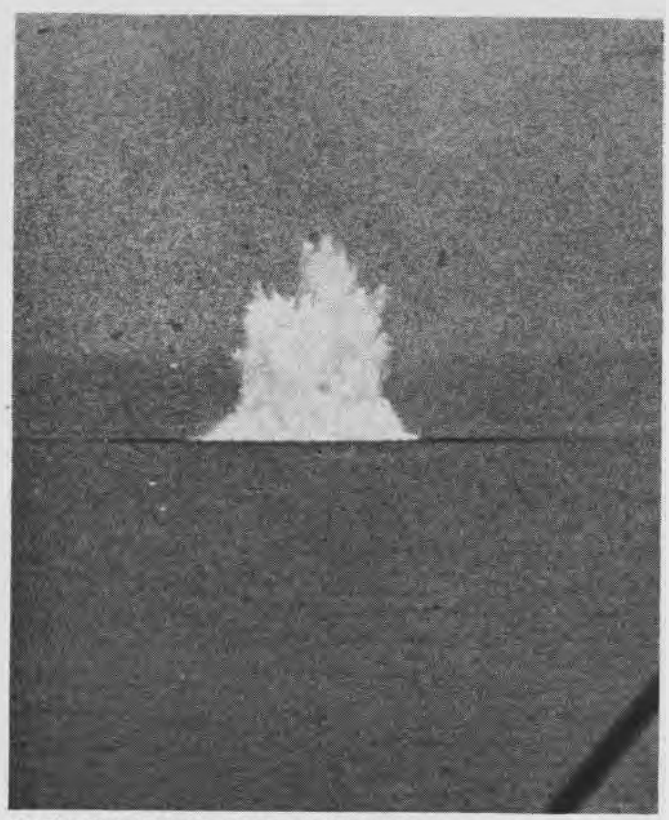
FINALLY the goats and their wardrobes were ready and the good ship Wassuc steamed down Chesapeake Bay. Goats were lowered into the water and depth charges containing a 300 lb. load of explosive were fired. Billies wearing the jackets escaped injury completely.

Other experiments followed upon a still larger scale and again there was no lack of volunteers nor of necessary equipment. At one time military strategists considered the use of shallow water mines as a defense against landing barges. An old landing barge was secured and a site chosen for the experiment. Mines were planted in shallow water and the landing barge was loaded with goats. Some were placed on varying thicknesses of rubber mats while others stood upon the bare deck. The barge was towed across the mine field and the charges were detonated. Every goat survived. Even those that went overboard with the explosion escaped injury. It appeared that to be injured by water-borne shock the victim must be in contact with the water itself.

Having proved the air-containing organs are vulnerable to blast waves and having learned through use of the goats that only actual contact with the water transmits the ill effects of blast, Navy doctors were in a position to adopt their first rules of blast survival. They knew a Navy pilot on a half submerged raft should sit up rather than lie on his stomach when depth charges went off. Otherwise he might be killed or badly hurt, because lying face down upon a partly submerged raft would place not only his intestines but also his lungs in actual contact with the water itself.

Unhurt by exposure to a depth charge because of his kapok jacket, a goat can be seen in background, back aboard ship after tests

VOLUNTEERING TO FACE A BLAST, NAVAL OFFICER IS LOWERED INTO SEA



DEPTH CHARGE EXPLODES WITHIN FEW HUNDRED YARDS OF VOLUNTEER

NAVY MEN FACE BLAST THREAT TO LEARN HOW OTHERS CAN SURVIVE

CHRONOLOGICALLY, the next development in the experiments came shortly after the goat episode when 10 officers of the Navy volunteered to go down to 20 ft. under the water in diving suits and expose themselves to the effects of a depth charge at varying distances. The chief experimenters were among the first to go down. At first, a Mk. 5 charge was fired at a distance of 920 yds. and even then the officers could hear their stomachs grumble from the blast wave. By the time they had moved up to 300 yds. their stomachs, as the chief put it, "were really grumbling good."

They proved that the deterrent distance at which a diver can feel shock but sustain no ill effects is equal to a calculated pressure of 50 lbs. to the square inch. By using beef gut, some of it empty, some filled with air and some with a saline solution, they exploded the old theory that it took 500 lbs. of pressure to perforate a man's intestines. Their tests showed it takes only 250 lbs.

In subsequent diving tests at Stump Neck one volunteer worked up to within 150 yds. of a Mk. 5 depth charge with no sign of an injury to himself from the water-borne blast.

Navy doctors present for the experiment check divers after they had undergone depth charges at a depth of 20 feet below surface

CERTAIN other conclusions are accepted by Navy medicine today because of the experiments. The old theory held that the deeper a man sinks in the water the greater will be the pressure he feels from a blast. In the Potomac area experiments it was found that depth made no difference in the intensity of pressure—it just lasts longer.

In striking the surface a compression wave bursts out into the air shredding the surface of the water into long finger-like strips. The same thing happens when a blast wave hits the body of a downed aviator. It travels through solid tissue and bone until it reaches an organ such as the lung or intestine containing air or gas. Then the wave bursts out into the gassy medium, shredding the tissue surface as it escapes into the air or gas bubbles.

As World War II moved into amphibious stages it was necessary to determine how much blast a man up to his neck in water can withstand wearing battle gear. Moving to the Amphibious Training Base, Fort Pierce, Fla., the experimenters again called for volunteers and got 10.

They proved that a man under such conditions can stand 70 lbs. of pressure, which is 20 lbs. more than he could stand in diving gear. The safety rules for minimizing if not avoiding injury from underwater blast were brought into existence because doctors of the United States Navy are curious, painstaking men willing to take a chance themselves.

FIVE WAYS TO AVOID WATER BLAST INJURY

1 Wear your life jacket properly tied and adjusted. It is a preserver that will safeguard you from explosions and drowning

2 Swim away from expected underwater explosions. You will be safe at 110 yards from Mk. 6 sans jacket, closer with it

3 Make use Of any floating object which will support your weight to draw yourself up out of the water. Keep chest out

4 Keep head out of water and when resting float on your back. Only those parts of your body under water will feel the blast

5 Do not lie on a partly submerged raft when underwater explosions are expected. Stand or sit to avoid bodily injury

PIX QUIZ WHAT DO YOU KNOW ABOUT SURVIVING ON LAND?

THE FINE old art of keeping body and soul together under difficult conditions is being practiced in many parts of the world these days. Try this survival quiz, then check yourself with the answers on page 40.

[QUESTIONS FROM BuAer Special Devices Visual Quizzer Film No. 59, Survivor on Land]

Write answers here

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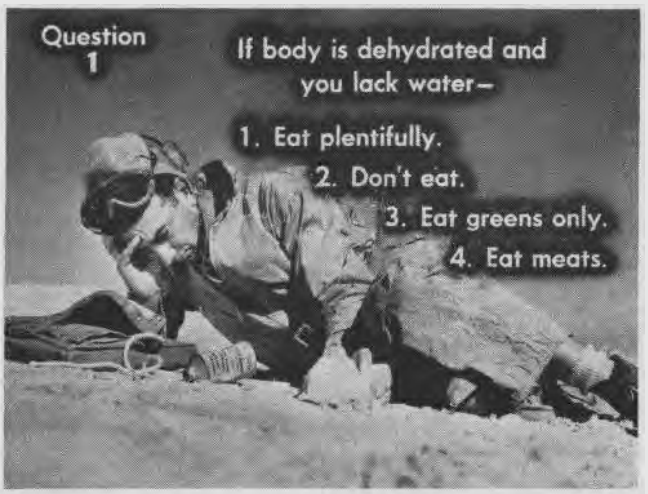
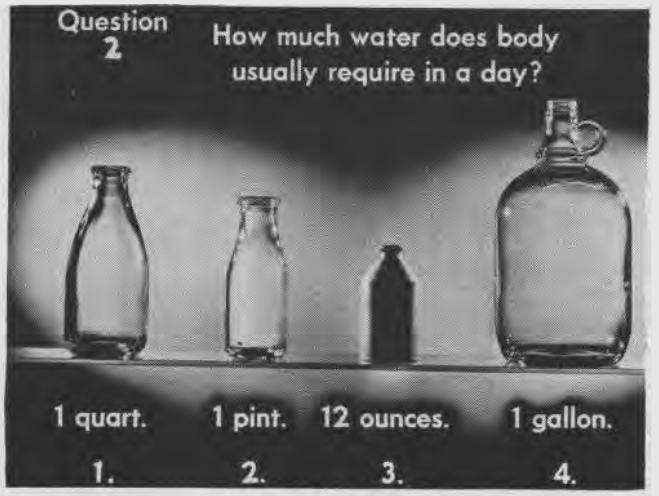
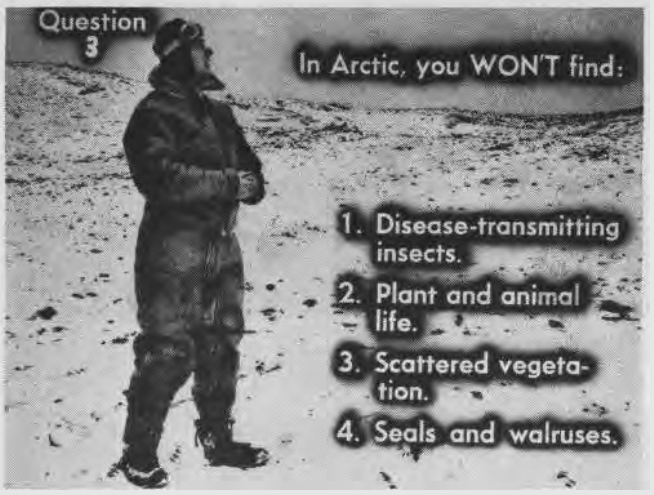
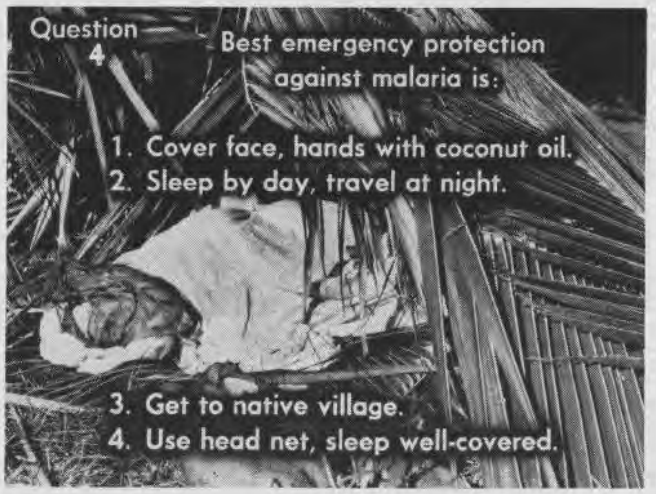
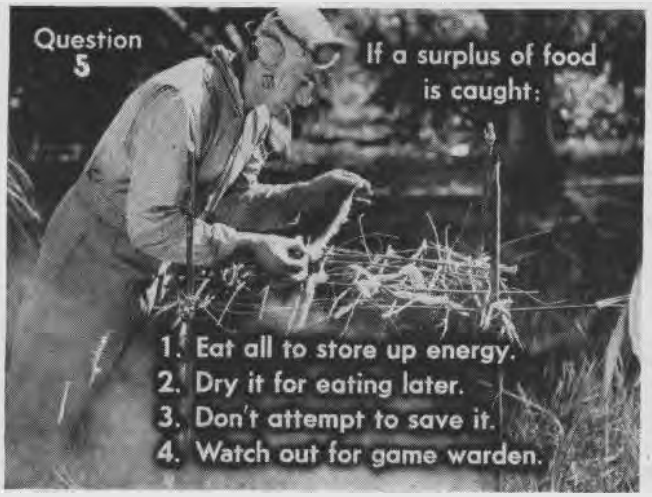
2. . . . . 5. . . . . .
3. . . . . 6. . . . . .

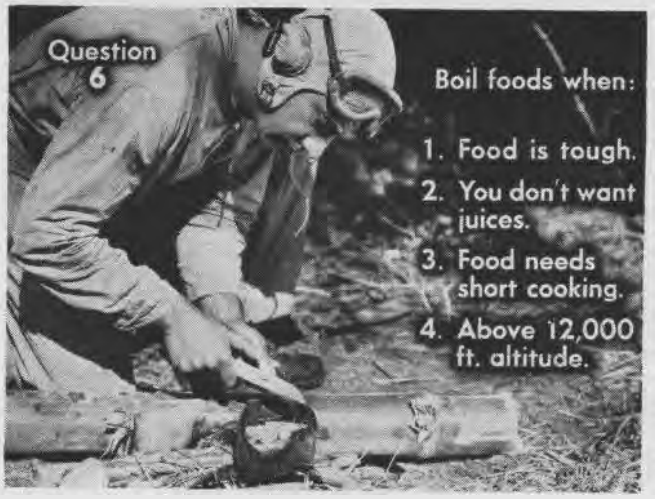












SHORE STATIONS

MCAS EL TORO-A Marine recently returned from the South Pacific tells this story: As radio operator in an armored amphibious tank, he was trying to raise a tank farther down the beach.

"Can you hear me? Can you hear me?", he asked. There was crackling static in the reply.

"Can you hear me? Can you hear me?", he called again. Then a reply came.

"I can hear you good. Give me message." But the Leatherneck recognized the Japanese touch to the English language and replied:

"I can hear you good, too. Goodbye."

NPFS CHAPEL HILL—Few officers at Pre-Flight have had the opportunity which came to an engine inspector during his Japanese visit in 1929. This lieutenant was pitcher on the University of California baseball team that was invited to Nippon, financed by the Japs. "The Japanese have some wonderful ball parks," recounted the lieutenant, "the one at Tokyo being comparable to Yankee Stadium with a seating capacity up to 70,000. Their players were excellent fielders, clever in base sliding, but not too potent at the plate."

NAS NEW YORK—A Marine did a reverse strip tease here recently, and sold his uniform for $65,550 worth of war bonds. The Marine appeared at a local bond auction in civilian clothes. Then, piece by piece, he put on his uniform as bids were made by spectators. Bids ranged from $50 for his hat to $50,000 for a gun.

MCAB CHERRY POINT-A Pfc at this station devours razor blades as easily as his buddies put away their daily chow.

"It all happened while I was serving in the Hawaiian Islands last year. One of the boys in our outfit was trying to prove how tough he was by biting off a piece of razor blade and chewing it to bits before swallowing it. Well, I figured that if he could get away with it, I could too, so I tried it without any ill effects. Recently I consumed 12 blades in four days for the entertainment of my pals." His buddies vouched for this statement.

MCAS EL CENTRO—The leading WR blood donor was thrilled to receive the following letter from a sergeant in the South Pacific who read of her donation in the *Chevron*:

"Dear Corporal:

"I don't know whether the contribution you and your friends gave to the Red Cross blood bank will hasten the return of your relatives and loved ones, but I can assure you from practical experience, those contributions have made and will continue to make it possible for some of your buddies who get wounded to return at all.

"Certainly, if your group can make the effort and the sacrifice, the least we can say is 'well done.' From all of us to all of you, our very best wishes."

NPFS ST. MARY'S COLLEGE—One lieutenant (jg) has introduced a new naval tradition for reporting aboard and paying respects to the commanding officer. He signaled his arrival by going out on the Orinda golf course and hooking his ball a mile off line through the skipper's living room window. He followed up this breezy approach by pursuing the ball into the house and introducing himself.

MCAD MIRAMAR—Father and son combinations among men in uniform aren't particularly unusual, but it is a rare combination when both are lieutenant colonels. These two have a total of 41 years in service, the father having begun his Corps career in 1917 and the son enlisting in 1930. Lt. Colonel, Junior has just returned from aviation duty in the South Pacific.

NAS GLENVIEW—The following letter was received from a young lady in a nearby Illinois city:

To Supervisor of Pilot Training
Glenview Airport
Glenview, Illinois

Dear Sir:
I am interested in learning to fly and have heard that there is a school for pilot training at Glenview Airport. Will you please send me all information regarding this program such as requirements, extent of course, length of time, price and any additional information necessary for entrance? Thank you very much.

Very truly yours,
Betty

NAS FLOYD BENNETT FIELD-A sign on the cigarette machine in the Administration Building Canteen reads: "NO cigarettes. Only Chelsea."

NAGS JACKSONVILLE — A sailor approached the Travelers' Aid desk and explained reluctantly that his bride of 1942 was arriving by 'bus in a few minutes, and that he was afraid he would be unable to recognize her. He had married a girl after a whirlwind courtship of four hours and had been shipped out the morning after the marriage. "I've been out of the States for two years," he added.

The Travelers' Aid representative met the bus. "Yes, I'm Mrs. Joe Doaks," answered a pretty, well-dressed girl. "Your husband had to leave the station," said the representative, "and he asked me to meet you and take you to my desk."

Seaman Doaks waited three minutes, rushed up to the desk, opened his arms to the girl and exclaimed, "Mary, darling, its like heaven to see you again!"

NATB PENSACOLA-Rides, weekly publication of the rationing office designed to bring about a greater share-the-rides movement, made its debut recently. Names of automobile owners, their addresses and phone numbers are printed so that persons in their neighborhood needing rides may contact them.

NAS NORMAN-TWO N2S3 aircraft have been painted to designate the 6-flag. When weather conditions are such that it is advisable for all aircraft to return to the field, these planes are dispatched. Pilots of each aircraft are assigned a certain number of fields which are listed on the instrument panel.

MCAS MOJAVE-Walter, duck mascot of a fighter squadron here, is just about ready to call it quits and be somebody else's good luck pet. The Mojave desert is no place for a self-respecting duck, says Walter, #recalling the climax to this desert trouble which was pretty rugged.

It seems that the dry air dried out all the oil in the mascot's feathers and turned them from snow white to a disgusting jaundice color. One day when suffering from the heat, Walter discovered the huge combat swimming tank and happily plunged in for a dip. All was fine for a few minutes-and then the water seeped into the unoiled feathers. Walter was waterlogged, and started to submerge!

Flapping his wings in great consternation, Walter was able to attract an alert lifeguard, who rescued him. The duck was restored to the bosom of his squadron, but he is still fed up with the desert.

MCAS . MOJAVE—Holding a unique position in the Corps is a Woman Reserve second lieutenant. She is the daughter of a lieutenant colonel, sister of a captain and wife of a lieutenant-all Marines.

MCAD MIRAMAR—Advertising that commercial companies carried in a Marine newspaper is still bringing results and proving that the sailor with his gal-in-every-port ain't seen nothin' yet.

An order was just received by a LaJolla concern for 34 Marine pillow cases. The request was placed by a Marine corporal and each is to be sent to a different girl.

MCAS MOJAVE—Two members of the Marine Corps Women's Reserve here, while spending a furlough in New York City, were amazed to discover that the majority of the civilian population did not recognize their forest green uniforms as being those of the Marine Corps.

After several days of being called WACS, WAVES, SPARS and members of various foreign organizations, they gave up trying to make themselves known and began nodding pleasantly to casual commentators regardless of the title used.

The climax and the end of their patience came, however, when they were confronted by some Canadian fliers. One of them questioned in a marked British accent, "I say, what are you-Seabees?"

NAS BRUNSWICK—Drawing and sketching classes were organized for military personnel. An eager response indicated that classes soon may outgrow the classroom.

MCAS EL TORO—Here's a new version to *Of Mice and Men*. On a recent oxygen hop while he was flying at 25,000 feet, a Marine fighter pilot saw a mouse climb over the top of his instrument panel, and settle himself comfortably-unaware that at such heights, an oxygen mask is necessary.

NAS PATUXENT RIVER-VR-1 has two seamen second class, V-10, assigned to duty as flight orderlies on the Patuxent-Norfolk-Washington National Airport shuttle service. It is anticipated that these WAVES will start on longer runs in the near future. Assignment of WAVES to this duty marks an innovation in NATS, and seems indicative of many domestic flights being taken over by WAVES.

MCAS EDENTON-TWO bottles of water -one from the Atlantic and one from the Pacific--were poured into the new swimming pool at recent dedication ceremonies.

NAS NEW ORLEANS-Awaiting word from BuPers on their commissions, 20 aviation pilots first class built 50 model aircraft, some so painstakingly exact they had tiny rudder pedals and sticks which actually moved control surfaces. Many plan to use them for instructing their students.

MCAD MIRAMAR-Nothing can better illustrate the fighting spirit of New Zealand fliers in the Pacific than this episode related by a lieutenant who recently returned.

"I was flying over Rabaul one day," he said, "when I heard a New Zealand pilot call over his radio to another: 'Hey, you, come on down here. I've got 40 Zeros cornered'."

NAS NEW ORLEANS—Designed to give a helping hand to ambitious bluejackets who wish to make the Navy their career, a school to prepare men for Annapolis will open here. It will be staffed by officers selected as especially qualified in naval matters. Applicants for training will be interviewed bv the commanding officer.

NAS BRUNSWICK—The duck season opened recently around this station, and if ducks could release communiques, their first undoubtedly would read, "Flak was terrific, but few of our aircraft are missing."

TOKYO TALKS

-To JAPAN

According to the Manchurian radio, a Japanese scientist has developed a beer extract to quench the thirst of front-line soldiers while saving shipping space. The beer extract is concentrated barley and hop juice to which the soldiers must add their own carbonated water.

-To THE UNITED STATES

The Japanese government is employing school girls to whip up civilian morale after air raids. When the all-clear signal sounds, the drum and flute corps of the Nagasaki girls' commercial school make their appearance.

-To THE UNITED STATES

General Yamashita, who seeks unconditional surrender from General MacArthur, sometimes gives the impression of being vague because he has been known "to doze off and even snore in the midst of conversation with people." A classmate of his, however, reports that he is the type of person who, while dozing, hears all the conversation carried on at the time.

-To JAPAN

Fashions for men as well as women have changed in Tokyo under wartime conditions. While women have taken to wearing slacks, men have donned western clothes and fez-like hats for the sake of convenience during air raids. Most people carry sacks to accommodate medical supplies or unrationed goods found from time to time or donated by friends.

-To JAPAN

The shortage of cigarettes in the United States is so acute that many American women have taken up pipe smoking.

-To JAPAN

A national cookery school has been set up for training village women to derive the most value out of all available food. Lack of proper nutrition was "showing a tendency to damage the will for increased food production and hindering the morale of the farmers." Extreme measures were necessary, since many were receiving unbalanced diets due to a decrease in allotment of fish and tastelessness of available food resulting from haphazard cooking.

-To OCCUPIED ASIA

Domei reported that several tanks, which were made in part of scrap iron and copper contributed with "boundless benevolence" by Emperor Hirohito, had been received "at a front line base in the Northern tip of Japan."

-To THE UNITED STATES

The Tokyo radio declared that the Japanese "consider it an insult to be called propagandists" and claimed that, whereas the "brilliant war results" achieved by the Japanese navy in the fighting off Formosa and the Philippines was "true news," America "has spread only false news" about that action. The broadcast went on to explain that "the difficulty is the Japanese are a truth-telling nation, and do not know the intricacies of falsehood."

-To JAPAN

The Japanese agriculture and commerce ministry has decreed. that "self-supporting" poultry farmers throughout Japan must turn over to the government "at least 10 eggs per hen monthly."

-To RUSSIA

Japan was surprised and offended by Premier Stalin's speech in which he branded them as an "aggressor nation." Since the Japanese are fighting to "free the peoples of Greater East Asia from the imperialism of America and Britain," Japan was disappointed that Stalin could not distinguish between liberation and aggression.

-To THE UNITED STATES

Roosevelt's re-election to a fourth term was greeted calmly in Tokyo. Although various American experts predicted a close race, only 10 to 1 bets were accepted by Japanese willing to put money on the much younger and inexperienced Dewey. "Assured of another four years' tenure in the White House, it is certain Roosevelt will now assume an even more arrogant attitude in the mad quest to bring the world under the smokescreen of American efforts toward 'world security'."

-To JAPAN

A total of 1,066 families "who have brought 10 or more living children into the world" will receive commendation certificates and a picture frame as a gift from the Japanese Welfare Ministry.

SHOW ME THE WAY TO GO HOME

DR Plotting Problem

You are returning from an operational patrol in a PBY and fix your 1300 position as 119 miles due south of Kiska, Lat. 51" 59' N, Long. 177" 30' E. You find your track to be 105°, GS 120 k, TH 096°, TAS 124 k.

What is wind? Force . . . . . .

From . . . . . .

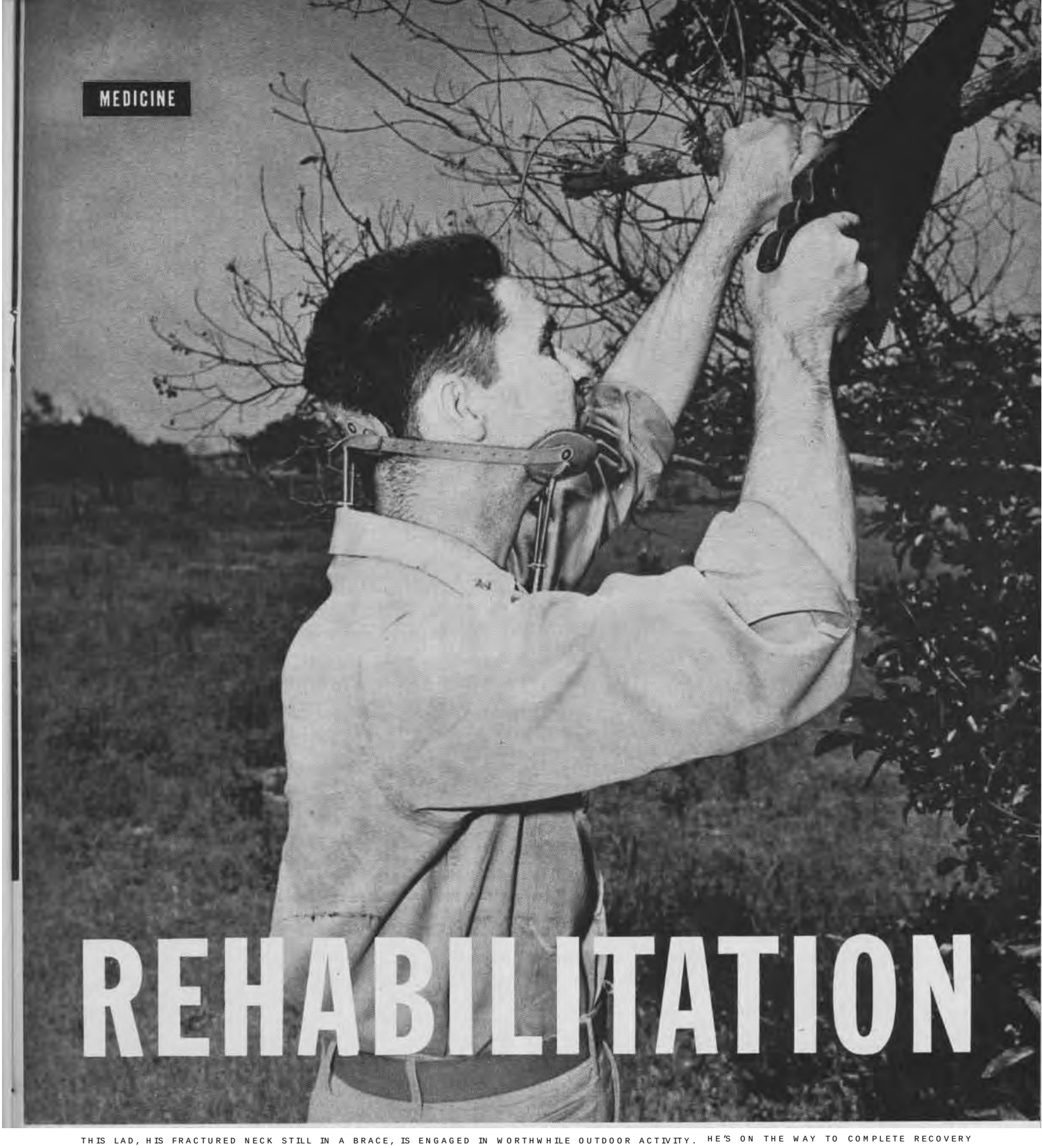
You plan to continue on track for 15 minutes and then change Cus for your base, the U.S.S. Pelican, Lat. 47" 19' N, Long. 177" 15' w.

What is TH to base . . . . . .

What is GS? . . . . . .

What is ETA? . . . . . .

(Answers on page 40)



REHABILITATION

THIS LAD, HIS FRACTURED NECK STILL IN A BRACE, IS ENGAGED IN WORTHWHILE OUTDOOR ACTIVITY. HE'S ON THE WAY TO COMPLETE RECOVERY

Varied Navy Program Speeds Recovery Of The Sick and Wounded

REHABILITATION goes along with standard medioal care. It includes everything 'that helps a sick or wounded man regain his health. As a supplement to medicine and surgery, it ranges all the way from heat treatments for wound-stiffened limbs to studying: aeronautics, from carpentering to skiing, or from learning radio mechanics to going to a dance or party on Saturday night.

The rehabilitation program, set up by the Surgeon General last April, speeds complete recovery of hospitalized -Navy men. They stay in the hospital longer than they would in civilian hospitals, but when they get out they do not go through long convalescence regaining strength and skills-they're ready to go.

MARINES WOUNDED ON SAIPAN ARE LIFTED INTO BIG R5C FOR TRIP TO PEARL HARBOR. QUICK EVACUATION OF WOUNDED SPEEDS THEIR RECOVERY

Skilled Care Paves Way Back to Health

EARLY treatment is a cardinal principle of naval medicine. It lays the foundation of speedy rehabilitation. There are medical units aboard all Navy ships, at every advanced base and at all shore establishments.

When a man at sea or in a forward area needs prolonged medical care, he goes by sea or air to a naval hospital in the United States. It is there that the rehabilitation program goes into action.

Medical specialists in physical therapy restore action to injured legs, arms, hands. Specialists in occupational therapy teach arts and crafts that rebuild a man's skill and confidence. The educational services officer conducts a program for strikers studying: for higher rates while others take 'high school and college courses. Navy chaplains are always-ready to listen to men with problems and give religious counsel- and personal a&ice. A" physical (training officer supervises a physical fitness program that starts with daily exercises for men still in bed and continues until they are back playing ball and other outdoor and indoor games. Red Cross representatives provide personal and social services. A man can always go to them for a helping hand with his personal or family problems.

Civil Readjusfm enf Officer Also Helps

FINALLY, a civil readjustment officer—in each case one who has been an enlisted man and has the enlisted man's point of view-helps men slated for medical discharge get set-to go back to civilian life and make good regardless of the disabilities they may have. Experience shows that they make good.

ADVANCED BASE HOSPITAL IN CLOTH-LINED DUG-OUT IS SAFE HAVEN

SICK BAY SCENE ON FIRST-LINE CARRIER IN ACTION AGAINST JAPS

Program Is Designed To Fit The Patient

IN ALL parts of the country there are naval hospitals that handle every type of illness and injury. Certain hospitals also specialize in particular types of cases. Thus, the few men who have been blinded go to the Philadelphia naval hospital where they all receive the full advantages of the specialized care and training that Philadelphia is equipped to give them.

On the staff are experts in teaching Braille reading, touch typewriting and other occupational skills that reduce the handicaps of blindness and will later help them earn a living. In the same way, Philadelphia takes care of deaf patients, teaching lip reading, helping them adjust to deafness and fitting them with hearing aids. At the same time, the blind and deaf are encouraged to mix with other people both inside the hospital and outside when they are on liberty in the city.

Minus a Limb, Men learn New Skills

Philadelphia and Mare Island naval hospital take care of men who have had amputations. Surgery is performed that prepares stumps for artificial limbs. Then the men are not only fitted with artificial limbs made in the hospital shops but are taught to use them. They learn to drive a car again and they learn to dance, in addition to acquiring skill in the ordinary matter of walking if they have lost legs. Men with artificial arms relearn old manual skills and also learn new ones. Men who couldn't use a typewriter before their injury, for example, learn #afterwards. Several fliers have gone back to flying after amputations and many of the men return to other duties in the service. Those who receive medical discharges prepare for civilian life by learning or relearning trades at which they can earn a living.

Other hospitals, like Oakland and San Diego, specialize in plastic surgery. Bethesda and Chelsea handle cases needing neurological surgery. And Corona, to mention another, takes care of men with tuberculosis.

The Navy also has a number of convalescent hospitals, such as the one at the famous mountain resort, Sun Valley, Idaho, and the one in Yosemite National Park. Here convalescent patients broaden their activities to include skiing, skating, swimming, fishing, golf and other outdoor sports.

Before they realize it, men can do all the things they did before they were hospitalized. When they reach that point they are all set for active duty.

STILL IN A CAST, PATIENT PASSES TIME STUDYING AN AERONAUTICS CORRESPONDENCE COURSE

CHOW IS SERVED ON FAMILIAR NAVY TRAYS, BUT IT IS SPECIALLY PREPARED FOR THE PATIENTS

FOLLOWING INFRA-RED LAMP TREATMENTS, THOROUGH MASSAGE EASES WAR-STIFFENED MUSCLES

In new occupational therapy building, St. Albans Naval Hospital, patients assemble machine parts for manufacturer of war material

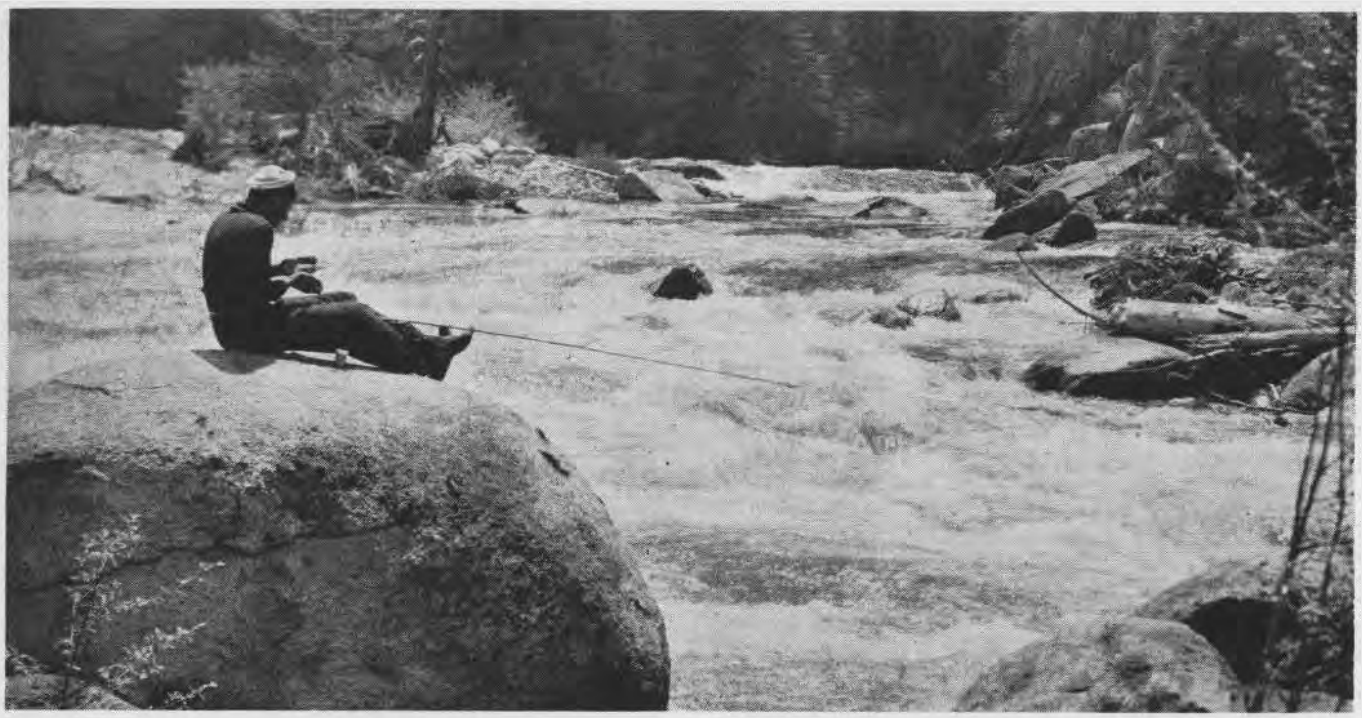
Two patients at Long Beach Naval Hospital use radiograph cutter. They are studying in vocational school as part of rehabilitation

Work and Recreation Aid Rehabilitation

A HOSPITAL can be the dullest place in the world, particularly to men like those in the Navy who are used to extremely active lives. And it takes longer for a man who has time hanging on his hands to get well than it does for one who has plenty to do. The rehabilitation program keeps men active and alert.

Rehabilitation requires effort on the part of the patient as well as the doctors and non-medical personnel. But the sooner he begins rehabilitation activities and the more effort he puts into them, the more a man gets out of them and the faster he regains his health.

A man may be surprised that he has to do daily exercises while still in bed. He may gripe about them, but they mean that he will get out of bed sooner. Study sometimes seems futile to men in the hospital, but when an ARM2c discovers that he can study for ARM1c when he's still flat on his back, time goes faster, his morale goes up and he gets well quicker. A hospital ward is an odd place to go the movies, but it gives men a lift when they see a movie even if they do see it in pajamas. And when a man in a wheelchair discovers that he can work in the carpenter shop he is on the way toward health. Rehabilitation is work-and it works.



CONVALESCENT AT NAVAL HOSPITAL, YOSEMITE NATIONAL PARK, FISHES IN MOUNTAIN STREAM THIS IS PHASE OF NAVY REHABILITATION PROGRAM

Men Leave Hospital When Ready For Work

THE majority of men who come under the rehabilitation program go back to active duty in the Navy, Marine Corps or Coast Guard. They go back as soon as they are capable of doing their jobs once more. Those men who, after a medical survey, receive discharges, are released only when they're ready for civilian life. Beforehand, they have the aid of a civil readjustment officer in lining up jobs and planning for the future. They have the help of the Red Cross in handling personal affairs, both while in the hospital and after being discharged. As civilians they also have the help of the Veterans Administration in arranging for further training and in finding jobs.

Veterans, of course, get preference in a great variety of jobs. Many men go back to their pre-war jobs. Others continue in the war effort by taking jobs in war factories. Hundreds of Navy veterans, for example, are working as civilians in the Brooklyn Navy Yard and others are employed in aircraft factories, munitions plants, shipyards, steel mills.

The great fear of men who receive medical discharges is that they won't be able to stand on their own two feet. They know that they are among the nation's most respected citizens. They want to make good on their own. The Navy rehabilitation program starts them toward this goal. The men do the rest.

A Marine wounded in action checks out of U.S. Naval Hospital, Philadelphia. He has an artificial leg, but as a result of skilled Navy rehabilitation he is ready for duty again

AT SUN VALLEY NAVAL HOSPITAL, **ARM2C** M. J. **CURLIN** RECEIVES DFC FOR "EXTRAORDINARY ACHIEVEMENT" IN PATROL PLANE FIGHT WITH U-BOAT

Fleet gunners practice on beaches of Florida Island

When wet weather interferes with outside gunnery in the British Solomons, antiaircraft gunners of fleet move into a Quonset Hut

FLORIDA ISLAND HAS ITS OWN CLASSROOM

ON FLORIDA island in the British Solomon islands not far off Guadalcanal stands a low iron hut beneath a file of towering palms. Within it, keen-eyed antiaircraft gunners of the fleet are keeping a sharp edge on their shooting form these days. For here an officer of BuAer's Special Devices Division supervised the installation of gunnery training devices for Siota Antiaircraft Training Command. Built by Seabees the Quonset hut furnishes a space 40' by 100' for class work. Generators nearby furnish power.

In cooperation with BuOrd, modified Panoramic Gunnery Trainers and modified 3-A-2 Dual Projection Trainers were installed in the hut. There is room for classes in antiaircraft gunnery, as well. When equipment was ready, training was established by the O-V(S) officer in charge. Trainers have provided an improved method for practice on the Mk.14 sight and when rains make use of the nearby range out of the question, classes now move indoors. Increased hits on the range have become common as a result of the new training program on Florida island.

Both torpedo and dive bombing attack training are now available with 20 mm. guns using the Mk. 14 sight in Seabee hut

TECHNICALLY SPEAKING

New Mk 78 Sight Goes Into Use

Training has been stepped up in use of the new Mk 18 gunsight, in line with recommendations of CNO, since the sight is to be installed as practicable in all operational turrets to be manufactured or designed. Aerial gunners and maintenance men both are being familiarized with the sight, the latter at aviation ordnance schools under NATTC. A 13-hour syllabus of training for free gunners who will use the Mk 18 has been approved.

The sight is an electrically operated, computing, reflector-type sight designed for use in power turrets. The gunner makes the proper settings on the control units, after which it is necessary for him only to "range and. track!' enemy aircraft, for the sight automatically figures proper point of aim. The gunner does not have to figure deflections. It makes no difference whether the enemy airplane is in a pursuit curve or whether the target is stationary as in strafing.

MK 18 GUNSIGHT TO BE PUT ON NEW TURRETS

The sight-really is two 'sights in one. It has two optical systems and two reticles, one "fixed" and the other movable. Two foot pedals are used to assist in operating it. Films on Mk 18 gunsight, MN-3588a and b, are loaned at aviation film libraries.

Dome Requires Correct Arm Usage

In order that navigation dome refraction corrections may-be used accurately when taking sextant observations through the dome, it is imperative to use the correct type of suspension arm.

The three types of bubble sextants designed for use in the navigation dome are: Pioneer Mk 5 sextant, Stock No. R88-S-350; British Mk 9A sextant, Stock No. R-88-S-355; and the Bausch & Lomb sextant, Stock No. R88-S-375. Each of these sextants, when suspended in the dome from the proper suspension arm, locates the index prism or index mirror at the correct position for which the dome has been calibrated. Correct position is 6" below the apex of the dome and 2%" away from the vertical.

Proper suspension arms to be used with these approved sextants are:

1. Pioneer Mk 5 sextant use Arm, Stock No. R88-A-595
2. British Mk 9A sextant use Arm, Stock No. R88-A-580
3. Bausch & Lomb sextant use Arm, Stock No. R88-A-585

PROPER SUSPENSION ARM MUST BE EMPLOYED

Approximately 2,000 Mk 5 sextants were initially supplied with arms that do not position the sextant correctly in the dome. It is recommended that activities in possession of Mk 5 sextants containing incorrect arms requisition the correct type arms from stock. Current sextant deliveries contain correct type.

British Mk 9A sextants have not been delivered with arms of any type. BuAer has procured sufficient quantities to supply correct type arms for all Mk 9A sextants. These arms may also be requisitioned from stock.

Bausch & Lomb sextants are delivered with the correct arms contained in carrying case.

Suspension hooks in the three arms listed are fixed into the shock-mount at a definite angle so that line of sight through the sextant will tend to lie in planes radial to the dome, insuring correct dome refraction corrections.

Bearing Jack Aids Prop Repair

NAS PEARL HARBOR-A civilian employe of the A&R department has devised a bearing jack for installing bearing stacks on split gear type Curtiss electric propellers. The tool saves 50% of the time formerly used for this operation and eliminates possible frozen bearings due to introduction of foreign particles caused by the old method.

EMPLOYE SHOWS JACK IN PLACE ON PROP HUB

The bearing jack is similar to a conventional gear puller, except for having a ball-bearing mounted pressure pad installed at one end of the screw. The bearings are pulled onto the gear halves of the prop at a steady rate and without cocking or distorting the bearing.

[DEVISED BY H. D. KIMMELL]

BuAer Comment-This bearing jack should be quite useful, particularly to those activities having occasion to install many bearing stacks. Elimination of the possibility of bearing damage due to striking the races or the pickup of metal chips is especially desirable. Recommend all activities avail themselves of this prop tool.

CLOTH FACE PIECE SEWED TO HAT PROTECTS SURVIVOR FROM SUN

HAT-HEADNET IS REVERSIBLE WITH NET AS ADDED PRECAUTION

RAFT GEAR

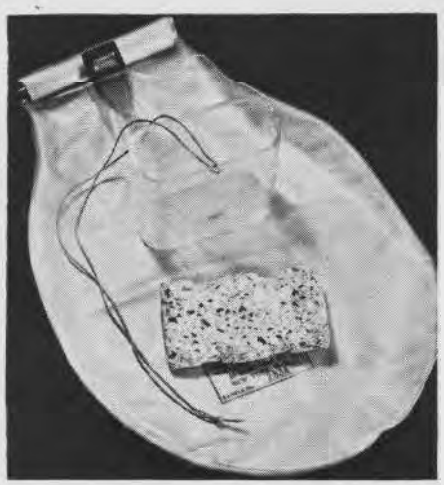
Four Items Of Survival Available From BuAer

NEW EQUIPMENT for survival in life rafts has been designed and procured by BuAer. Since drinking water is recognized as one of the most important items of survival, plastic water stowage bags and emergency drinking cups have been provided. Available also are hat-headnets to alleviate sun exposure and bailing sponges for removing water from life rafts.

The water stowage bags have a five quart capacity and are designed for use aboard pneumatic life rafts. The purpose of this item of equipment is to provide a convenient, leakproof reservoir for rain water or excess production from the solar still. When water is stored in the container over a period of several days, it may acquire a taste imparted by the vinyl resin material. This effect is not in any way harmful; however, water should not be allowed to remain in the stowage bag for too long a time.

Stock number R83-B-30175 should be used when ordering bags.

Rectangular plastic drinking cups are under procurement for each multi-place life raft. The transparent surface is marked at each half ounce level so as to facilitate the division of available water rations on an equitable basis. These cups fit securely over the bottom of a rectangular drinking water can or desalting kit, thus consuming only a negligible amount of stowage space. The stock number for ordering this item is R83-C-81525.



WATER BAG, CUP AND SPONGE ARE USEFUL AIDS

A PRACTICAL means of protecting the heads of personnel from the effects of sunburn was necessary and the hat-headnet unit was designed to be used on land or sea.

The hat-headnet is reversible and consists of a fabric cap with netting. Cloth face and neck pieces are sewed to the cap portion to afford protection from the sun. A drain is built into the crown of the cap for use in funneling water into available water stowage bags or containers. When ordering, the hat-headnet unit is identified as Stock Number R83-H-20,000.

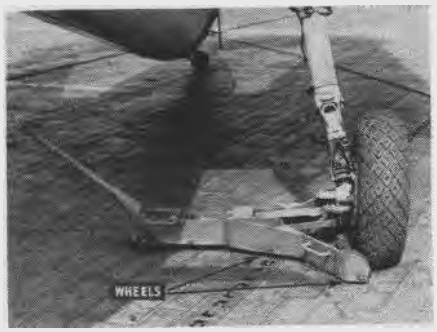
The purpose of cellulose life raft bailing sponges is to facilitate the complete removal of all water from the effects of continuing salt water immersion. These helpful sponges are designated by stock number R83-S-648500.

Plane Jack Speeds Wheel Work

U. S. S. WOLVERINE—An ensign has devised a hydraulically-operated airplane jack by which two men can change a wheel in three minutes without relocating the plane or cutting the engine.

The unit is six inches high when lowered and 19%" high when raised. It weighs 190 lbs. and is 104" in length with handle extended. The hydraulic unit is a five-ton ram, capable of lifting any carrier-type aircraft. Handle and lifting arm are standard jack parts. Framework and wheels were constructed of scrap metal. If made of cast steel, the jack would weigh considerably less without impairing its lifting power.

A wide supporting point gives great stability to the jack. The wheels on which the framework is mounted allow the unit to roll with the ship and thus preclude the aircraft from dropping off the support. The "V" shaped framework allows the supporting point to be rolled into place directly below the jacking point of the axle, eliminating difficulty of properly locating the support when a ruptured tire laps to inboard.



WOLVERINE ENSIGN DESIGNS PLANE WHEEL JACK

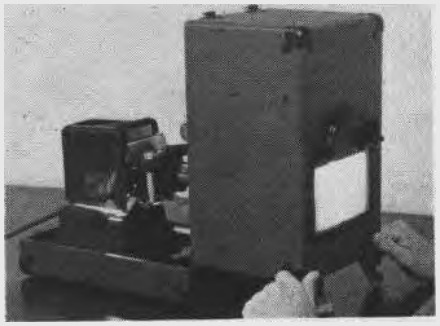
[DEVISED BY ABRAM GORDON, ENSIGN]

BuAer Comment—This is an excellent idea. BuAer is developing a similar model with a quick-locking device which will insure no movement of the jack while supporting the plane. BuAer does not recommend use of this device without a locking feature because movement of carrier decks may result in a damaged aircraft.

FAW-2 Modifies Microfilm Gear

FAW-2 — The microfilm projector, Recordak Model A, and carrying case have been modified at this activity to provide for easier examination of microfilm-reproduced material.

Modifications were acomplished by installing a 4" x 6" piece of ground glass in the top of the carrying case and by adding a lengthening attachment to projector lens assembly so that the image might be focused on the installed screen. Other minor revisions necessary to complete the assembly included changing positioning members in the bottom of the case so the projector can be turned end for end, changing upper members of the hinges and hasps in the same manner, revolving the carrying handle 90°, providing a retractable support for the case top when it is in open position, and adding a small spring to keep the carrying handle off the glass.


FAW-2'S CHANGES MAKE EXAMINATIONS EASIER

The completed arrangement provides a satisfactory enlargement of microfilm material, and eliminates the necessity of setting up a screen unless the information is being exhibited before a group.

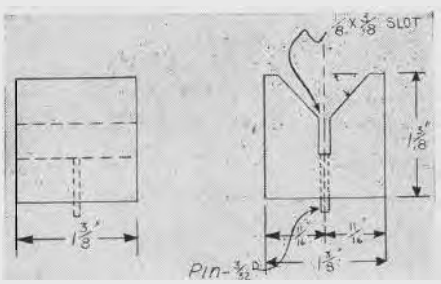
BuAer Comment—This is a splendid idea, and it is recommend to other activities as a facile way of viewing strip film. BuAer is making similar modifications on one of its own projectors.

New Gauge Does Accurate Work

NAS PEARL HARBOR—A civilian employee in the A&R shop has developed an aligning gauge-power brake for finding the exact center of a bend line on a template. The gauges are made for all bend radius dies from 3/16" up to ¾".

Past practice has been to sight the bend line in relationship to the male die. When it looked about right, the operator would set his back stop up to the metal. This procedure, all right for small bend radii, is inaccurate for large radii. These gauges fit into the 3/32" bend line holes of the template. The template and gauge then are placed on the female die and the male die brought down until it fits tightly in the notch of the gauge.

The back stop then is set to the edge of the metal. This method saves time and there is no possible chance for wasted material. A very accurate braking job is done and guess work is eliminated.



PEARL HARBOR WORKER MAKES BRAKE GAUGE

[DESIGNED BY A. M. SWENDSEN]

BuAer Comment—A valuable tool under certain conditions and one easy to make.

PHOTOGRAPHY

Do Not Photograph Through Plexiglas

Recently some good combat motion pictures of the Philippine landings arrived in the Navy Department. One shot of a Jap dive-bomber being knocked down by carrier antiaircraft fire is spectacular and well worth all the effort put into the work. Other scenes also are good. A part of the aerial photographs, however, were made through the Plexiglas of a TBF, and although the subject matter is excellent, the film has poor photographic quality.

This and other gun camera film shot through Plexiglas received by the Navy Department demonstrate that attempts to photograph through Plexiglas windows lead only to unsatisfactory results.

Owing to a critical shortage of certain films, it will be necessary to use the product of more than one manufacturer for some items on the Standard Photographic Stock List. An example of this is Ansco Triple S Pan Aero film which will be supplied on Stock No. 18-F-31575. This film should be developed in D-19 developer if high contrast negatives are desired.

Attention is invited to BuAer Letter Aer-PH-16-CLR, F44-2, Ser. 196278 to all Ships and Stations, dated 7 November 1944. The subject of this letter is "Outdated Photographic Film and Paper, Suggested Use of."

A supplement to the Standard Photographic Stock List and Quarterly Report, NavAer-453 (Rev. 4-44), has been issued for gun cameras and related equipment, NavAer-453A (11044). A copy of this form is to be attached to subsequent stock lists when submitted as a quarterly report. Additional quantities of the supplement may be procured upon request to Publications Section of BuAer. It is to be noted that this publication must be ordered separately from the regular Standard Photographic Stock List until such time as it may be incorporated in a revised edition.

Which Type Photos Are in Demand?

Attention of all photographic officers again is invited to Photography Technical Bulletin NavAer 10-1R-62 dated 11 July 1944. It is requested that all photographic units contribute a few good shots monthly to insure adequate news and historical coverage of the present war. Quality should be the prime consideration. These photographs should be packed with interesting subject matter and suitable for reproduction.

It is suggested that each photographic officer set a quota of five photographs a month as his laboratory% share. The average photographer's mate greatly desires to shoot such photographs, all he needs is a green light and encouragement.

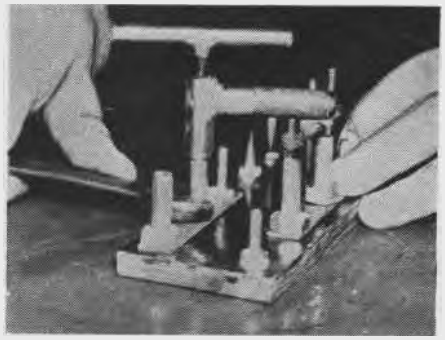
Several units operating on outlying bases have reported that the Navy standard 20 mm. ammunition box makes an excellent emergency storage for cameras and film.

Stud Extractor Speeds Operation

NAS CORPUS CHRISTI—Damage to studs and junction boxes has been eliminated by use of a stud extractor or retainer tool designed by an electrician at this station through the Navy's beneficial suggestion program.

The tool consists of a tee handle and a tee lock screw. In use the handle is screwed into the stud and then the lock screw is screwed into the handle until contact with the head of stud is made and bound. With the tool thus secured, tightening or extraction of the stud becomes an easy matter.

Use of the tool permits tightening or extracting studs without removing the terminal strip from the junction box or



NEW TOOL MAKES EXTRACTION EASY MATTER

the junction box from its location. Operations have been expedited materially through use of the stud extractor tool.

[DESIGNED BY OLLEN O. NEWSOM]

Astro Compass in Low Latitudes

The astro compass was designed primarily for use in middle and high latitudes. Navy navigators already have found that, when used by the rules, the astro compass will not give accurate headings in latitudes below about 25°, especially when the sun is near the horizon.

It is possible to use the astro compass as a simple pelorus. Azimuth of the sun can be found by use of the almanac and tables in the same way as in computing a sextant shot. With latitude set at 90°, set the azimuth into the LHA drum against the true bearing lubber line. Then, when the sights are directed toward the sun by moving the azimuth plate, the true heading may be read off.

A simple modification of the sight

CROSS LINES ADAPT ASTRO COMPASS SIGHTING

assembly may be made which will obviate need of calculations. A cross piece may be placed on the foresight as shown in the sketch. Care should be taken to have it parallel to the base of the sight.

A cross line or pair of lines then should be inscribed on the shadow screen. These must be at the same distance from the base of the sight as the cross piece on the fore sight. Thus, when the LHA drum is set to zero latitude or near it, the cross pieces will be nearly vertical and can be used in the same manner as the standard fore sight and shadow screen arrangement.

This modification may be accomplished easily and is subject to several variations. The principal purpose is to provide accurate reference lines or marks at 90" to standard reference lines.

Rudder Lock Method Saves Time

ZP-24-A new method of securing rudder locks which saves minutes in take-off preparation has been suggested by an officer with this activity.

The method employs sticks, as now used tied in line, altered in the following manner: Forward ends of the sticks are secured with parachute webbing, width of which is determined by the size of aircraft tail. After the sticks are around the tail the aft ends are secured with bungee. The lock can be used on all sorts and sizes of tails and rudders by , pushing bungee back or forth as the size demands. It is suggested that a tie-off be attached to the throttles so that the pilot will be aware the rudder lock is on.

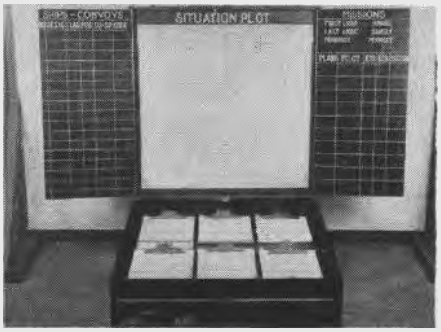
Present method of rudder locking with sticks tied with line at both ends [NANEWS, 15 Nov. 1943] requires about four minutes to put on or take off. Suggested* method requires less than one minute. New method of rudder lock is especially useful at outlying bases where makeshift materials must be used or at fields where many planes are kept outside hangers at night.

[DESIGNED BY LT. DAVID STAR, USNR]

BuAer Comment-The simphcity of construction of this rudder lock and the common materials used makes it an item that can be manufactured locally.

ACI Officer Designs New Field Case

VB-143—An Air Combat Information field case that incorporates basic facilities of a control room and yet is conveniently portable by air has been designed by an officer in this squadron. The case is specifically adapted to requirements of a land-based medium bomber squadron engaged in patrol



CASE PROVIDES CONTROL ROOM FACILITIES

and other anti-submarine operations. If additional working surfaces were incorporated to aid in briefing of a more extensive character, this case could meet the requirements of others.

Constructed of 3/16" aviation plywood, the case weighs 58 lbs. empty and approximately 105 lbs. loaded. It contains one supply drawer and one combination chart and filing drawer. Spaces are covered with 1/16" Plexiglas for the mounting of two charts, one for situation plotting and one for missions. One sliding surface can be used as a desk. The supply drawer has 10 compartments, holding office supplies.

The chart and filing drawer provides space for a limited number of essential charts. Removable shallow partitions provide for elementary filing necessities supplementing the six-clip top surface. Detailed specifications for construction of this ACI field case may be obtained from Services Section of Air Intelligence Group, Division of Naval Intelligence.

[DESIGNED BY E. G. SIMPSON, LT. USNR]

CARRIER STRIPS SHIP

Stripping a Navy ship about to put to sea brings up some strange assortments to gladden the heart of a church bazaar chairman. All gear such as boats and anything inflammable or liable to cause splinters has to be sent ashore before the ship leaves port, or it may be jettisoned at sea in some cases. In the picture on the opposite page, almost everything imaginable, from skiis to old SBD's are piled on the deck, awaiting transfer to the dock. A good pair of eyes or anyone with 20/10's plus a magnifying glass can spot such oddments as valises, chairs, cowlings, beds, duffle bags, mattresses, bicycles, tires, wheels, seat cushions, trunks and overstuffed davenports. Even a time-worn dive-bomber and a couple of TBF's make up the pile, which resembles a postoffice during the Christmas rush. Extra gear, especially if made of wood, is a hazard.

AVIATION ORDNANCE

INQUIRIES SHOULD BE ADDRESSED TO THE CHIEF OF BUREAU OF ORDNANCE

BuOrd Lists Material in Aeronautic Index

The new Naval Aeronautic Publications Index lists material issued by various divisions of BuAer, DCNO (Air), Air Intelligence Group, BuOrd, Aviation Supply Office, BuMed, Airborne Radar Coordinating Group, Adjutant General's Office, and AAF, Air Service Command.

The index will be revised completely four times a year, and monthly supplements will be issued to keep it up to date. If sufficient copies of the index are not provided, additional copies may be ordered from BuAer Publications Section.

Bomb Handling Tongs Make for Safety

Bomb handling tongs to facilitate the safe handling of Depth Bomb Mk.54 have been designed by the Naval Ammunition Depot, Hawthorne, Nevada. The tongs

DRAWINGS ON TONGS SOON WILL BE AVAILABLE

may be used with particular advantage because these bombs do not have hoisting: or suspension lugs attached.

BuOrd is preparing and will soon distribute drawings for these tongs as well as for a bomb handling sling (chain) for 1000 lb. and 1600 lb. AP bombs. The drawings will enable interested activities to manufacture these devices locally.

Identification of Navy Signal Carfridges

In a previous issue of NAVAL AVIATION NEWS a system for quick identification of signal cartridges in their' "canvas stowage case was printed. That system suggested painting two quarter-inch stripes on the under and top side of the stowage case to correspond with the color of the cartridges, thereby permitting identification of the cartridges without withdrawing them from the case.

An improved system which allows greater flexibility was recently suggested by Raul Olsen, ARM1c, of Chase Field, Beeville, Texas.. This system provides for insertion of colored composition stripes through slits in the cartridge stowage case instead of painting them as suggested above. Insertion of color combinations in slits rather than painting the colors on the holder facilitates changing combinations.

T.O. Covers Trigger Control Troubles

. Reports of unsatisfactory operation of the Mk. 7 type electric trigger control fall into three general groups: 1. physical failure of the unit, 2. faulty gun components which prevent the solenoid from functioning properly, and 3. incorrect adjustment of the solenoid. War Department Tech. Order No. 11-1-55, dated 17 Nov. 1943, copies of which have been distributed to all interested naval activities, outlines corrective measures which should eliminate many of the previously encountered malfunctions.

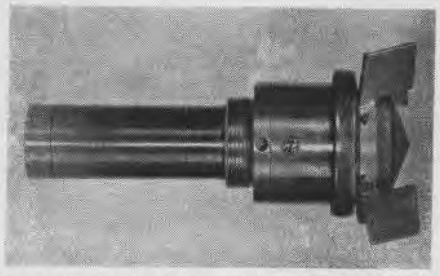
Failures of early production Mk. 7

ORDNANCEMAN SHOULD KNOW ABOUT SOLENOID

type Electric Trigger Controls, due to loosening' of adjustment cap retaining ring and breaking of the flexible electrical connection, have been corrected by soldering retaining ring screws, and by the addition of "U" clamp to position connector cord.

Bent trigger bars, burred sears, and trigger bars of incorrect length may prevent proper functioning of the trigger control. Before attributing all firing failures to the trigger control, it is well to investigate these and other possible causes.

The ordnance&en should have complete knowledge of the action and limitations of the solenoid before trying adjustment.



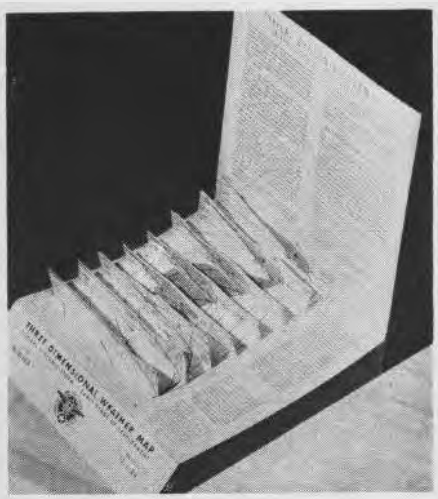
NEW BOMB NOSE FUZE MARK 239 IS DESIGNED

Three-dimensional Weather Map

Pilots who have difficulty in visualizing the vertical structure of large cyclonic storms will find the cardboard three-dimensional weather map helpful in determining weather aloft and in planning flights near or through bad weather areas.

Developed by Special Devices Division, the set of three models illustrates a typical cyclonic storm in an early stage of development, the more developed warm front and cold front type occluded weather systems. The base map of each model represents an area 800 by 1,000 miles, and shows weather information at the earth's surface in the same manner as a typical synoptic map.

Attached to each map are eight sections that move to a vertical position when the model is opened. The upright sections show frontal surfaces, air mass movements, cloud structures and precipitation. Weather formations are represented up to aprpoximately 25,000



BASE MAP REPRESENTS 800 X 1.000 MILE AREA

feet. Requests for the device, 12-K-2-a, 'should be directed to Chief, BuAer.

Deburring Tool Made From Drills

NAS SAN DIEGO-A deburring tool made from a broken drill has been developed at this station under the Navy's beneficial suggestion program. In effect, the tool is a spiral screw driver with a suitable point for removing burrs. It has a range of from 1/32" to 7/32" diameter holes with the smaller tool and 7/32" to 15/32" for the larger.

The manufactured tool consists of handle, spring, housing, guide screws, and twist drill. Because of its simplicity of design it can be manufactured readily at small cost to accommodate work at hand. Specifications should be requested from the Industrial Division, Office of Procurement and Materials, Navy Department.

Broken drills that otherwise would be scrapped can be salvaged for use.

[DESIGNED BY ROBERT B. DOWNING]

Bombing Crew Builds Skeet Range

Although seriously handicapped by scarcity of building material and ranges suitable for required shotgun training, an advance based bombing squadron completed a high-low tower skeet range ten days after arrival.

CREW CONSTRUCTS OWN RANGE FOR SHOTGUN

Ground was cleared by hand, and towers, walkways and stands were constructed from salvaged ammunition boxes and other scraps.

As the crew became proficient, it was evident that a high tower range should be constructed. Standard specifications called for a forty-foot tower, but lack of material made a compromise to a thirty-foot tower necessary. An SBD-5 discarded bullet-proof windshield was used for the tower window, and a log replaced the flexible shotgun mount (2-M-490) issued by the Bureau of Ordnance. The crew used a standard spade grip shotgun, supplied by the Bureau, with a Mk-9 sight.

Tool Aids Rubber Transfer Work

NAS-BANANA RIVER-A tool used for installing rubber packing on selector valves has been designed by an aviation machinist mate in the, station A&R shop's hydraulic unit.

The rubber transfer tool is designed for getting packing over the cams on selector valves. Use of the tool has saved much time in this operation.

Inside diameter of the tool is to be a slide fit on the selector valve with a wall thickness of about 1/32 inch. The

WASHER INSTALLATION PROCESS SIMPLIFIED

tool may be made from any stock.

[DESIGNED BY D. V. HORNBECK, AMM2c]

BuAer Comment—This tool is not a new idea, since most manufacturers of hydraulic selector valves have similar tools, which are described in the AN manual for the selector valve, The tool would prove useful to activities, which should be cautioned to keep it absolutely clean and to have no sharp edges to cut the seals. Prior to use, the seal should be dipped in hydraulic fluid and slipped over the cam shaft.

OVERHAUL

Progressive Engine Overhaul

Since inauguration of a Progressive Engine Overhaul Program, initiated by the Overhaul Branch of the Maintenance Division, many questions have arisen regarding its purposes. An explanation of aims and objectives of the program follows:

1. TO INCREASE CAPACITY OF ENGINE OVERHAUL SHOP.

   a. This is accomplished through utilization of production line methods throughout the entire shop, including cleaning, disassembly, inspection, rework, assembly and test.

2. TO FACILITATE UTILIZATION OF UNSKILLED LABOR.

   a. Job Methods Simplification-It has been proved that repetition of one operation by an unskilled person will produce in that person sufficient skill and facility to enable him to disassemble, process or assemble parts of an aircraft engine equal to that of a skilled mechanic.

   b. Simplification of, Training of *Unskilled* Personnel for *Operations*—Each part of engine overhaul can be learned to a degree of skill necessary to maintain continuous disassembly and assembly to a minimum amount of time (estimated learning time *average:* one hour). Greater skill and

facility are developed by experience.

   c. Safety of Personnel. Unskilled labor presents a greater industrial hazard than skilled labor. The progressive system is taking into account the necessity for safety.

   d. Reduction of Personnel Turnover. (1) Elimination of Heavy Work. Supervisory personnel observe that labor has a keen dislike for very heavy work such as lifting heavy engine parts and handling large, cumbersome pieces. Employment of conveyance and handling devices and chain falls eliminates necessity of this type of manual operation.

   (2) Elimination of Disagreeable Work. The most disagreeable part of engine. overhaul is disassembly and cleaning. By installing automatic cleaning and mechanical handling systems, a great many disagreeable tasks are eliminated.

   (3) Reduction of Number of Workers. Number of man-hours per engine overhaul is reduced.

3. IMPROVE ENGINE OVERHAUL QUALITY

   a. Control of Supervision. By limiting activity of personnel in various operations of overhaul, supervision is specialized; and by becoming more familiar with a limited phase of disassembly, processing or assembly, supervision quickly can control operations, both in time, consumption and quality.

   b. Control of Inspection-By specialization and geographical localization of operations, inspection can anticipate traffic through an area and exercise better control of quality.

   c. Improved Cleaning Methods-By utilization of more effective cleaning procedures, cleaning can be controlled and made more thorough than by ordinary dip processes formerly employed.

   d. Improved Parts Processing Methods-By standardization of processing operations, maintenance of tolerances

specified in Technical Orders can be facilitated.

4. TO REDUCE MAN-HOUR EXPENDITURES

   a. Simplification of *Organization*—Progressive overhaul requires exact planning of sequence of operation. By coordinating supervision, inspection and administrative control, the organization can be simplified and will permit a reduction in number of non-operative personnel.

   b. Closer Control of Operating *Personnel*—By control of sequence of operation, operating personnel would be anchored in function and area. This results in a reduction of waste of time, thus increasing production.

   c. Improved Parts Conveyance Methods-By eliminating handling of individual pieces for transportation between areas, time allotment for interim operations can be reduced. Safeguarding of parts by use of especially designed containers will reduce amount of time expended in removing nicks and burrs and other damage caused by handling of parts after disassembly.

   d. Simplification of Parts and Stock Accounting-It is estimated that frequently from 10 to 25 percent of a mechanic's time is spent in locating needed parts for an assembly. By delivering necessary pieces to an assembly area, stock chasing can be eliminated completely.

Almost any engine overhaul shop can be made to operate on a Progressive System, but it is to be understood that a thorough study of the present arrangement of equipment. area and workload first must be made.

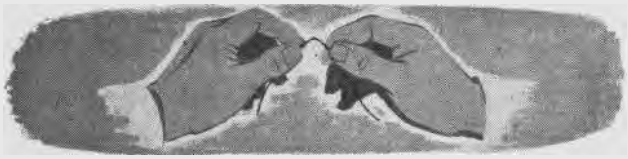
FATIGUE FAILURE—How to Recognize i

MAINTENANCE TIPS

PERSONNEL in maintenance should be able to recognize *Fatigue Failures* and, wherever possible, ascertain their causes. Once the fundamentals of Fatigue *Failure* are understood, recognition of them and determination of their underlying causes are relatively easy to learn

THE term FATIGUE FAILURE is really a misnomer. Materials do not get "tired." The term, however, has been commonly accepted as a description of certain typical failures that occur to materials subjected to variable or alternating stresses.

The mechanics of fatigue failure are simple. Everyone is familiar with the act of bending a small wire back and forth until it breaks. What actually happens is that the wire at the point of bending has been subjected to plastic cold work. Cold work of metals results in embrittlement, and if carried beyond the limits of plastic flow, excessive embrittlement and consequent fracture result. That is what happens when the piece of wire finally breaks.



***Stresses* Appear in Definite Places**

In materials under stress it is found that stresses are concentrated at irregularities in the surface, or at abrupt changes in shape or cross-section. These points are called stress raisers. The degree of concentration, or rise, in stress increases with the sharpness of the irregularity. Local stresses at such points of concentration can be many times higher than average stress carried by the piece as a whole.

If the stress in the piece then is alternated, or is varied between two reasonably different values even in the same direction, the material in the vicinity of any sufficiently sharp irregularity may be subjected to cold work and plastic flow, just as the wire that you bent in your hand. If stresses are high enough and are alternated or varied over a fairly wide range, embrittlement at this point results after a sufficient number of cycles.

When the limit of plastic flow has been exceeded, the material in the vicinity of the irregularity becomes too brittle and a little crack develops. Usually this crack is not visible to the naked eye. The base of the crack is a continuation of the irregularity, and is in itself a stress raiser of the highest order. The material at the base of the crack then is cold worked, becomes embrittled and cracked.

In this fashion the crack progresses and grows, and if the part is not removed from service, the cross-section area eventually is reduced to a size not able to carry the load, even once, and the piece breaks completely.

FATIGUE failures can occur in pieces in which maximum stress is well below the yield point for the piece as a whole. Disproportionate concentration of stresses at irregularities is the basic cause. Stresses also must alternate or vary over a reasonably wide range and at fairly high frequency. Without variation in stress, cold work at the place of concentration does not take place.

It is difficult to say just what cyclic frequencies will or will not make fatigue failure possible. Unit stress carried by the piece, material of the piece, and sharpness of the irregularity also must be considered. However, it may safely be said that practically all structural parts of air-

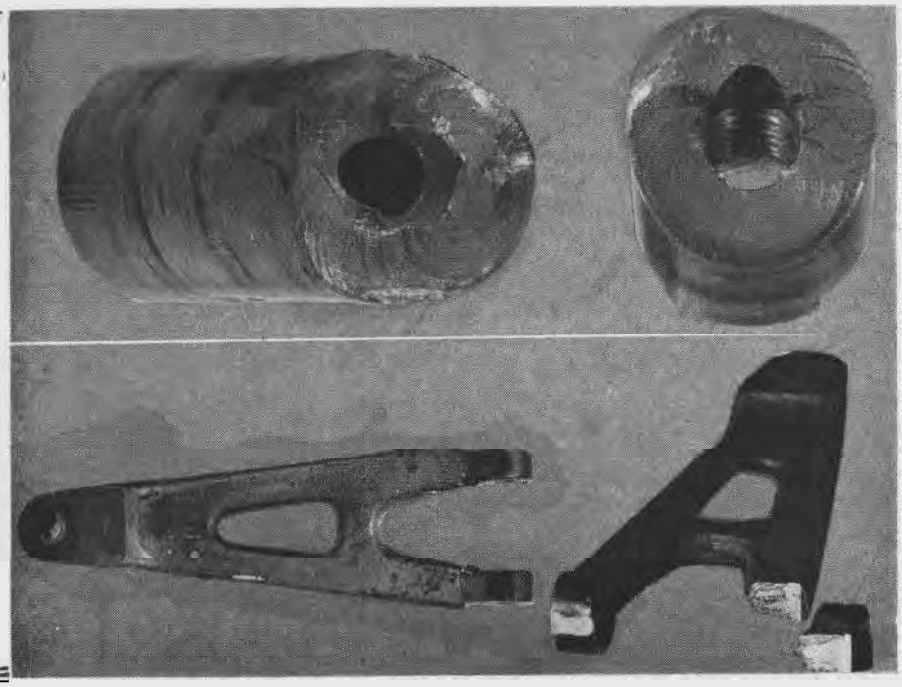
EXAMPLES OF FATIGUE FAILURE

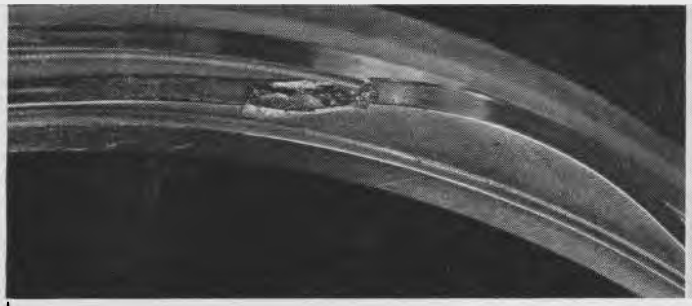
1. ENGINE KNUCKLE PIN

Nucleus of failure was the internal threaded groove. Illustration shows almost circular arcs which record progression of fatigue crack.

2. ELEVATOR HINGE BRACKET

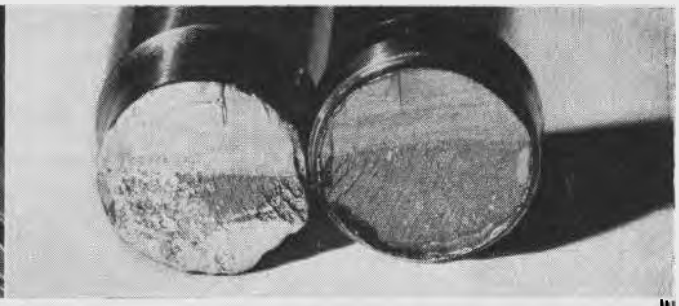
Fatigue crack started at the sharp milled corner. About ¼th of surface, extending down from sharp corner, is smooth. A fillet in place of sharp corner probably would have prevented this fatigue failure.





3. CAM LOBE

Part of cam lobe is shipped out as result of fatigue failure, which started at deep grinding mark on face of lobe. Normal signs of failure are not too apparent, but can be seen in lower forward portion of break. Failures of this sort usually occur on the leading side of the cam load.



4. VALVE STEM

Broken surfaces evidence fatigue failure. Fatigue crack began at upper part of valve lock recess, either because of insufficient radius or fillet or because of a tool mark.

Valve became bent and head of valve was torn off after failure of valve stem, which allowed valve to drop into cylinder. This resulted in complete engine failure in flight.

Note that broken surface on main portion of valve stem was marred by contact with other parts of engine after failure occurred, although this did not cause complete obliteration of evidences of fatigue failure. Surface of break on tip of valve stem was not marred after failure of the part.

craft and aircraft engines are subjected to alternating or varying stress of a frequency high enough to make fatigue failure possible, provided the factors of sufficiently high unit stress and sharpness of surface irregularity exist.

Fatigue Failures Start at a Nucleus

The point at which a fatigue crack starts is called the nucleus of the fatigue failure. Some of the irregularities or surface defects that might form fatigue failure nuclei are scratches, nicks, tool marks, slight defects in material, surface roughness, galling, square-machine interior corners, thread grooves, corrosion pits, etc. There are other conditions, but a discussion of them is not necessary to understand the basic theory.

Fracture surfaces of the great majority of fatigue failures have a representative appearance. A portion of the broken surfaces ordinarily is quite smooth, and most often lines may be seen on this surface that are approximately arcs of circles with a common center at the nucleus of the fatigue crack. The smoothness is caused by rubbing of the surfaces of the crack while the part is still in service.

Finally, when the crack has progressed so far that there is insufficient material left to withstand the load, even once, the uncracked portion gives way suddenly. This previously uncracked portion that suddenly failed has a granular or crystalline appearance. (In the photographs of fatigue failures, the smooth part of the broken surfaces and the crystalline part can be quite readily distinguished.)

It must be emphasized that the word "crystallization" to describe the cause of such a fracture is definitely incorrect. We have all heard people make the remark, "That piece failed because of crystallization." The statement is an erroneous description of what usually is a fatigue failure. All metals are crystalline by nature. The crystal structure may be changed in heat treatment or certain other manufacturing processes, but once a metal part is placed in service the crystal structure does not change. It is this crystalline structure that is seen in that portion of the part which suddenly fails.

IN PARTS subjected to repeated compressive loads, such as those occurring between ball-bearings and their races, and between valve cam and cam followers in engines, surface fatigue failure can take place. It sometimes is difficult to recognize surface fatigue failures, since marring of the broken surface often takes place after the break has occurred. However, in many cases, marring may not occur, or it may not be so severe that the fatigue nature of the failure cannot be recognized.

For Every Stress There is a Strain

Parts that carry only a nominal load, but are subjected to vibration, also may fail in fatigue. For every stress there is a corresponding strain. That is, whenever a piece is stressed, provided load is not beyond yield point, there is an elastic deformation of the material. It returns to the original shape when stress is removed.

A material in which this phenomenon can be visually recognized readily is ordinary rubber. All materials behave thus even though elasticity is not so apparent. Of course, deformation in most cases is very small and cannot be observed by the naked eye, but nonetheless is there.

Amount of elastic deformation for a given load depends on size and material of the piece. For any given material deformation or strain is proportional to stress or load. Similarly, when a part is deflected or deformed, an internal stress is induced in the material. Vibration is a deformation or strain, and when this occurs, there must exist a corresponding internal stress. Many times, parts only lightly loaded but subjected to vibration fail in fatigue because of internal stresses induced by vibration.

Fatigue Failure Can Hex Entire Unit

Fatigue failures occurring in one part of an assembly often result in complete and final failure of the entire unit. Many of the parts become severely mutilated and we often are at a loss to determine just what gave way first. However, if we look at all the broken surfaces with a critical eye, some fracture with evidence of fatigue usually is found.

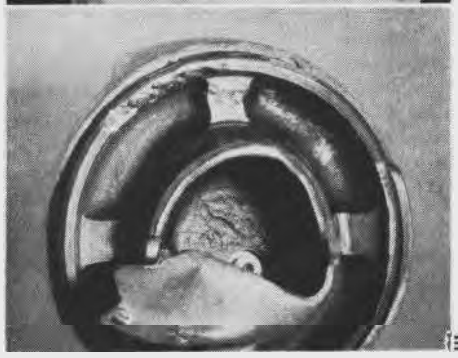
Sometimes one surface of the fatigue break becomes mutilated in the resulting large scale failure, but most often the other portion of the piece is not marred, and recognition of fatigue is possible. When we realize that fatigue failure of some small, apparently unimportant piece may result in complete and destructive failure of an entire unit, we realize the necessity of guarding against fatigue failures in aircraft and aircraft engines.

When aircraft components are undergoing overhaul after a period of service, it is essential that thorough examination be made for fatigue cracks that have not yet progressed to a point to cause final failure. [Continued]

EXAMPLES OF FATIGUE FAILURE

5. LANDING GEAR STRUT

Failure started at base of a thread groove in outer cylinder of strut. That fatigue is to blame is shown by smooth appearance of about ⅓rd of broken surface of outer tube seen in upper left hand section of this vertical view.



6. STRUT

Visual examination showed nothing wrong, but magnetic inspection revealed a fatigue crack. Sectional view shows fatigue crack which started at base of a thread groove.

If this strut had been allowed to continue in service, complete failure (as in Landing Gear Strut) probably would have resulted.

Steel parts can be most readily examined by magnetic inspection. Nonmagnetic parts may be more readily inspected if etched to bring out defects more distinctly. There also is a patented process on the market designed to facilitate inspection of nonmagnetic material.

Notify BuAer of Fatigue Cases

Manufacturers, as well as operating and maintenance personnel, desire to improve aviation equipment. Maintenance personnel who encounter fatigue failures in aircraft, aircraft engines, or aircraft accessory parts should advise BuAer in the manner provided. If known, the cause for fatigue failure should be reported and photographs of broken parts forwarded.

Fatigue failures often are the result of oversight in design, such as omission of fillets or incorporation of fillets of insufficient radius. They sometimes are caused by manufacturing methods, such as machining of internal corners, tool marks, scratches, etc. They may result because of scratches or nicks caused by improper or careless handling by maintenance personnel.

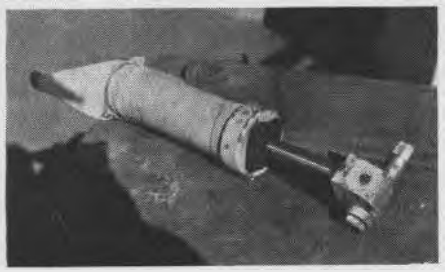
By properly recognizing fatigue failures, maintenance personnel can be of direct assistance in the constant effort to improve aircraft and engines. An understanding of the nature of fatigue failure will impress the necessity for thorough inspection of parts undergoing overhaul and demonstrate the necessity for proper handling. If it is necessary to manufacture replacement parts in the field, need for proper manufacturing methods can be understood.

Felt Wiper Prevents Seal Failure

CASU-52-By fitting a one-quarter inch felt wiper around the piston and securing it to the cylinder, this activity has virtually eliminated failures of hydraulic seals in landing gear of F4U-1 aircraft.

Designed by an officer attached to the unit, the felt wiper has eliminated hydraulic seal failure trouble. Prior to installation of the wipers, considerable difficulty was experienced with failure of hydraulic seals in the wheel well door actuating cylinders. Dusty conditions on the field previously had made it necessary to repack an average of 14 cylinders a day out of 24 F4U-1 planes making an average of six take-offs and landings.

[DESIGNED BY DANIEL B. DELLY, ENS.]



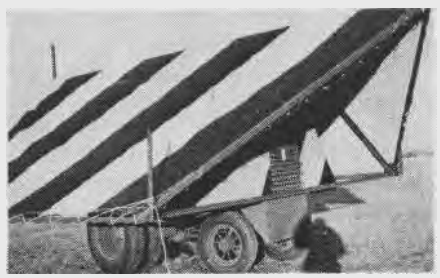
FELT WIPER TIES INTO ACTUATING CYLINDER

Uninspired Moments

Historical officer at work on the story of a squadron that didn't send in the dope.
(Reminder:-Squadron histories due in I Jan.)

Self-Propelled Bombing Target

The Self-Propelled Bombing Target, developed by Special Devices Division, provides a maneuverable target to be used in aerial bombing practice. It essentially is a standard commercial shop tractor covered with steel plate to protect the machine from direct hits.



SHOP TRACTOR BECOMES A MOVABLE TARGET

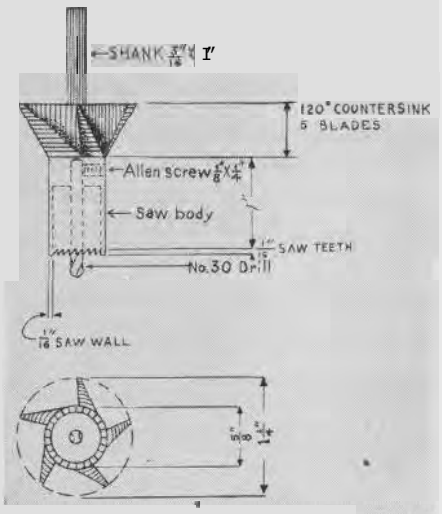
Protected by armor plate, the driver can maneuver the target on a predetermined course and speed or take any desired evasive action to simulate attack conditions, thereby affording an opportunity to drop practice bombs and assess results.

A canvas cover with diagonal yellow and black stripes is stretched over the armor plate to provide a clearly visible target. Provision is made in each unit for the installation of GF radio equipment so the driver may receive instructions from an observer for control of the target. Requests for the device, 7-J-1, should be directed to Chief, BuAer via CNO (OP-33).

Three-in-One Tool Saves Time

NAS PEARL HARBOR-A combination drill, hole saw and countersink, designed by a civilian employee in A&R shop, saves considerable time in work on plastic glass.

Combining three operations in one, it eliminates changing of tools in the drill



NEW TOOL REDUCES PLASTIC GLASS BREAKAGE

chuck, reduces by one-third the lineal distance covered in producing a series of countersunk holes and results in less breakage of plastic glass, because tools make fewer contacts with the work.

The four plastic glass enclosures of the SBD, for example, have a total of 346 five-eighth countersunk holes for screw fastenings. Each of these holes must be hole-sawed and countersunk from both sides of the plastic glass to minimize breakage. This formerly took 1730 individual operations. Using the combination tool, only 1038 operations are required. The old method required 35 chuck changes. No changes are required using the combination tool.

[DESIGNED BY V. C. EHNBORN]

BuAer Comment-Another useful tool under certain conditions and one that can be made in any A&R shop at a station.

SCREEN NEWS

Broken Field Running. A hit flier dreads the flak, but pilots not yet tested in combat may tend to thumb their plane noses at the deadly bursts. Convincing proof of the hard-hitting power of ack-ack fire is followed by a thorough study of flak patterns and evasive tactics, in:

MA-4947 Flak (Restricted, 16 min.)

DEMONSTRATED: accuracy of enemy antiaircraft fire and theory of its operation; patterns of continuously pointed fire, predicted concentration fire and barrage fire; flak facts at 15,000, 20,000, 25,000 and 30,000-feet level; briefing information preparing bomber and fighter pilots for expected flak areas; safety factors in extreme low or high level bombing.

Animation is used to demonstrate effective and poor evasive patterns. Special attention is called to the importance of flying exactly as planned by intelligence.

Use of this film in operational training is expected to reduce needless chance-taking and casualties among the men who run the Rak gamuts of the air.

Down But Not Out. Ceremonies that attend the grim business of getting a land plane down on water are all work and no play, but if you gotta go, you gotta go-and it can be done without loss of life. Correct procedures are capably demonstrated in:

MA-4499 Ditch and Live (Restricted, 40 min.)

The crew of a B-17 is shown at a certain time B. C. (before combat) getting the word on what to do if . . . CREW IS SHOWN: types of emergency kits, life rafts, inspection, repair and methods of inflation; duties of each man when the ditching signal is given; position taken by crew and specific equipment assigned to each man; proper use of rafts and emergency kits in life on the briny deep after successful abandonment of the aircraft.

In summary, the same crew is seen in a realistic simulation of ditching, every man doing the right thing at the right moment, From the time plane is disabled to the final rescue at sea.

Although a B-17 is used in the film, general principles demonstrated apply to ditching of any aircraft, and out of all the details comes the inevitable conclusion that there are two ways of doing the job-the right way and the dead way.

beating the Jungle. The Jap can be disabled, killed, sometimes captured. The jungle-trickier and potentially even more deadly than the Jap-cannot be killed and is just as dangerous after capture as before. Nevertheless, tropical enemies can be beaten, as demonstrated in :

MA-4586 Personal Health in the Jungle (Restricted, 16 min.)

Primary dangers: heat, infection, disease. Counter-measures: knowledge, good equipment, willingness to use it. COVERED: defense against heat prostration and heat exhaustion; use of the Individual First Aid Jungle Kit M-2; water purification with Halazone tablets; importance of personal cleanlines; care of cuts and scratches to avoid infection; offensive tactics of insect-borne diseases and defensive measures against them, with malaria exposed as Jungle Enemy No. 1.

Confidential Shipments.

MN-1933b Simulated Combat Missions -Problem #2 — *Protection of Convoy*, 20 Min.
MN-1933c Simulated Combat Missions -Problem #3-Attack on Wake Island, 24 Min.
MN-1006h Fighter *Direction* — Principles of Interception, 26 Min.
MN-1006i Fighter Direction — Typical Interceptions-The *Straight-In* Attack, 5 Min.
MN-1006j *Fighter* Directions-Typical Interceptions-The Crossing and Dog Leg Attack, 7 Min.
MN-2867e *Radex* Airborne PPI and B Scan, 22 Min.
MN-3583a *YJ* Radar Beacon Operation--Principles and Operation, 15 Min.
SN-2749a *YJ* Radar Beacon *Operation—Theory* and Principles (slide film)
SN-2749b YJ Radar Beacon *Operation—Installing* and Checking (slide film)
SN-2738a to g ASH Maintenance (AN/APS-4) Alignment and Adjustment Series (slide film)

Films on the up-and-up. Whenever the American urge to get ahead moves ambitious individuals to start climbing the ladder of naval aviation ratings, plenty of help and encouragement are on hand to give a push. Among these aids to advancement are films that supplement the standard Navy Training Courses booklets.

In the past, however, it has been something of a chore for officers charged with the education and ratings of enlisted men to find out just what films are available for any given aviation rating. A useful reference booklet now available eliminates this dig-and-hunt difficulty. Title :

Training Films Recommended for Advancement in Aviation Ratings.

RATINGS COVERED :

Slc	AOM	PR
GTC	AEM	Ptr V
AM	ARM and ART	AerM
AMM	SKV	

Copies have been released to training and educational officers, but additional copies may be obtained, when needed, from Aviation Training Film Libraries.

Where to Get 'Em. The above films are being distributed to Aviation Film Libraries at :

ComAirPac	NAS Seattle
NAB Navy #140	NAS Alameda
ASD Navy #3205	NAS San Diego
Hedrons 3, 4, 10, 12, 16, 17	NAS Norfolk
	NAS Patuxent
FAW 7, 15	NAS Floyd Bennett
NAOTC Jacksonville	NAS Quonset
NATR Pensacola	NAS Atlanta
NATB Corpus Christi	NAS Clinton
NATEC Lakehurst	NAS Moffett
MCAS Cherry Point	NAS Navy #115
MCAS Navy #61	NAS Navy #116
MarFairWestCoast	NAS Navy #117

4th MBDAW

(Succeeds List dated 19 October 1944)

LATEST BULLETINS

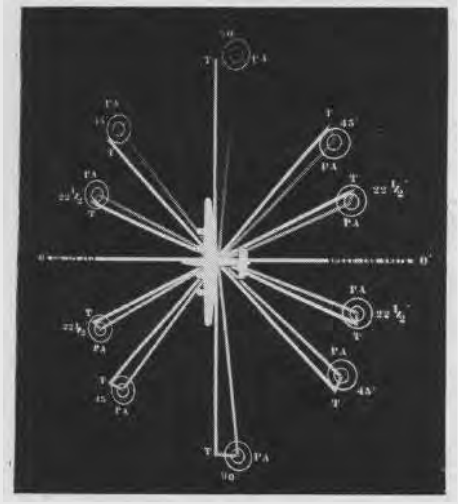
ENGINE, AUXILIARY POWER PLANT, ACCESSORY, PROPELLER 20 November 1944

ENGINE	BULLETIN	DATE	SUBJECT	EXPLANATION
PRATT & WHITNEY				
R-1 830	372	Supp. #1 8-10-44	Auxiliary Drive Housing and Auxiliary Adapter.	Directions on rework of auxiliary adapter
R-1830	376	Supp. #1 10-27-44	New Rubber Oil Seal for Impeller Shaft Liner	Describes new part
R-1830	380	11-4-44	Master Rod Bolts	Information on new type master rod bolts & nuts
R-1 830	381	Being issued	Clutch Selector Valves	
R-1830	382	Being issued	Reoperating of Impeller Shaft Front Oil Seal Liners	Difference between two types of clutch selector valves
R-1830	383	10-26-44	valve Clutch Selector	Difference between two types of clutch selector valves
R-2000	56	Rev. #1 11-2-44	Cylinder Installation on	To insure proper assembly of cylinders to engines
R-2000	80	Supp. #1 10-26-44	Auxiliary Drive Housing	Improve lubrication of auxiliary drive
R-2000	80	8-10-44	Auxiliary Drive Housing	Improve lubrication of auxiliary drive
R-2000	82	9-21-44	Supercharger Fuel Drain Valves	New type supercharger drain valve
R-2000	88	1 o-5-44	Inlet Valves	Information on non-Interchangeability of inlet valves
R-2800	86	Supp. #2 10-18-44	Propeller Governor Oil Transfer Pipe and Oil Seals	To provide additional information on
R-2800	89	Supp. #3 10-25-44	Secondary Counterhlance, Secondary Counterbalances Keys & Keyways-Rework of	Additional information on interchangeability of parts
R-2800	100	Rev. #1 10-30-44	Rocker Box Oil Sump	Revised to include R-2800 engines
R-2800	133	Rev. #1 9-25-44	Oil Flow to Main Impeller Shaft Thrust Plates	Change drawing dimensions & additional information on
R-2800	135	Rev. #1 7-14-44	Oil Pressure Pump	Revision cancels & supersedes Bul. 30 May 44 to correct dimensions & test
R-2800	139	Supp. #2 9-8-44	Type 3 and 4 Counterbalances & Related Paris. Designs and Part No Differences	Lists engines incorporating Type 4 secondary counterbalances
R-2800	140	Rev. #1 7-14-44	Thrust Bearing Cover Nut Torque	Change R-2800 Bul. 136 dated May 44 to R-2800 Bul. 140
R-2800	153	10-10-44	Carburetor Setting Change	Increase combat radii of P&W R-2800-8-8W-10-10W-65-65W-Corsair, Hellcat & Blackwidow airplanes
R-2800	156	10-31-44	Governor Drive Bushing-Pinning of	Information on subject part
R-2800	158	Being issued	Supercharger Pressure Regulator Pad Holes	
R-2800	162	10-27-44	Valve Tappets, Guides, Rollers and Pins	Information on revised assembling, clearance & parts of valve mechanism
R-2800	167	1 l-l-44	Exhaust Pipes	Instructions on two types of exhaust pipes of applicable engines
R-2800	168	1 l-3-44	Covers- Hydraulic Couplings	Instructions for reoperating cover to facilitate removal
WRIGHT				
R-1820	369	Supp. #1 10-7-44	Rework of R-1820-56-56W Ignition Harness	Bureau numbers of engines not included in original bulletin
R-2600	148	10-23-44	Generator Drive Garlock Oil Seal, WAC Part No. 160967 N-Rework of	To eliminate oil leakage and failure of subject part
R-2600	149	10-6-44	Exhaust Valve Guider WAC Part No. 118583—Replacement & Procedure at Overhaul on	New overhaul procedures in regard to subject part
R-2600	150	10-21-44	Metering Channel, Limits for Holly Carburetor	To increase test limits on metering channels
GENERAL ENGINE				
	53	10-30-44	Table of Limits for Aircraft Engines	To establish source to be used for correct clearance
	54	10-17-44	Caution Cards-Radial Engines ASC. Form No. 66501—Use of	Instructions concerning use of cards
	55	Being issued	Replacements of Damaged, Broken or Stripped Out Studs	
	56	11-7-44	Electric Primer Gaskets—Material change	To replace unsatisfactory gaskets
CONTINENTAL				
R-670	15	Rev. #1 8-17-44	Inspection of R-670 Crankshaft Bearings	Disposition instructions for rejected parts
R-670	20	10-30-44	Continental R-670 Crankshafts Bearings—Replacement of	To reduce number operational failures of crankshaft ball bearings
AUXILIARY POWER PLANT				
	17	10-30-44	Homelite H.R.11-28 Auxiliary PP	To prevent cylinders & pistons from becoming scored or broken
CURTISS	**PROPELLER**			
	25		Shaft Nut Extension Sleeve, S.T.-11 81-1-Modification of	To insure correct fit of tool on the shaft nut Part No. 102681
HAMILTON STANDARD				
	15	11-4-44	Modification to Include Feathering Line Bleed	To prevent congealing of oil in feathering line
	16	11-3-44	Incorporation of Mechanical Dump Valve H. Std. non-accumulative type governor	Concerning ball type dump valve employed in double capacity governors
	23	10-4-44	Hamilton Standard Service Bulletins-Approval of	Approve use of Service Bulletin No. 92
	24	11-8-44	Rotating cams- Hamilton Standard Cracking of	To clarify extent of magnaflux indications and/or cracks that may be present in rotating cams
	25	10-27-44	Hamilton Standard Manual-Approval of	To approve use of Hydromatic Propeller Reassembly Procedure Manual No. 142
POWER PLANT ACCESSORIES				
	62-44	9-22-44	Starters, b-18 Eclipse series 43 starters, types 444 and 915	Oil Drainage, Hole in
	64-44	9-27-44	Starters, b-14 Premature pitting of ball races in Eclipse Starter Model 484-1-A	Prevention of pitting
	65-44	10-3-44	Lubricating System Accessories, g-4	Testing of all oil coolers—identification of
	66-44	10-2-44	Fuel Pumps, d-18; Pesco Products Corp. Fuel Pumps, Model P-600-C WT	Installation of new 'spring, valve and retainer nut on relief valve
	67-44	10-9-44	Fuel system accessories, j-6 Aero Supply Co. Fuel Selector Valve, PG-4	Modification of valve
	68-44	10-23-44	Fuel Pumps, d-l 9 Pesco Products Corp. Fuel Pump Electric Motors	Inspection of gear head at overhaul
	69-44	10-20-44	Fuel System Accessories, j-7 aero supply poppet type fuel selector valves	Inspection of valve
	70-44	10-25-44	Hydraulic Pumps, h-9 Pesco Products Co., Pressure Loaded Hydraulic Pump, 1P-320, 1P-549, 1P-583 and 1P-585	Winterization of pump

Display Simplifies Gun Sighting

NAS QUONSET POINT—The sighting officer at the free gunnery unit here has devised a position firing display to be posted on walls of 3-A-2 trainer rooms to help gunners figure out deflections.

It consists of strips of colored Scotch tape, a plane model painted white and ringsights cut from cardboard. The strips representing the various angles-off run from the center of the plane



WALL DESIGN DEMONSTRATES GUNNERY ANGLES

outward about two feet, the yellow representing the point of aim (PA) and the white, the target (T).

The ringsight is placed to show the "rad" lead at each of the angles represented. The fore and aft axis and bomber speed have been indicated by the inked lettering.

[DESIGNED BY LT. S. 0. BAKER]

Improved Box Carries Small Bombs

CASU 38-A box for carrying loaded miniature bombs has been designed by one of the divisions.

Empty 20 mm. boxes were strengthened by adding screws to sides and bottoms. The box was then divided into 24 sections, using 3-ply ¾" wood. With the "rope" handles already on these boxes, they proved to be very efficient in carrying bombs from magazine to truck, then to miniature racks of plane.

[DESIGNED BY G. L. COOPER, ACOM]

CASU DESIGNS SIMPLE BOX FOR BOMB HANDLING

LETTERS

SIRS:

Your recent article in the NAVAL AVIATION NEWS about the U.S.S. Shawmut and Captain Steele did not mention the name of the squadron which Lieutenant Commander Leighton commanded. This was old VS1 and I think their squadron insignia, the eye between a pair of wings, was the first squadron insignia. In all of the squadron insignia sheets which have come forth, I have never seen one published. Do you have a copy of this? If not, let me know and I'll get one photographed from a Christmas card we used in 1925.

U.S.S. Guadalcanal COMMANDER, USN

¶ NANEWS would appreciate' a copy of the picture.

SIRS:

Referring to your September issue "25 Years Ago This Month," you made no reference to the entrance September 15, 1919, into aviation at Pensacola of Class 1 (I don't know why it was called that) which was the first class of regular officers sent to Pensacola or any other naval flying school after the commencement of World War I. It was followed, I believe, by Class 2 which was an enlisted class and by Class 3 which

was an officer class similar in size, all entering in the fall of 1919 and all finishing about the same time.

The members of Class 1, as I remember them, were: Lieutenant Commander Elmer and Lieutenants Broadfoot, Farrar, Durgin, Davison, Wead, Steele, Selman, Baugh, Havill, Price, Wooster, Stump, Fleming, Clark and Halland.

The senior was, of course, "Fats" Elmer; Farrar was Class of '15; the next nine in 16; the next four in '17; and the last, Halland, in '18.

Of this class, four are now Rear Admirals; three or 19% were killed in flying accidents. Havill, Homer Clark and "Fats" Elmer resigned from the service.

Steel and Broadfoot did not complete the course and, I believe, Halland shifted from HTA to LTA before completion of the course, later shifting back and completing.

Of the three killed: Stan Wooster died while testing a heavily loaded plane with Noel Davis ('14), who finished Pensacola in a later class. These tests were preparatory to making a non-stop Atlantic flight before Lindberg's time; Farrar spun into the Delaware River below Philadelphia; and Gus Selman spun in just after a take-off at Norfolk with Tony Fehr.

One of the most promising officers of his time, "Spig" Wead, broke his neck a few years later in an accident not connected with aviation, but in spite of the handicap of being a partial invalid he became an eminent playwright and movie director, specializing in subjects connected with aviation. By writing and supervising the production of *Hell Diver*, he is responsible for the adoption of dive bombing by the leading air powers of the world, an art which had been used previously only by our Navy, after it was invented by "Honus" (now Rear Admiral) Wagner. who finished Pensacola shortly after Class 1.

"SPIG" WEAD

Although there were some minor crashes, the only serious crash was that of an F5L piloted by Henry Broadfoot and Jim Steele.

Upon arrival of Class 1 at Pensacola, an endeavor was made to overcome the first haphazard methods of training and to prepare a course which was a forerunner of the elaborate and well-planned courses which are used today for training our naval aviators.

Mechanics were scarce so that we were assigned N-9's, which we had to keep clean and in flying shape ourselves.

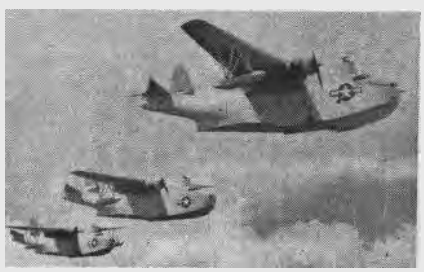
Air Force
U. S. Pacific Fleet A READER

SIRS:

Speaking of formation flying (NANEWS 1 Nov. 1944, Letters page), this photograph is submitted for publication if considered practicable.

VPB-210 COMMANDING OFFICER
FPO, New York

¶ NANEWS notes the excellent formation photography and also notes the names on two of the Mariners-Co-Poop and Meassam Dragon.

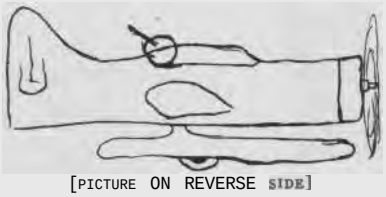


LETTERS

LETTER OF THE MONTH

¶ There should be no future shortage of naval aviators if this note from a junior enthusiast, turned over to the Navy Department, is any indication:
Vinelund, N. J.

Dear Roosevelt:
John C. Leistner wants a big airplane mold to make.
The plane I want is a seaplane that flys.
Will you please send me one?
Yours true
John C. Leistner
P.S. Turn this paper over to see the plane I want.



[PICTURE ON REVERSE SIDE]

SIRS:

We in the Navigation division of VN8D-18-C were particularly interested in your article on Navy Wings in the October 1st issue.

According to the qualifications listed for technical observers, several of us are eligible to be so designated.

The article did not state who could designate one as a "Technical Observer" or how one might go about obtaining the designation. Any further information you might be able to give would be greatly appreciated.

Rodd Field LIEUTENANT J.G. USNR

¶ There are no special qualifications for assignment to duty involving flying as a Technical Observer, and no officer is ever officially designated Technical Observer. That title is used to indicate difference between a flying officer and a non-flying officer for pay purposes. Technical Observers are non-flying officers and are paid for flying in accordance with the Naval Appropriations Acts. No Technical Observer is entitled to wear wings of any kind.

SIRS:

In the 15 Sept. 1944 issue of NAVAL AVIATION NEWS on the page "Shore Stations," I read the article about my making the first parachute jump. May 1 correct your last statements?

I didn't graduate from Hunter College, as I took my boot training at Iowa State Teachers College, Cedar Falls, Iowa, in December, 1942, with the first WAVE class and went to Lakehurst, graduating from

PRS in May, and came to Texas as a PR3c and not S2c.

KATHLEEN SCOTT ROBERTSON PR1c.
Naval Air Station
Corpus Christi

¶ Information on the WAVE parachute jumper came from the station paper.

SIRS:

Air Group 60 recently chartered a new and unofficial class of Navy airman at an informal ceremony in the ready room of this carrier. After a year of continuous duty at sea, the policy has become "anything for a laugh" in the periods between major operations.

The chief engineer and ship's dental officer became charter members, Model XIX, Mk XLIV, of the class "Alae Sectatae" or "Clipped Wing Airdale," and are the proud possessors of "diplomas" testifying to their distinction. The air group commander gave a ceremonial address and after some sword play awarded them their certificates and "clipped" wings.

Both men were cited for their efforts toward breaking the monotony in the ready rooms, the dental officer being an accomplished magician. He was awarded the wings, certificate and accorded the additional privilege of standing "Condition 10%" watches (asleep in the plane) for all aircraft aboard of less than 100 hp.

Air Group 60 COMMANDING OFFICER

CONTENTS

ANSWERS TO QUIZZES

● PIX QUIZ (p. 26)

1.2 2.1 3.1 4.4 5.2 6.1

Films available from BuAer, Special Devices, for showing in Visual Quizzer, Device 5-X. Standard slide film version may be obtained from Training Films, BuAer.

● NAVIGATION PROBLEM (p. 28)

From 022″
Force 20 k
TH 121″
GS 129 k
ETA 1507

(Tolerances of 2 or 3 miles or 2 or 3 degrees from ans. are considered correct)

● GRAMPAW'S QUIZ (p. 10)

1. Yes. Reference: Flight Safety Bulletin IO-44.
2. When used, alternate air should always be turned on FULL. Reference: Flight Safety Bulletin 10-44.
3. Aircraft at the higher altitude must avoid those at the lower altitude. But don't let this keep you from looking around if ▱□◆ are at the lower altitude. Reference: CAA Regs 60.341.
4. Five seconds. Reference: Technical Order 80-44.
5. After each warm-up. Reference: Technical Order 80-44.

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YOU FIRST, SIR

Three Navy airmen narrowly escaped death in a flaming TBF when each member of the crew insisted upon delaying his jump until the others had bailed out. This tale speaks of heroism.

THE mi... was photographic, Yap Island. As ... they skimmed along at a low altitude, ack ack burst in the air around them, and the ... were struck just as they pulled out for the homeward flight. The *Avenger* shuddered, lurched, and great quantities of smoke filled the cockpit. The instrument panel became almost invisible. . . . The pilot fumbled for the controls.

Struggling to keep the plane on an even keel, the lieutenant called his crew. "We're hit, dammit. . . . Bail out."

Warren N. Bennett and Howard M. ... Webster, Jr., aircrewmen, both received the command, but Bennett shouted back, "You ... sir." The pilot never heard that message ... idly spreading fire had damaged the microphone wire.

The pilot waited for them to jump. No one stirred. Seconds ticked by, and the control stick became hotter and hotter. Even with gloves on, he was unable to grasp it for any length of ...

Finally, the smoke became ... able and the flames so engulfing ... bullets tore ... he so unbearable ... all opened fire. ... the same time the Japanded in the water without casualties ... as they floated ... hours later, an OS2U sighted the crew and rescued all.

Aircrewmen have what it takes!

EMILY CHECKS OUT

Light armor plate on Japanese Emily proves no protection against heavy firepower of Navy patrol plane and it heads for destruction in Pacific. Four-engine plane is a workhorse of enemy's air force

NAVY PATROL BOMBER POURS STEEL INTO FLEEING EMILY AT CLOSE RANGE, PLOWING BIG HOLES IN SKIN AND SETTING ITS STARBOARD ENGINES AFIRE

HUGE BURST OF FLAME ENVELOPS THE JAP AS IT PLUNGES DOWN

TALL SPIRE OF BLACK SMOKE IS TOMBSTONE FOR FALLEN ENEMY