

NAVAL AVIATION

NEWS

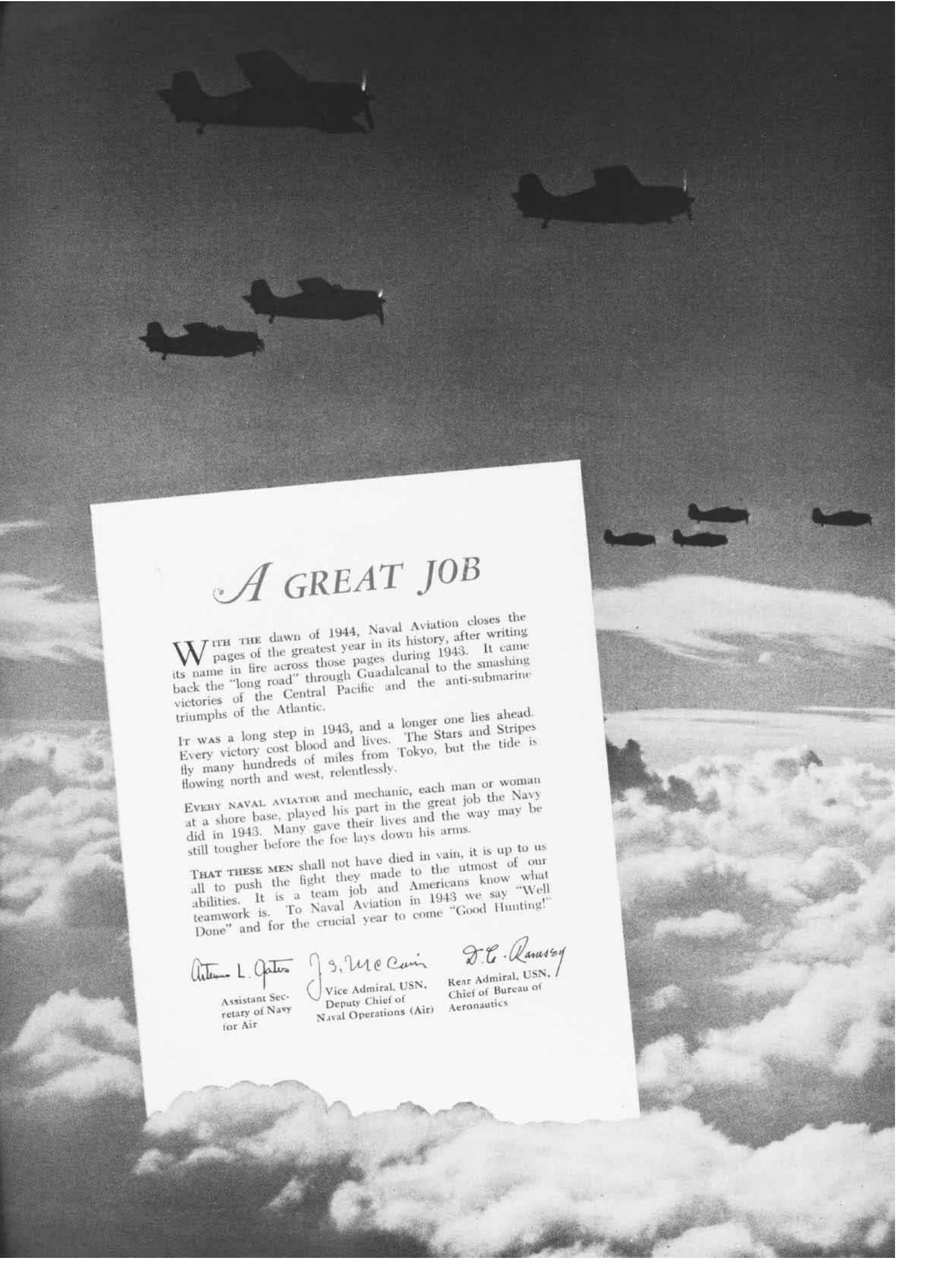


Cherry Point Marines
Vision After Nightfall
1943 NANews Index



Jan. 1, 1944

RESTRICTED



A GREAT JOB

WITH THE dawn of 1944, Naval Aviation closes the pages of the greatest year in its history, after writing its name in fire across those pages during 1943. It came back the "long road" through Guadalcanal to the smashing victories of the Central Pacific and the anti-submarine triumphs of the Atlantic.

It was a long step in 1943, and a longer one lies ahead. Every victory cost blood and lives. The Stars and Stripes fly many hundreds of miles from Tokyo, but the tide is flowing north and west, relentlessly.

EVERY NAVAL AVIATOR and mechanic, each man or woman at a shore base, played his part in the great job the Navy did in 1943. Many gave their lives and the way may be still tougher before the foe lays down his arms.

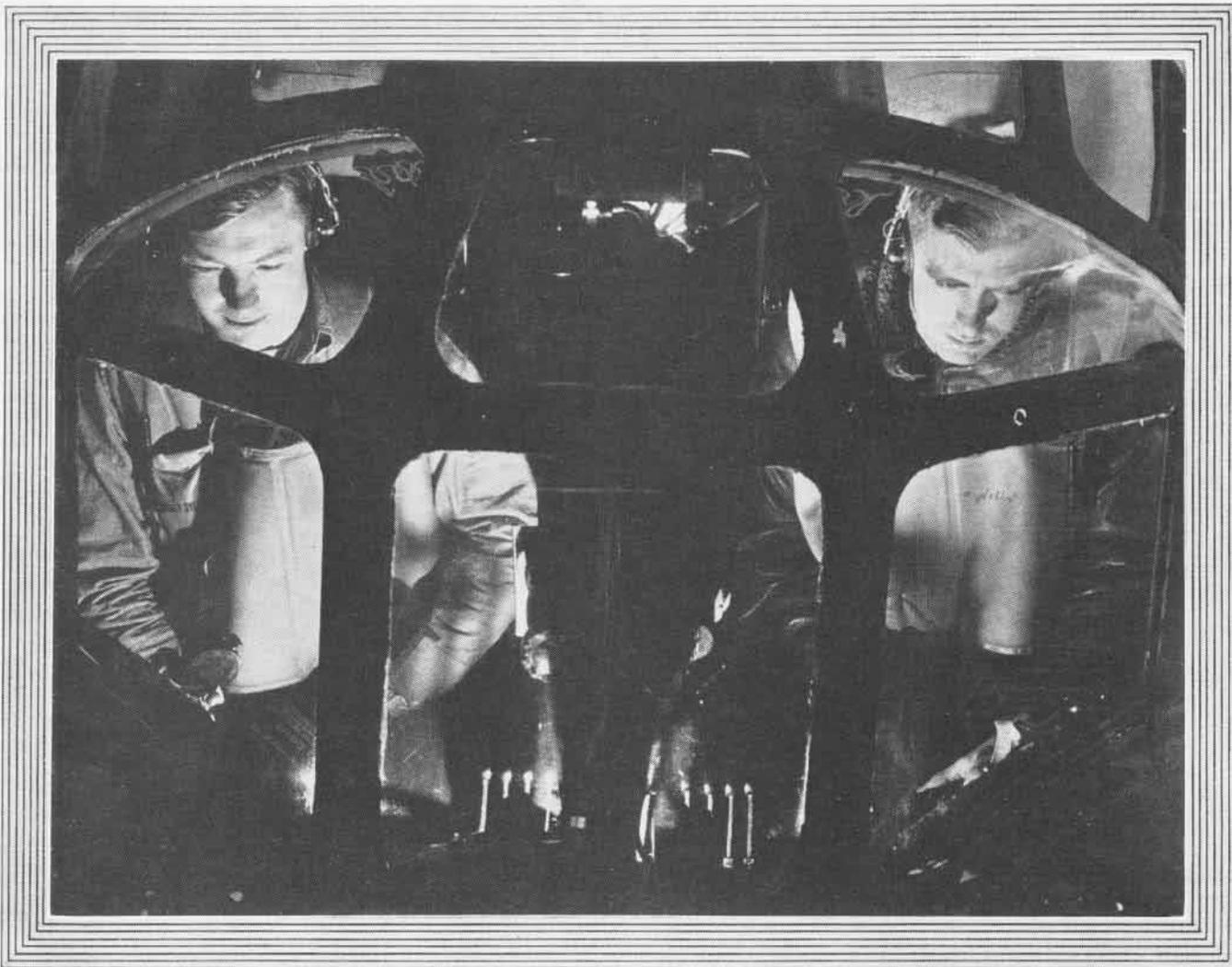
THAT THESE MEN shall not have died in vain, it is up to us all to push the fight they made to the utmost of our abilities. It is a team job and Americans know what teamwork is. To Naval Aviation in 1943 we say "Well Done" and for the crucial year to come "Good Hunting!"

Arthur L. Gates

Assistant Secretary of Navy for Air

J. S. McCain
Vice Admiral, USN,
Deputy Chief of
Naval Operations (Air)

J. C. Ramsey
Rear Admiral, USN,
Chief of Bureau of
Aeronautics



VISION AFTER NIGHTFALL

SEEING AT NIGHT is much different from seeing in the daytime, but it is difficult to convince pilots of this, flight instructors and aviation medical officers say. Too often pilots assume that both day and night vision are simply a matter of seeing or not seeing. Also, the false idea persists that good day vision means good night vision.

Actually, night eyes are quite different instruments from day eyes. Furthermore, it has been shown that inferior night sight can be improved, just as day vision has been. With practice, some men have doubled the power of their night vision.

In explaining the problems of night vision, doctors point out that the retina of the eye is equipped with a layer of

cells, or nerve endings, known as cones and rods. The big distinction between cones and rods, other than their shape,

is that only cones can recognize color.

Rods are unable to distinguish either color or detail; they respond to dim light and are responsible for vision far out in the corner of the eye. Were retinas to have only cones, however, the eye would be totally blind in dim light. Rods save the individual from complete night blindness because they are capable of detecting light down to one five-thousandth of the intensity at which cone vision ceases.

The night "blind spot," at the visual center of the retina, exists because at that point there are only cones—no rods. Because only rods are present in the peripheral portion—or sides—of the retina, this area is more sensitive to low levels of lighting, dimness and shadows.

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DARKNESS CUTS EYE'S POWER TO PICK OUT SHADOWY DETAIL

THE POWER of picking out detail is reduced at night because of the sparse distribution of nerve fibers serving the rods. Lines of shadow in a factory roof will often blend together from quite a low altitude, except sometimes when the contrast is increased by the lighted parts of the roof reflecting the moon. Roughly, the eye's power of resolving detail is five times less by the brightest moonlight than by day.

A great number of conditions of visibility may be met with at night, depending on the phase and position of the moon and disposition of cloud and haze at different levels. Under usual conditions of darkness, dull colors fade

to gray, bright red looks black, and blue looks pale gray. Ground features may look very different from time to time. Since recognition is made easier by familiarity, night crews are instructed to determine the direction from which the target and its surroundings will be lighted, before setting out to make observations.

As practice in judging the size of ground features, it is helpful, whenever objects of known size are seen, to note altitude, so that a mental picture can be formed. It will then become easier to allow for haze variations.

The size of an object is an important determining factor in night orientation.

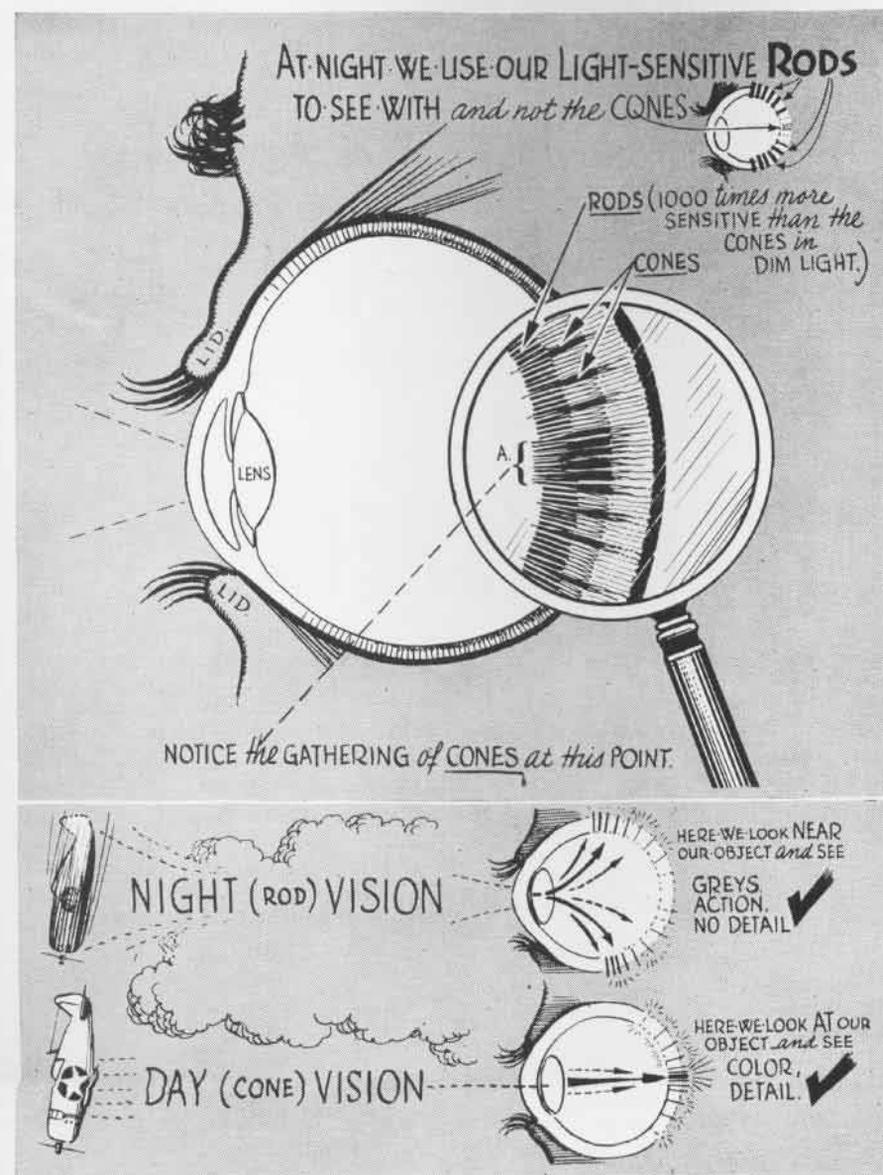
An airplane, clearly visible in plan, might be invisible when looked at from dead astern. The average aircraft is too small to be seen beyond 1,000 feet on a clear starry night unless it is seen in plan. When in pursuit of an enemy plane, the pilot should stay above or below where he can get a plan view, until he closes in.

ONE OF the primary hazards of night flying is sometimes experienced by wingmen whose only light source is the tail light of the lead plane—a single point of light against a formless gray-black field of unlighted sea and sky. The wingman soon begins to experience strong *autokinetic movement*—technical term applied to the apparent movement of a light source that is actually fixed—in the light he is following.

Attempts to follow the "movements" of the light lead to closer fixation, setting up a pre-hypnotic condition in which the pilot stares at the light to the exclusion of practically everything else. If the pre-hypnotic phase occurs, the wing pilot may spend an indefinite period at the controls in a dream-like condition ill-suited to the management of a modern airplane.

While proof of more than a preliminary nature is still lacking, aviation medical officers feel the above conditions are sufficient to provide a reasonable explanation for certain hitherto "inexplicable" accidents. These accidents exhibit a common pattern in that the pilot is observed to break away from night formation, enter an all-out dive, and strike the water without any apparent attempt at recovery.

Pilots in training are now warned that *autokinetic movement* is common and may be expected to occur in their night flying, possibly leading over into a pre-hypnotic condition. Pilots should also be instructed that the simple avoidance of long periods of staring at the light ahead will help them to keep out of trouble.



RETINA IS EQUIPPED WITH CONES AND RODS; LATTER PLAY IMPORTANT PART IN NIGHT VISION



OXYGEN ASSUMES GREATER IMPORTANCE IN DARKNESS

MUCH publicity has been given to the relationship between diet, vitamins, and night vision. It is sufficient to say that use of large extra doses of vitamins—more than one would get in a liberal well-balanced diet—will not improve night vision above normal. The medical officer should be consulted for specific advice or further details on this subject.

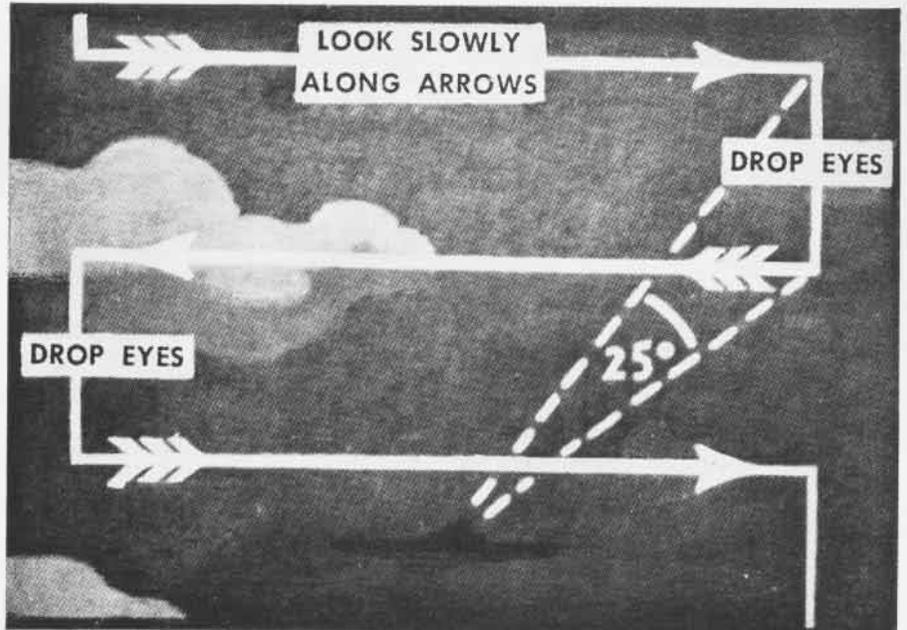
Night vision is one of the first faculties affected adversely by failure to use oxygen at altitudes above six or eight thousand feet. In night flying, crews are now strongly urged to use oxygen prior to reaching these altitudes—to prevent night blindness and to preserve maximum vision and efficiency.^o

An important new aid that reduces time required for adapting vision to darkness is a close fitting red-leased goggle which wearer uses one-half hour before entering darkness [More information in NANEWS, 11/1/43, p. 27].

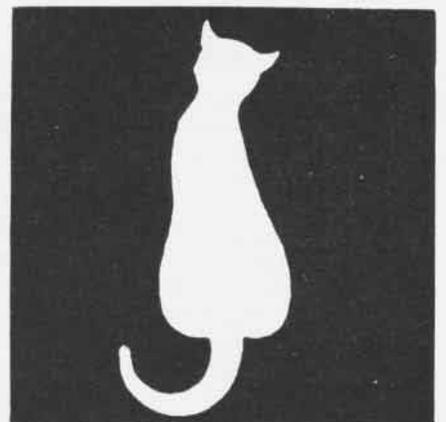
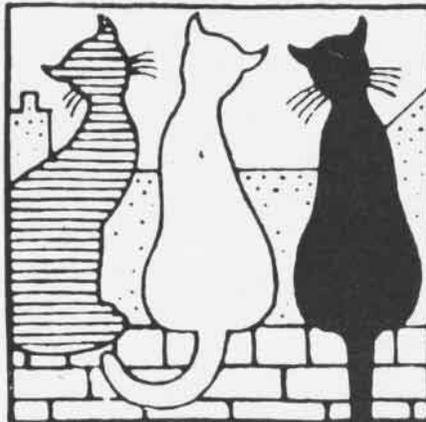
^oSee *Oxygen Sense*.

TEN COMMANDMENTS OF NIGHT VISION

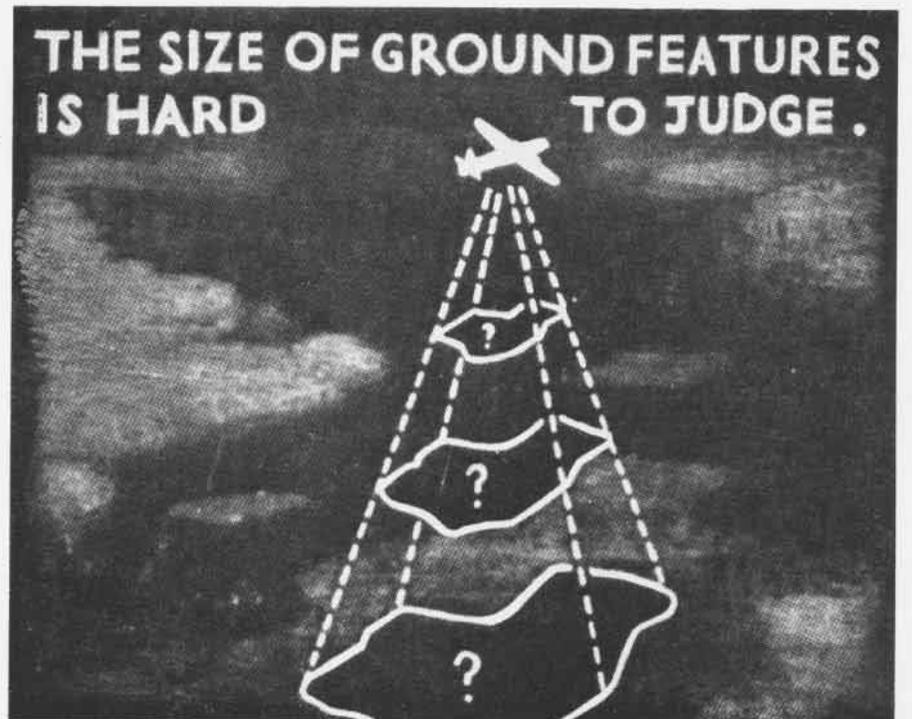
1. Do not attempt night duties until dark adapted—avoid short cuts.
2. Maintain maximum dark adaptation by avoiding all possible light; practice blindfold drills until all surroundings are known by touch.
3. For instrument lighting use dim light, preferably red; do not stare longer than necessary at lighted instruments.
4. Keep windshield and goggles spotless and unscratched.
5. Practice use of corners of the eyes; night targets are better seen by not looking directly at them.
6. Move the eyes frequently; practice systematic scanning; be alert for moving objects.
7. Know the tactical value of low light contrast in night missions.
8. Use night binoculars when available.
9. Observe technical orders in use of oxygen; be over-conscientious at night, not over-confident.
10. Don't break training—stakes are too high.



A ROUTINE METHOD OF SCANNING IS ADVISABLE TO INSURE COVERAGE OF THE FIELD OF VISION



DIFFERENCES BETWEEN BLACK AND MIDDLE TONES ARE MORE DIFFICULT TO DISTINGUISH AT NIGHT



UPON SEEING OBJECTS OF KNOWN SIZE, IT IS HELPFUL TO NOTE ALTITUDE FOR FUTURE REFERENCE

GRAMP AW PETTIBONE

Attention Line Chiefs

Several recent ground accidents have occurred as a result of planes jumping chocks while engines were being warmed up by inexperienced ground personnel. In every case, insufficient brake pressure was held. Ground personnel who have been designated as qualified to start engines of certain type aircraft should be cautioned to inspect for proper placement of chocks before entering the cockpit and to apply sufficient brake pressure at all times when the engine is being started or is being turned up beyond idling rpm.

Flat Tire Landing

Bombing Squadron 133 submitted a report on the landing characteristics of a PV-1 airplane with a flat tire.

Upon returning to the field after a six-hour flight, the pilot made a normal transport landing. As the wheels touched the ground, the safety ring flew off the starboard wheel. The tire rolled off the wheel 2,000 feet down the runway. The plane remained on the runway, sending up a shower of sparks, until it came to rest 2,000 feet farther on.

The pilot reported that there was a noticeable vibration after the tire came off. As the plane went down the runway, it had a tendency to veer first to the left and then to the right. This tendency was countered with the rudder and, as the plane slowed, a slight amount of left brake was necessary to counteract the drag of the right wheel.

'Pass the Bailing Wire— I Gotta Get Home'

While making a cross-country flight, the pilot of an SNJ-4 drifted off course and because of low fuel supply and approaching darkness, elected to land at an airport short of his destination. A



fence was struck during the landing, resulting in considerable damage to the airplane.

The next day the pilot and passenger (a CMM) repaired a hole in the port stabilizer, but left untouched several holes in the underside of each wing and the battered leading edges of both wings. They then decided that the airplane could be flown, and took off. At the next stop, however, the operations officer grounded the plane as "unsafe for flight."



Grampaw Pettibone says:

Perhaps the pilot thought his 1,000 hours of flight experience qualified him to handle the airplane in this condition. Unfortunately, however, it takes more than pilot technique to fly a plane with badly damaged wings. Except in an emergency, better let the aeronautical engineers decide what the flying characteristics of an altered airfoil are and not attempt to find out by experimenting.

As an example of what might have happened in the above case, let me tell you about a recent TBM crash. This TBM hit a flock of ducks, striking three or four with the leading edge of the wing, which flattened it and destroyed its airfoil characteristics. Since the plane seemed under control, the pilot attempted to make a forced landing. As airspeed was reduced in the final part of the approach, the plane made a half roll and hit inverted.

This fatal accident could have been

avoided had the pilot tested the stall characteristics of this plane while still at altitude, in compliance with Technical Order 48-40. Note carefully that this pilot thought his airplane was controllable, but the leading edge of the wing had been so deformed that under certain flight conditions the flying characteristics of the plane had been altered enough to cause complete loss of control.

I wonder if our SNJ bailing-wire pilot realizes how close he came to taking his last unnecessary risk when he took off with damaged wings. A plane temporarily grounded for repairs is much more of an asset than one permanently grounded as the result of an unnecessary crash.

PV-1 Night Take-Off Crash

After becoming airborne during a night take-off, wheels were retracted normally. About 200 yards past the end of the field the plane was seen to nose over slightly and fly into the ground.

In analyzing the accident, the investigating board gave the following opinion: "After reaching what he thought was a safe altitude to clear local obstructions the pilot nosed over prematurely and excessively, and flew into the ground at a gliding angle."

Switch Off



The plane captain of an SBD experienced difficulty one morning in starting the engine. Upon leaving the cockpit he forgot to turn off the ignition switch. While pulling the propeller through, the engine backfired, causing him to be struck on the head

by one of the blades.

Up-to-Date Logs

In investigating a recent aircraft accident, it was found that aircraft and engine logs were not up to date. The board made the following comment on this situation:

"In regard to the discrepancies found upon investigation of the airplane and engine logs of subject airplane, it is desired to emphasize the importance of maintaining airplane and engine log

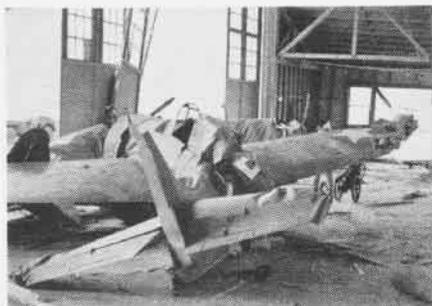


books up to date and exactly correct at all times. Laxity in keeping these logs can result in serious consequences, both to personnel and material."

COMMENT—These observations are fully concurred in and it is recommended that units check to see that all pertinent data are promptly logged. In this connection, overhaul units should insure that overhaul work and incorporation of any "changes" are logged, as this information is an important part of the history of any airplane.

No Way to Enter a Hangar

In taking off, the pilot of an F4F-4 noticed the left wing start to dip just as the wheels were leaving the ground.



He gave it more gun, got immediate increased left torque, and the Grumman veered left and smashed through a hangar, taking out a 12-inch-square wooden post and making mincemeat out of two Cubs.

No Substitute for Common Sense

A PBJ was taking off at night with the first pilot at the controls. The side cockpit lights being inoperative, the pilot was forced to manipulate the yoke with his left hand so that he could play the fluorescent lights on the instrument panel. He then nudged the co-pilot and told him to lock the throttles. Owing to noise in the cockpit and darkness, the co-pilot was unable clearly to interpret the signal and thought it was intended that he get ready to retract the gear. In an effort to get the throttles locked, the first pilot again nudged the co-pilot who then raised the landing gear. The plane was not yet airborne and settled to the runway where it skidded for about 300 feet. A hydraulic line was broken and fire consumed the aircraft.

Grampaw Pettibone says:

Both pilots agreed that the accident was caused by a misinterpretation of signals between two pilots who were not familiar with each other's procedures. If this were the first time for this type of accident I wouldn't be so upset, but it isn't the first time, not by a long shot! In nearly every previous case there was signal confusion.

But there is something more to it than mere misinterpretation; a lack of good old common sense was indicated on the part of the co-pilots involved in these accidents. Something so elementary as a premature retraction of wheels on take-off should have been obvious to them. A co-pilot isn't supposed to be along just for the ride. He is supposed to assist and learn. He does have responsibilities.

Come on co-pilots; get on the ball! I'm jumping on you this time because you're mainly at fault in this type accident. Your main job is to help the pilot, not make life more difficult for him by increasing his responsibilities. You'll appreciate a good, wide-awake assistant yourself when you get to be a first pilot.

Ignominy

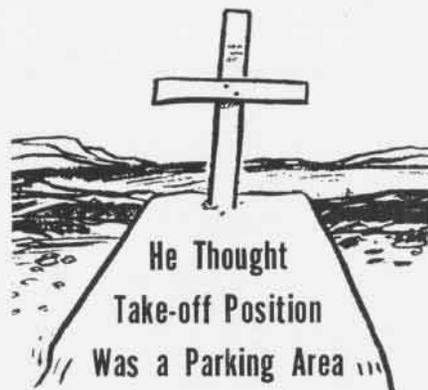
An N2S was dispatched to search for a man overboard from a freighter. Upon reaching the area to be searched, the passenger (also a pilot) sighted an object in the water and took the controls. While circling the object at low altitude, he felt the stick jerk slightly and released the controls, *thinking* that the front seat pilot had taken over. The airplane then took matters into its own hands and flew into the water. The would-be rescuers became the rescued, as they were picked up by the freighter they had been sent to help.

Grampaw Pettibone says:

Pure carelessness and negligence! There is no excuse for ever varying the correct procedure for changing control, as laid down in Article 13-111 *BuAer Manual*. It was written specifically to prevent just this dumb sort of accident.

Keep Your Head

During dive bombing practice, the propeller governor drive of an SBD-5 failed, causing the prop to shift into positive low pitch. The pilot became rattled and decided to land immediately at a nearby municipal airport. The decision was OK, but in his excitement he forgot to lower his wheels.



Collapse of SNC-1 Landing Gear

Several SNC-1 landing gear failures (gear collapse on landing) have been attributed to malfunctioning of the retracting and down-lock mechanism. It appears that nothing short of a complete redesign of this system will remedy the trouble, but in view of the status of the SNC-1 and the minor nature of the accidents, it is impractical to make this major change. However, most, if not all, of these accidents could have been avoided if the hydraulic hand pump had been used to force the retracting cylinder to completely extend and the down-lock to engage. It is recommended that pilots, after lowering the landing gear, operate the hydraulic hand pump to build up and maintain full pressure prior to every landing.

More Parachute Sense

The pilot and crew of a TBF were forced to bail out over mountainous territory. All landed safely, but considerable difficulty was experienced in locating them from the air. They were



dressed in khaki flying suits and were not easily distinguishable against the natural background of the terrain. One man was not found for four days and went through many unnecessary hardships. Had these men spread their parachutes in a conspicuous place and stayed with them, or at least carried a sizable portion of the canopy to signal searching planes overhead, they could have been spotted and rescued in a very short time.

Mooring Equipment

The pilot of a PBM was directed to tie up to a mooring buoy. The buoy had a four-inch line tied to it with the eye of the line lying across the top of the buoy. Thinking this was the regular buoy line, the man in the bow put the eye over the plane's port snubbing post. The line was only a few feet long, however, and the sudden strain on it pulled the snubbing post out of its installation.

Pilot said, "This was due to my ignorance of length of line on buoy and to my not instructing bow man to use plane's own buoy line."

DID YOU KNOW?

Now Artillery Takes Wings Mitchells Pack 75 mm. Cannon

The 75 millimeter cannon has proved itself more effective than bombs against certain targets and is being installed by Army Air Forces in the B-25 *Mitchell* bomber. First experience in cannon-firing from the air was gained against the Japs in New Guinea, with marked success. Stalking larger game in the same area, the B-25 was sent against the larger of two Jap destroyers, scoring five direct hits and leaving the warship in a sinking condition.

Similar to the famed French 75's of World War I, the cannon installation is intended primarily against targets that are more vulnerable to shells fired against their sides than to bombing.

Despite its size, the comparatively rapid-fire weapon is said not to decrease effectiveness of the B-25 in performing its usual missions of bombing, strafing, carrying torpedoes, and acting as reconnaissance, transport, and fighter.

2 Ministers' Sons Pilots AA Fails to Halt Long Dive

Two ministers' sons from Illinois and Texas, currently Marine Corps dive bomber pilots, are teaming to plaster Jap installations in the Solomons area. Their early record included six dive bombing missions against the enemy on Kolombangara, Ballale, and Bougainville Islands.

One turned in a unique performance by diving upside down on a gun em-

placement near Vila airdrome, his plane being blasted over on its back by ack-ack fire. His engine conked out on the way down but he righted the plane and unloaded on the gun.

Trains Air Storekeepers Alameda School Is Launched

Aviation storekeepers are being trained at a school opened at Naval Air Center, Alameda, filling a long-felt need for storekeepers with technical training in aviation supply. The classes are composed of graduates of the regular Navy storekeepers' school who are given a two-week course of instruction.

Facilities at Alameda limit enrollment to 99 men, with 33 being graduated every two weeks. It is expected that a curriculum will be developed at this school which can be readily adopted at other points for turning out storekeepers. Present staff is two pay clerks, two aviation chief storekeepers, two aviation chief machinist's mates.

Inbound Mail Is Heavier Men Overseas Best Writers

Men of the armed services overseas are writing home quite often, to judge from mail figures received by Naval Air Transport Service. One month's air mail from overseas in the Atlantic area totalled 36,505 pounds, 7,386 pounds more than the total from home destined for foreign ports.

Naval Air Ferry Command Operates as Air Wing of NATS

To keep pace with the increasing requirements for ferrying of aircraft, a Naval Air Ferry Command has been established with headquarters at NAS, New York. A field command of OCNO, it operates as an air wing of NATS.



OTTUMWA SAVES TIME BY BRINGING PAYWAGON TO MEN INSTEAD OF HAVING THEM PICK UP

Now the 'Ghost' Rides! Itinerant Paymaster Cuts Time

NAS, OTTUMWA—They bring the mountain to Mohammed at this air station to save a lot of man-hours and speed up the twice-monthly "Ghost Walk." In the old days, all hands knocked off every pay day and stood around as much as three hours waiting to get their money. Now the money comes to the sailors and little "time-out" is declared while the men are being paid. The device saves considerable

time and cost the Navy a mere \$6.40.

The station already had the "milk wagon" type of truck. A bench was built into it to serve as a desk and the pay files were placed on it. Two chairs for officers and one for the storekeeper make up the traveling office which tours the station, paying mechanics on the line and yeomen at the administration building. Pharmacist's mates and mess attendants get paid in 10 minutes.

ATTENTION
SQUADRON COs!

Can each of your PILOTS
START his own ENGINE?



Functions such as accepting and testing, as well as matters of matériel, remain under the cognizance of BuAer.

The term *Aircraft Delivery Unit* is discontinued upon commissioning of the various ferry squadrons, and *Aircraft Commissioning Unit* will designate functions of these units left attached to the air station or facility.

'Baby Flat Top' Released Casablanca Type on Sub Duty

First pictures have been released of the *Casablanca* class escort carrier, the



CASABLANCA TYPE HAS SIZABLE FLIGHT DECK

"baby flat tops" which are helping the Navy crush the U-boat campaign in the Atlantic.

Exact figures as to the size and aircraft complement of these CVE's have not been released. The ship illustrated was built by the Kaiser Shipbuilding Company and was converted from a freighter-type vessel.

NATS Takes Over 'Mars' Huge Plane on Long Flight

Naval Air Transport Service has acquired the world's largest flying boat, the 70-ton 150-passenger *Mars*, and after testing will use it to transport men and materials to distant fronts.

In a recent test before it was turned over by the Naval Trial Board, the *Mars* flew 32 hours non-stop with a



crew of 22 men, traveling a distance equivalent to a flight from Baltimore to Berlin and back to London.

The *Mars* is two-thirds again as large as the biggest flying boats now in service with NATS. It has a 200' wingspread, is 117' long and 36' high. Cubic content of the huge plane is equivalent to a 15-room house. It can hold a tank carload of gasoline and up to 20 tons of cargo. Four Wright Cyclone engines, each of 2,200 hp, turn three-bladed propellers 16' 6" in diameter.

Photo School at Anacostia Develops Reconnaissance Study

A photographic interpretation center has been established at NAS, Anacostia, with administrative functions under the commanding officer, its policy and procedure being directed by CNO.

Functions of the center include a school in the techniques of photo interpretation and the manufacture of terrain models in quantity. From its growing files of aerial reconnaissance negatives, the center develops special studies based upon interpretation in the third or final phase.

Contact is established with Army and Allied agencies and the center maintains a pool of trained photo interpretation teams the Fleet can draw from.

Waves to Teach Gunnery Enlisted Girls Get Training

Petty officer ratings as full-fledged air gunnery instructors have been opened to enlisted WAVES and training is being given them at NATC, Pensacola.



ENLISTED WAVE LEARNS MACHINE GUN SECRETS

Women who qualify for the rating of specialist (G) will be able to teach airmen how to shoot pistols, revolvers, and machine guns on the range, as well as teach gunnery theory in classrooms and gunnery accuracy on special training devices.

To qualify for the third class specialist (G) rating, enlisted WAVES must be able to instruct in aviation free gunnery on any firing range, excluding turret machine gun; on synthetic gunnery training devices, and in a classroom. They must be able to fire properly a shot gun, a service pistol, machine gun, and turret machine gun, demonstrate ability to assemble and dismantle arms, identify common types of ammunition and belt a machine gun, and be able to operate and repair synthetic trainers.

BEST ANSWERS

XIII—Navy Regs

Pick the best choice to complete the statements below, then check your answers on p. 40.

1. No written communication shall be received as official which is not forwarded through—

- a—the hands of the parties immediately concerned
- b—the usual postal channels
- c—prescribed channels
- d—a Navy censor in time of war

2. A chief petty officer has had nine years of active service with a good conduct record. He would wear—

- a—three red service stripes
- b—three gold service stripes
- c—two red service stripes
- d—two gold service stripes

3. Ruffles and flourishes are part of the honor given officials above—

- a—commander
- b—captain
- c—commodore
- d—rear admiral

4. Navy regulations are violated when—

- a—several officers are saluted and only the senior returns the salute
- b—commissioned and warrant officers use the starboard gangway
- c—officers and men salute the colors first on coming aboard ship
- d—officers enter vehicles and boats in inverse order of rank

5. The mess treasurer is—

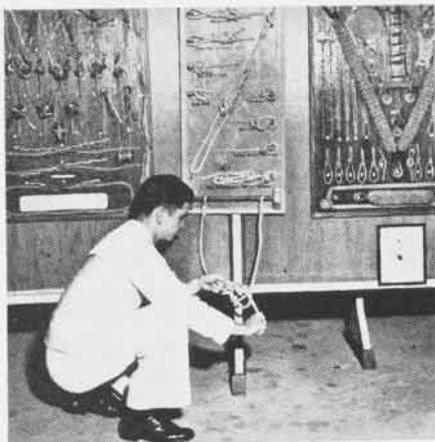
- a—elected by the members of the mess
- b—appointed by the commanding officer
- c—the supply officer of the ship
- d—the chief commissary steward

6. The one of the following men who cannot be tried by a summary court-martial is—

- a—seaman 2/c
- b—chief machinist's mate
- c—fireman 3/e
- d—boatswain

7. No sentence of a court-martial, extending to the loss of life or to the dismissal of a commissioned or warrant officer, shall be carried into execution until confirmed by the—

- a—Judge Advocate General
- b—Secretary of the Navy
- c—Secretary of the Navy and the President
- d—President



KNOT BOARD HAS LOOSE LINE FOR PRACTICE



BOOTS LEARN NAVAL HISTORY FROM DISPLAY

EYE APPEAL STOPS 'EM

NATC, CORPUS CHRISTI—Bulletin boards are excellent teaching aids, but several elementary principles must be incorporated in every display to make them "sell" the story. A study of relative values of exhibits at Cabaniss Field led to the following findings:

1. The board must be placed where men not only pass but are inclined to pause. The hallway where chow line forms proved to be an excellent spot.

2. They must change periodically, in fact frequently enough so that the element of freshness is always present. An empty bulletin board is preferable to a stale one.

3. Presentation should be graphic, colorful and designed so that the casual passerby may gain something. However, it has been found that highly technical and detailed material is desirable in almost every exhibit. It is a mistake to assume that one must "talk down" to a Navy audience.

4. Best exhibits are those that require some participation on the part of the spectator. This ranges from providing lines with which knots and splices of the mar-

linspike seamanship boards may be reproduced, to questions regarding history of the Navy. The questions were framed primarily to stimulate curiosity and are typified by, "When was the first U. S. naval victory over the Japs."

The seamanship series of bulletin board exhibits now includes: 1. History of the Navy, 18 color prints of naval actions and portraits of naval heroes, together with a brief history. 2. Ranks, rates, and ribbons. 3. Marlinpike seamanship including knot boards covering knots every sailor should know, splicing and fancy work. 4. Aircraft carrier—color prints, cross section drawing, recognition material, model carrier, and model task force with lines of flight of attacking and defending planes indicated by colored wires. 5 to 8. Similar material covering uses and characteristics of battleships, cruisers, destroyers and submarines. 9. Navigation comprising the history of navigation, problems with their solutions and demonstration of simplified or raft navigation.

War Bond Sales Set Mark Pearl Harbor Day Successful

Naval personnel will have about \$300,000,000 to spend in 1953 as a result of their purchases of War Bonds during the 1943 calendar year, which was topped off by sales of around \$25,000,000 on Pearl Harbor day.

The Navy's War Bond office announced that a million out of the total three million persons in the Navy, Coast Guard and Marine Corps were buying bonds regularly on payroll allotments. Pearl Harbor day sales in the Navy building totalled \$730,000, with Bureau of Aeronautics buying \$101,000. The whole Navy bought \$25,000,000 worth of bonds that day, far above the goal of \$15,000,000.

Relief Maps Help Fliers Seaplane Squadron Uses Idea

NATC, PENSACOLA—Relief maps used at this station to acquaint flight students with geodetic characteristics of operating areas are receiving enthusiastic support of instructors in the seaplane squadron.

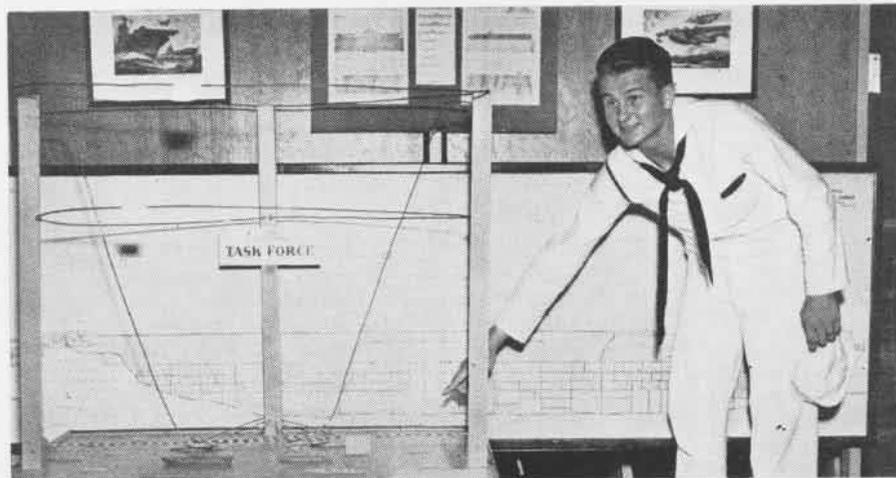
All prominent landmarks are accurately reproduced, with emphasis on obstacles such as buoys, range boats, docks, bridges, and sandbars which are encountered during routine flights. Bombing targets, gunnery ranges, and restricted areas are outlined in red on the map, with primary formation and navigation sections encircled by a broken white line.

Effectiveness of teaching by this pseudo-visual method is indicated by the facility with which instructors can explain the topography of operating areas assigned to this squadron. Previously it was necessary to devote a considerable amount of lecturing to students, before their first flight, to acquaint them with geographical particulars. The students learn faster and make fewer course rule violations.

New 'Sub Target' Set Up Shows Conning Tower's Outline

MCAS, CHERRY POINT—A new "submarine target," 120' long, with a 20' beam and the outline of a conning tower, has been set up for gunnery practice at this station. White lime 1½' wide and thick enough to stand up under a few thunderstorms affords a sharp outline from the air.

From most points of the compass the flat desert allows practice approach runs for strafing. On one side, however, an abrupt butte shields the target and permits an absolutely blind approach, so that advanced pilots have a chance to develop skill and speed by simulating attacks.



BULLETIN BOARD TEACHES SEAMANSHIP BY SHOWING MODELS OF SHIPS MAKING UP TASK FORCE

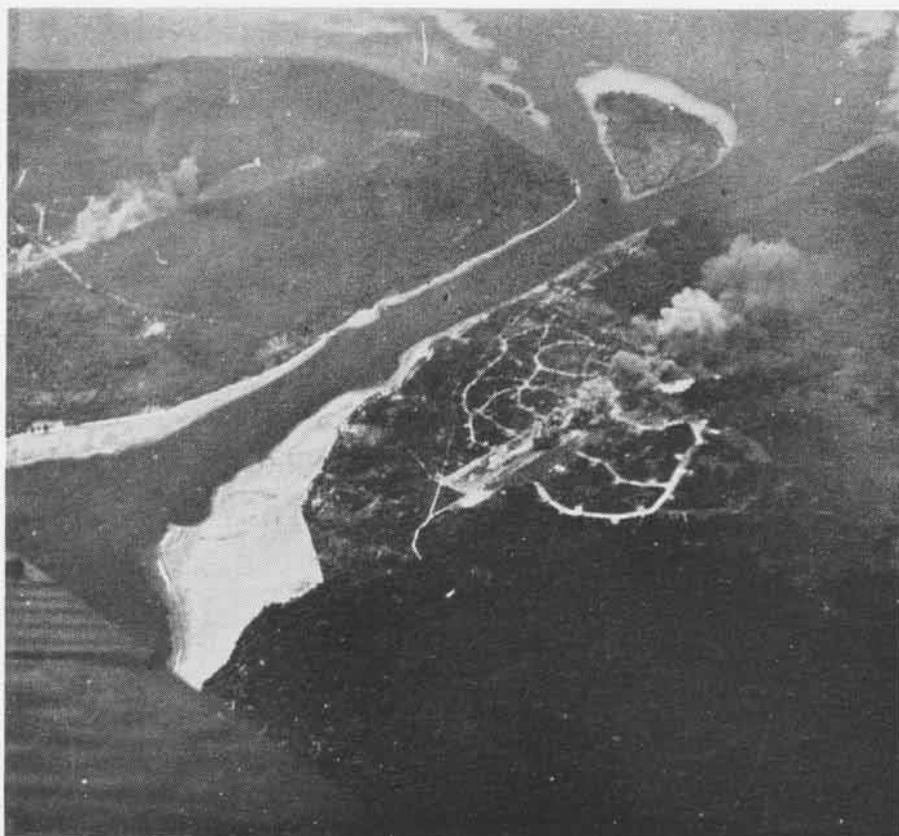


JAP REFUELING AND REPAIR STATIONS STRATEGICALLY LOCATED ALONG NARROW BUKA PASSAGE WERE TARGETS FOR HEAVY ALLIED BOMBARDMENT

RAIDS HIT BUKA-BONIS

DEVASTATION on Buka and Bonis, Japanese airfields in the Solomons, are shown in these photographs. The picture above indicates the relation between these highly strategic positions, situated on narrow Buka passage, which separates Buka Island from Bougainville. This site was chosen by the Japs as a refueling and repair station for planes from other Jap bases in the South Pacific on their way to attack U. S. positions in the Solomons.

As a result of the strikes on Buka and Bonis, enemy aircraft were destroyed on the ground and considerable damage was inflicted on buildings, installations and small shipping. Enemy personnel losses were heavy. Photograph at right shows hits on runways.



BUKA-BONIS STRIKES SPLINTERED ENEMY AIRCRAFT, ALSO DAMAGED BUILDINGS AND SHIPPING

NAVAL AVIATION IN 1943

DURING 1943 naval aviation played a major rôle in the crescendo of World War II, growing into the world's most powerful naval air force as its operations spread from Europe to Kiska and the South Pacific.

The Navy today has more planes, more aircraft carriers, more pilots and aviation technicians than in all the years since Admiral George Dewey signed a report in 1913 recommending establishment of an air department.

Navy planes brought new laurels to their already fine records of 1942 when they smashed Japanese attempts to recapture Guadalcanal and aided in the North African invasion. The year 1943 saw the tide definitely turned against the Axis, and naval aviation was in the front line blasting hundreds of enemy planes out of the air, knocking out airports, and helping troops capture new



PBJ, MITCHELL

territory. Victory against German U-boats was largely a story of Navy patrol planes and escort carriers teaming with other surface units.

The huge offensive in the South Pacific, when the Gilbert Islands were taken, was made possible in part by swarms of aircraft carriers and their hundreds of planes smashing all Jap opposition. Groundwork for this and the northward surge in the Solomons was a months-long battle plan of endless softening-up raids on Jap airfields.

The first half of 1943 opened with Navy planes helping fend off final Jap attempts to blast Americans off Henderson Field. One April raid cost the Japs 34 planes and another in June cost them 94. Soon the Navy was broadening its operations, striking back at the Rising Sun's airports and planes on Kolombangara Island, at Lae, Salamaua, Rekata Bay and Kahili.

Japanese on the Aleutians took endless bombings from American planes, some operating from Navy aircraft carriers, before being driven off the last acre of North American land in August. An American carrier even was

assigned to duty with the British fleet and participated in raids on Norway.

Naval aviation units also were active in the Sicilian and Italian invasions. One scout plane pilot distinguished himself by capturing 150 Italian ground troops, herding them to nearby American troops by firing at their heels.



FG6, HELLCAT

THE SOUTH PACIFIC saw the biggest naval aviation battles of 1943. The largest aircraft carrier forces ever assembled in history blasted Marcus Island, leveled everything on Wake Island and helped sweep over Tarawa and Makin. Land-based Navy *Liberators* participated in the destruction.

In the southern sector of the Pacific front, Navy planes helped in preliminary hammering and capture of Vella Lavella, Kolombangara, Munda, Salamaua, and Lae. Kahili, Vila, Buka, and Bonis were bombed so often they were of little use to the Japanese as air bases. Army and Navy squadrons cooperated in blasting these points.

Early in December a Navy carrier task force followed up on the Gilbert Islands invasion by striking powerful blows at Nauru Island and two bases in the Marshall group—Wotje and Kawajalein atoll. In the Marshall engagement 72 Jap planes were shot down and six ships sunk.

More than 40 aircraft carriers of all types, including merchant fleet conversions, were completed, a dozen of them



PB4Y-1, LIBERATOR

in November, and eight of those big ones. All told, the United States has spent a billion dollars since July, 1940, building up its aircraft carrier fleet.

ONE OF the most remarkable records of the war was set by carriers. Operating in all major naval engage-

ments, convoying merchantmen and carrying 3,000 fighting planes to battle areas, only the *Liscome Bay* was lost. The last previous carrier sinking was the *Hornet* in October, 1942. Three other carriers have been sunk in this war—*Lexington*, *Wasp* and *Yorktown*. The *Langley* was a seaplane tender.

At the outbreak of World War I, naval aviation had one air station, 38 officers, 163 enlisted men and 54 planes. Today it has a 30,000-a-year pilot training program, a 100,000-a-year mechanic training program, 200 airships, 27,500 planes, scores of air stations all over the world and swarms of large and small aircraft carriers.

Naval aviation played a large part in the United Nations' successful campaign to defeat the submarine menace in the Atlantic convoy lanes. Blimps and PBVs which patrolled offshore were bolstered by long-range Consolidated bombers, Lockheed *Venturas*, and carrier-based aircraft which escorted Europe-bound ships through



F4U, CORSAIR

U-boat danger zones of the Atlantic.

That the anti-sub campaign was successful was shown when President Roosevelt announced 90 submarines were sunk by the Allies at sea during the May-July period, 22 by planes. Later, Secretary Knox announced naval aircraft accounted for 21 of the 29 German subs sunk by the U. S. in the August-October quarter. U-boats were forced to rearm with heavy anti-aircraft guns to protect themselves from swarms of Navy planes. Many planes and even a blimp were shot down by subs, but the U-boat toll still mounted.

Five new-type airplanes were brought into widespread action during 1943, two of them developed by the Navy itself and the others being Army planes adapted to fit needs of island and submarine warfare. The Navy produced probably the two most sensational fighters of the year when it sent the *Corsair* and the *Hellcat* to the Pa-

cific area in large numbers to outperform the best Jap planes.

Other newcomers to the list of planes in 1943 were the PV-1, the Lockheed twin-engine plane, used predominantly for anti-sub work; the PB4Y-1, the Consolidated long-range bomber, and the PBJ, called the B-25 *Mitchell* by the Army.

Several other Army aircraft were adopted in smaller numbers by the Navy for specialized tasks, such as the BD-1, the Army's *Boston*; the JM-1, the Martin *Marauder* which the Navy used mainly for target towing; the L-5, Vultee *Sentinel* liaison plane, and the HE-1 hospital plane. A new torpedo bomber, the eight-ton Consolidated *Seawolf*, was revealed as being on its way toward production in 1943.

THE NAVAL Air Transport Service made a phenomenal expansion during 1943 to meet demands of the global war. Its 60,000-mile transportation lines stretched from the Aleutians and South Pacific to Iceland and West

Africa. NATS started the year with three squadrons, 100 planes and 1,500 personnel. It ends the year with 11 squadrons, 200 planes, and 6,000 personnel. Miles flown rose from 1,237,000 in January to 3,259,000 in October. It carried 20,200 passengers in



PV-1, VENTURA

October, plus 7,143,000 pounds of cargo and mail, three times the January total. Many shuttle flights between shore stations were inaugurated during the year, as well as new overwater hops.

Five naval aviation activities won Presidential Unit Citations during 1943

by their valorous exploits. The *Enterprise* won a citation for its part in occupation of Guadalcanal, the battles of Stewart Islands, Santa Cruz, Solomon Islands, the battle of Midway, and raids on the Gilberts, Marshalls, Wake and Marcus Islands, all of which took place in 1942.

The task force of which the U.S.S. *Card*, together with VC squadrons one and nine, was a part, was cited for destroying more submarines in the Atlantic than any team in naval history. Torpedo squadron 8 was cited for the Midway action.

The Marine First Division operating in the South Pacific was given a Presidential Unit Citation for smashing Japanese attempts to recapture Guadalcanal and this included all aviation units operating with the division. Torpedo squadron 8 was one of these units; thus it became the only naval group to win two citations. The only other unit to be cited during the year was Marine Aviation Group 22 for its gallant action at Midway Island.



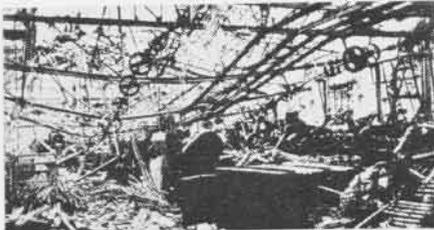
ALLIED WINGS BOMBED AXIS TARGETS

ARMY AIR FORCES

STRIKES to the important ports of Kiel, Bremen, and Emden, to targets in occupied France, the Messerschmitt factory at Regensburg or the ball-bearing factory at Schweinfurt, including trips all the way to Danzig, occupied the Eighth Army Air Force in 1943, with precision daylight blows at Hitler's Europe. Fighter coverage by sturdy *Thunderbolts* and speedy *Lightnings* destroyed or drove off swarms of enemy fighters while hard-hitting *Marauders* weakened the defensive line of air bases in France and the low countries.

In the Mediterranean theater, the Ninth played a vital rôle in clearing the Afrika Korps out of Egypt and Libya, in what has been described as the greatest air offensive of the war to date. Particularly effective were the devastating attacks on the ports of Tobruk, Bengasi, ports in Greece and Crete and Axis shipping, especially tankers carrying gas and oil for Rommel's war machine. This strategic bombing played an important part in the expulsion of the Axis from Africa.

More recently the Ninth played an important part in softening Sicily and Southern Italy for invasion by smashing ports, airfields and communications, and struck a particularly effective blow in the long-range, low-flying attack on the Ploesti oil refineries.



DEVASTATION OF MACHINE SHOP FOLLOWS RAID

The Twelfth Air Force, active throughout the year in conjunction with RAF units, is now largely a tactical unit cooperating with the Fifth and Eighth Armies and in softening the Balkans. The newly established Fifteenth Air Force has now established bases in Italy for pounding the southern and eastern war industries in the tightening air circle over Nazi Europe.

In the Pacific theater, the Fifth and Allied air forces have been active in the southwest, as, for example, sudden strikes destroying 300 enemy planes at Wewak in August and more than 200 at Rabaul a few weeks later. Earlier in the year they participated in the victorious Bismarck Sea engagement. The Thirteenth Air Force has been operating in the South Pacific and Solomons area under joint Army-Navy-Marine command. Meanwhile, the Seventh in the Central Pacific has been making long-range attacks on Wake, Nauru and other Jap outposts. The Eleventh in Alaska helped to drive the Nips out of the

Aleutians as well as direct some solid blows at Paramushiru.

Rounding out the air forces headed toward "Target Tokyo" there is the Tenth in India and the Fourteenth in China, both of which to the limit of their available equipment and supplies have shown amazing resourcefulness in hammering away at Jap positions in Burma and China.

MARINE CORPS

MARINE SBD and TBF squadrons based at Henderson Field were busy hitting enemy barges, capital ships, and submarines trying to reach beleaguered Japs still on Guadalcanal when the year 1943 dawned in the South Pacific. During the first two months, several enemy expeditions to relieve or evacuate the island were turned back. Marine pilots were keeping the Japs in a trap and at the same time keeping enemy bases to the north and west continuously under bombardment.

On February 20, the Russell Islands were occupied without resistance and work started immediately on building fighter and bomber runways. The object of the northern push was Munda on New Georgia Island, and this strategic point of Jap resistance was already under daily strafing and bombardment.

The first weeks of June saw a step-up in tempo of these raids. Various Japanese air outposts such as Munda, Vila, Bairoko, Wickham Anchorage, Viru, Ballale, Kahili, and Buka were the targets of increased bomb tonnage while Marine fighters were active over these points.

The push proper opened on June 30. Landings were made by Army and Marine ground troops at half a dozen points on New Georgia Island. In the air, the First and Second Marine Aircraft Wings kept a constant stream of bombers and fighters active.

During the first 30 days of this drive the Japs lost an average of 10 planes every 24 hours, the official total being 306. More than 800 tons of bombs were dropped, most of them on Munda. Intelligence reports indicated that Marine SBD and TBF planes hit the high average of 80 percent accuracy in these strikes.

Munda was completely neutralized as an air base within 10 days after air operations began. On July 15 the score of aerial fighter victories reached the comparative total of 15 to 1, highest ever recorded in the South Pacific theater, with 45 enemy planes shot down by Marine, Navy, and Army fighters, while only three U. S. pilots were lost.

On August 5 Munda was taken. Treasury Island came next in the Marine fliers' push northward. Then the west side of Kahili felt the sting of Marine planes, while the capture of Empress Augusta Bay on Bougainville added another victory.

COAST GUARD

COAST GUARD aviation, while relatively small, operated throughout 1943 under the various Navy sea frontiers on anti-submarine work, including convoy coverage and area patrol. With nine air stations, located at Salem, Brooklyn, Elizabeth City, Miami, St. Petersburg, Biloxi, San Diego, San Francisco, and Port Angeles, VPB, VJR and VOS squadrons have combed the seaways. Some of these stations have advanced bases to increase the scope of Coast Guard operations.

A Coast Guard VPB squadron, organized during the year, is now operating outside continental limits on anti-submarine warfare and air-sea rescue work. Also, throughout the year, planes were operated outside the United States on special aerial mapping projects for the Coast and Geodetic Survey and on other special work of a confidential nature. Some Coast Guard cutters now carry amphibian planes for reconnaissance and special duty.

The following statistics list some of the accomplishments for the year 1943 in assistance and rescue work:

1. CG planes made 450 assistance flights
2. Rescued 64 survivors
3. Located and directed rescue of 507 other survivors
4. Located 45 disabled, overdue or crashed planes
5. Transported 82 emergency medical cases.

Specific air-sea rescue organizations have been established in certain areas under CG operation to coordinate facilities of various services and effect more prompt rescue of plane crews forced down or other persons in distress. Seaplanes and amphibians are used in this work with fast rescue boats, while in one area the CG has a crew of trained parachute jumpers to aid survivors from crashed planes in the wooded and mountainous regions along the coastal area.

ROYAL AIR FORCE

January: RAF planes were in action against Germany, Italy and occupied territory during every 24-hour period in the month with two attacks on Berlin. Raids on Lorient and other U-boat manufacturing centers highlighted anti-submarine campaign, while joint action with USAAF covered 8th Army advance in Tripoli.

February: Heavy blows at Axis rail transport and submarine bases were maintained with Lorient, Wilhelmshaven and Cologne selected as main targets. Intensified air support given in North African and Burma campaigns.

March: Heavy blows at German production centers of Essen, Berlin and U-

boat base at St. Nazaire. *Mosquitos* raid molybdenum mine at Knaben.

April: 10,000 tons of bombs dropped in ten major attacks on Duisburg, Essen, Stettin, Rostock, Berlin, Mannheim, Keil and Stuttgart targets, 1,000 tons in two raids on Spezia. RAF-USAAF air cover in North Africa involved 300 to 1,300 sorties daily. Record number of sea-mines laid and enemy rail, river, canal and sea traffic blasted.

May: Greatest single blow against Germany was the breaching of Mohne, Eder and Sorpe dams. Dortmund blasted with 2,000-ton assault. Other major targets were Duisburg, Bochum, Dusseldorf, Essen and Wuppertal. For the first time in any



LANCASTER BOMBERS DO RAF HEAVY DUTY WORK

action, the sheer weight of air attack blasted a way through formidable enemy ground defenses when combined RAF-USAAF tactical air force flew 2,500 sorties and dropped 1,250,000 lbs. of bombs in the North African campaign. Leghorn was first raided from North Africa and the bombardment of Pantelleria opened.

June: First shuttle bombing when *Lancasters* attacked Freidrichshafen and Spezia on return trip. Battle of the Ruhr continued with 10,000 tons dropped on Dusseldorf, Bochum, Oberhausen, Krefeld, Mulheim and Wuppertal, with concentrated blows at Schneider armament works at Le Creusot. Offensive operation started against Sicilian, Sardinian and Italian targets.

July: Hamburg blasted with three raids of over 2,000 tons and five *Mosquito* attacks and Cologne given double blasting. Invasion of Sicily opened.

August: Hamburg, Mannheim, Nurnberg, Peenemunde, Berlin, Munchen and Gladbach feel weight of RAF bombs. Sicilian operations concluded with increased pressure on Italian targets, principally Milan, Turin and Genoa.

September: Major targets included Berlin, Mannheim, Munich and Montlucon. Salerno landings and subsequent operations given air support.

October: Aerial blows delivered on Hagen, Munich, Kassel, Frankfurt, Stuttgart, Hanover and Leipzig. Continued steady pressure maintained in Italian and Burma campaigns.

November-December: Air offensive maintained, culminating in the large-scale attacks on Berlin.

BRITISH FLEET AIR

BRITISH naval aviation saw greater expansion in 1943 than in any like period since its beginning with the introduction of late type U. S. Navy planes

including the Grumman *Avenger* torpedo planes, called the *Tarpon* in the British Navy, Grumman *Hellcat* and Vought *Corsair* fighters as well as the latest type of Grumman *Wildcat*, known to the British as the *Martlet*.

Additional British models re-equipped Fleet Air Arm. These included the *Seafire*, single seater fighter developed from the Vickers-Armstrong Supermarine *Spitfire*, and the *Barracuda*, Fairey Aviation's new torpedo plane. Introduction of the American CVE type of auxiliary aircraft carrier in quantity was a contributing factor in this expansion program.

Typical of the missions carried out by British Navy pilots was fighter coverage provided for the North African landings. During this engagement one Navy pilot in a Grumman *Martlet* captured the Blinda airfield in Algiers when French ground forces indicated their surrender by waving white flags. The pilot sat his plane down on the field and took command.

Another important assignment was fighter protection for the Army at the Salerno landing when *Seafires* and Grumman *Martlets* battled the land-based *Luftwaffe*.

H.M.S. *Victorious*, equipped with U. S. planes, was active in the Pacific theater during the year, but the biggest job performed by the FAA in 1943 was its part in winning the battle of the Atlantic.



H.M.S. VICTORIOUS OPERATED IN PACIFIC AREA

CANADA

THE British Commonwealth Air Training Plan administered by RCAF in Canada stepped up its tempo of aircrew training during 1943, while on the home front long-range *Liberators*, flying from East Coast bases, closed the mid-Atlantic gap in the aerial umbrella over convoys, scoring several attacks on U-boats and helping to cut convoy losses.

In the Aleutians, RCAF squadrons cooperated in routing the Japs from Kiska and Attu.

The first RCAF bomber group in Britain was formed Jan. 1, 1943, composed of RCAF squadrons which already had been fighting alongside RAF squadrons, participating in most of the year's big raids including heavy raids on Berlin. Nearly all RCAF bomber squadrons converted to 4-engine aircraft during the year, exceptions being squadrons of *Wellingtons* which moved to North Africa in the early summer, helping to wind up the campaign there and to soften up Sicily and Italy. RCAF fighter squadrons from Malta followed fighting into Sicily, then to Italy.

In the United Kingdom, RCAF fighter, intruder and *Mosquito* fighter-bomber squadrons carried out thousands of sorties over France, accompanied USAAF heavy and medium bombers on 69 major missions, shot down 158 enemy planes with many more probables, badly damaged 112 locomotives, made 32 successful attacks against enemy shipping and many more where results were not assessed. An average of three intruder sweeps a week were made by *Mosquitos*, *Mustangs*, and *Typhoons*, while Canadian bombers completed 115 heavyweight raids on enemy industrial targets.

AUSTRALIA

AUSTRALIAN aircrew members serving outside the Australian theater of war number 15,000 and during 1943 RAAF squadrons and Australian crews in RAF were engaged in operations from Britain, North Africa, Sicily, India, North Atlantic and Caribbean areas as well as the Pacific.

In March, RAAF participated in the Battle of the Bismarck Sea where a convoy of 22 Jap warships and troopships was completely destroyed. Australian squadrons flying P-40's, *Beaufighters*, *Catalinas* and *Beauforts* did much of the strafing and low level work. RAAF crews and Australians in RAF formed a high percentage of the personnel in the dam-buster raids in the Rhineland later.

The first Australian-built fighter plane, the cannon-firing *Boomerang*, went into operation in 1943. Other Australian-built planes in combat operations were *Beauforts*, *Beaufighters* and *Wirraway* (an army reconnaissance plane).

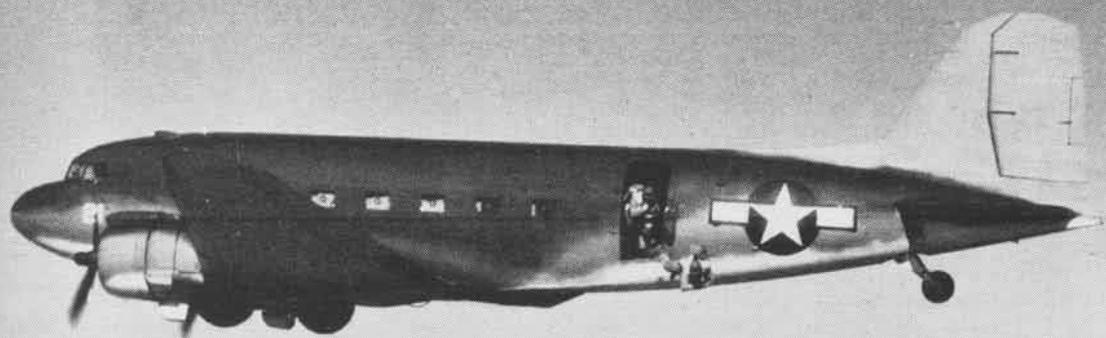
With a greater number of U. S. aircraft available to RAAF, including *Mitchells*, *Vengeance* and *Kittyhawks*, the Australian element in the Allied air force is becoming increasingly important.

NEW ZEALAND

AN ACTIVE Royal New Zealand Air Force made its contribution to the war in the South Pacific during 1943 by participating in reconnaissance and anti-submarine patrol, air coverage of convoys and, during the last seven months, by entry of a number of fighter squadrons into actual combat.

Strategically located near the sea lanes, anti-submarine patrols in PV-1's and PBY flying boats covered coastal waters adjacent to New Zealand and operated from bases in the Fiji Islands, flying well over 4,000 missions and sorties.

Newly trained fighter squadrons, flying P-40's, went into action for the first time in June and operational reports for the week of June 23 disclosed that 29 sorties were flown and four *Zeros* shot down while in the following week 47 sorties accounted for five Jap planes. Increasing tempo of fighter activity by RNZAF was indicated by the fact that average weekly sorties flown during November increased more than threefold compared with June.



CHERRY POINT, N. C.

TO STIFF OPERATIONAL TRAINING—as well as to traditional *esprit de corps*—goes credit for the aerial achievements of Marine Corps pilots and crews in battle. At Cherry Point, North Carolina, proving ground for

Marine squadrons forming, the toughest in training is meted out, and all phases of plane combat and maintenance coordinated in air and ground crews that learn to thrive on a strict diet of teamwork. NANews reports.

A CITY WITH MANY SUBURBS

CHERRY POINT, largest and busiest Marine Corps air station, can be compared to a rapidly growing city with huge hangars, enormous runways, extensive railroads, and thousands of enlisted personnel, officers, and Women Reserves.

The station developed with phenomenal speed. It was not until July, 1941, that the south side of the Neuse River in North Carolina was chosen as the site for this \$50,000,000 Marine Corps project. The following month a small office established in New Bern directed growth of the embryonic air station and construction on the 16,000' runways started 17 days before Pearl Harbor.

By the following March a number of barracks were in usable condition and a small staff went to work. The official commissioning of Cherry Point took place in May, 1942.

Although scores of permanent structures have been erected for operations, living quarters, and offices, construction must be continued to accommodate the increasing number of personnel and activities of the Third Wing and OTS-8. Daily more and still more space was needed for practice grounds, so outlying fields were established to alleviate congestion at Cherry Point. Atlantic, Bogue, New River, Pollocksville, Greenville, and New Bern are now used by many squadrons and groups. Kinston and Washington are in the process of construction. Wilson, the newest field, is in the paper stage. These auxiliary air facilities are complete within themselves and operate as miniature air stations, but all come under the jurisdiction of the parent main station. Thus Cherry Point becomes a small city controlling a group of suburbs in the surrounding area.

STATION ACTS AS LANDLORD & HOUSEKEEPER

AS IN ANY community, a number of servicing functions must be provided, and Cherry Point air station acts in the capacity of landlord and housekeeper to outlying fields, Third Wing, and OTS-8. A power plant supplies water and heat for offices and barracks. A laundry and cleaning establishment keeps the Marines looking their snappiest. A corner grocery store and quarters are maintained for the use of married personnel.

All outlying fields receive maintenance of runways and buildings in addition to master weather reports which are prepared twice a day by the station and flown to their nearby suburbs. A daily truck service hauls freight and supplies to the fields. R4D's are maintained and provided for Paramarine training and transportation of military personnel in the line of duty. Training facilities such as Link and gunairstructors are functions of the station as well as the control tower which is constantly busy clearing all incoming and outgoing traffic.

The number of personnel at Cherry Point fluctuates, increasing by the day. Squadrons leave and others form. Aviation casuals in this section of the country report to the station for orders to duty or specialized schools. Recreational facilities, such as sailboats, movies, dances, and competitive sports, have been established for these thousands of Leathernecks. An outstanding example of the spirit and pride Marines have for their station was shown recently by a group of enlisted men, who at no cost to the government or station, constructed a recreational club for their exclusive use. All work was done by them alone, and wood and material used in construction had been discarded as scrap.

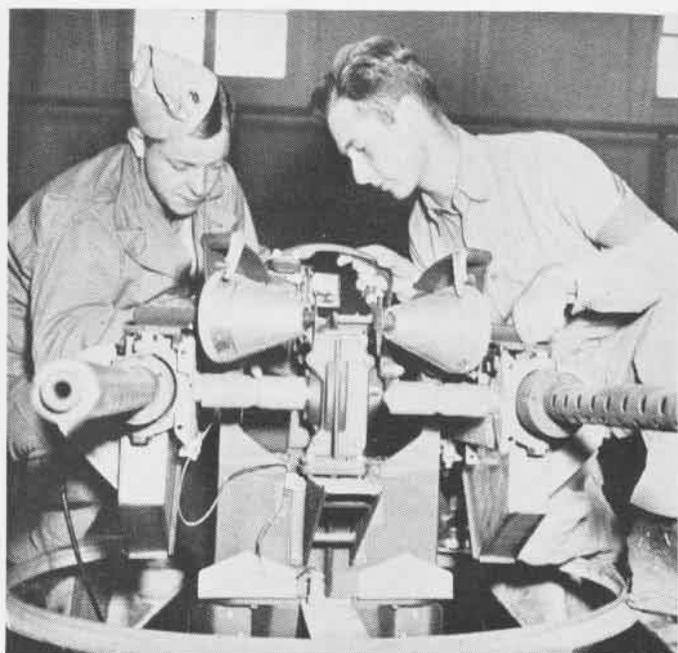




AFTER learning the structure of PBJ's engine and accessories, hydraulic, fuel, and oil systems, OTS-8 ground crewmen spend the last four weeks of their training period working on check crews. Every two weeks 25 Leathernecks report for their eight-week training

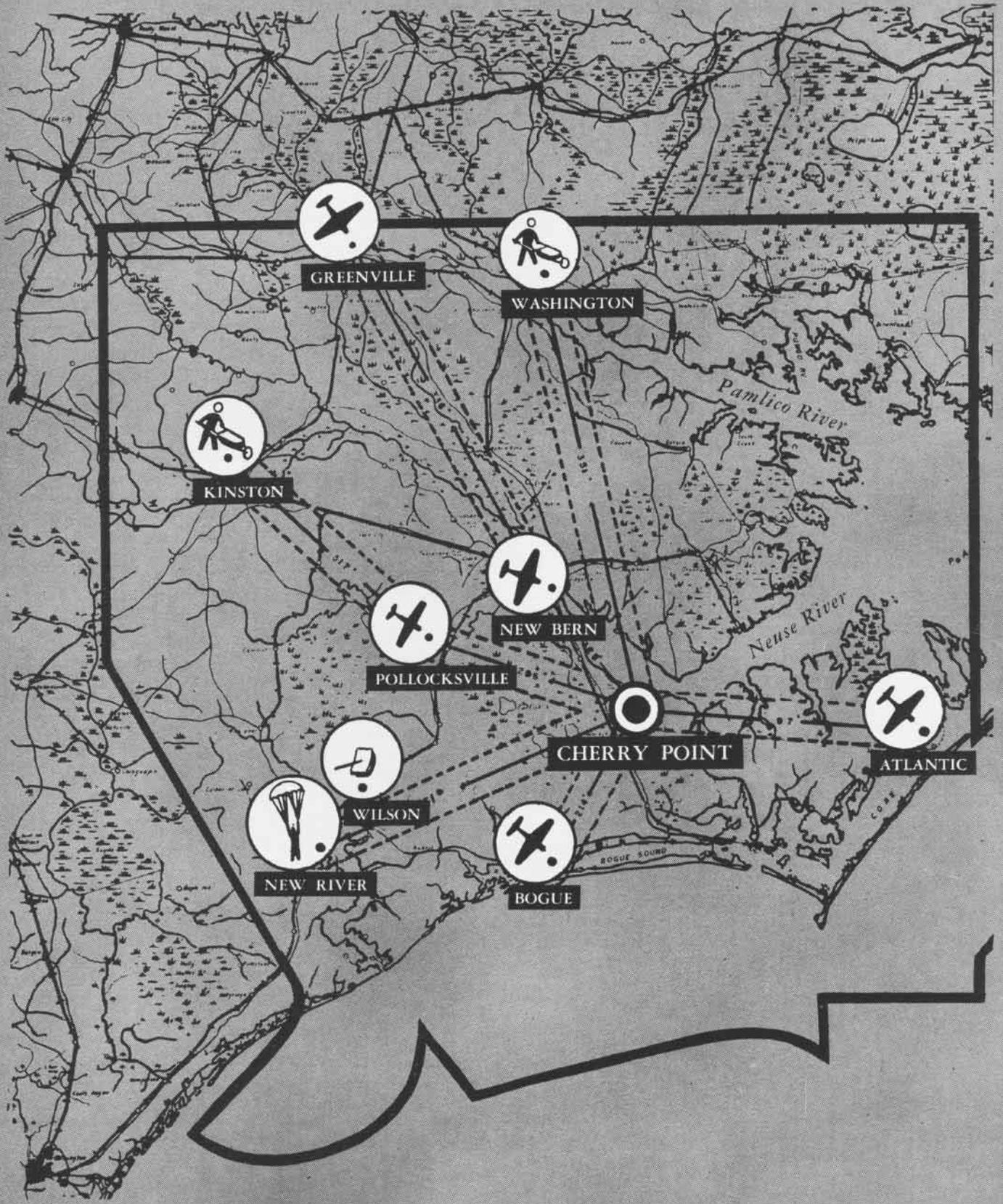


TACTICAL flights are scheduled for gunnery practice. Scores on tow sleeves determine ability and progress of OTS-8 Leathernecks



AERIAL gunnery, belting ammunition, loading bombs, checking sights, and maintaining turrets and guns are aircrewmembers' jobs

CHERRY POINT, N. C.



THIRD WING PREPARES MARINES FOR COMBAT

IN NOVEMBER, 1942, Third Marine Aircraft Wing was organized at Cherry Point "to conduct such training and exercises as may be authorized or directed in order to prepare for battle missions." In a year's time, the baby of Marine Corps aviation has grown from a small group of fighters to a wing of eight groups: two dive bombers, two fighters, one utility, medium bomber, night fighter, and an air warning group.

Today Third Wing has a larger number of personnel than the entire Marine Corps possessed some few years ago. Officers and enlisted men are constantly on the job to prepare themselves for that day when the order comes in to "move." Many squadrons have completed their syllabus and left for combat areas, others are about to leave, while more are being constantly formed.

At Pollocksville, home for a group of fighters, all pilots first go through a transitional phase on SNJ's before they are checked out on F4U's. Experienced men from combat zones are there to pass along experience and information they have gained. After discussing fighter tactics on the ground, simulated action is taken in the air.

This is followed by further discussions, criticisms, and appropriate suggestions. Mock air battles, dives on tow targets, and shooting with camera guns determine the ability of fighter pilots for combat. Strange planes that hover around Pollocksville are friendly targets for pilots who are grooming to go.

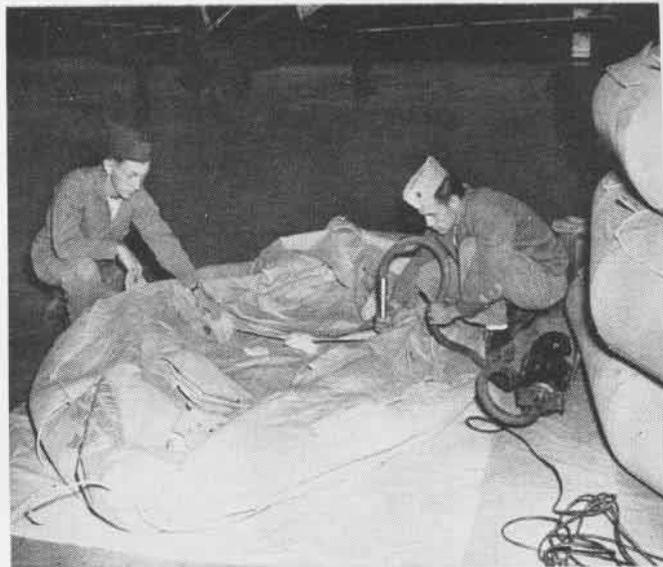
Men in the Utility Group are trained to handle anything from a bag of peanuts to 28 Paramarines, work without much protection, carry on under fire. Placing a jeep in the proper spot of a plane, transporting wounded, and hauling supplies are all in a day's work. They are preparing themselves to fly strenuous and long hours in *Liberators*, R4D's, fighters and even *Piper Cubs*.

PROBABLY the most enthusiastic experiment of Third Wing is the Medium Bomber Group. Although this happens to be the first group venture on PBJ's, pilots from operational training are becoming proficient in altitude flying, instrument, night, and long distance hops. After familiarization on the twin-engine craft, pilots are sent out for squadron training and simulated attacks on troops, tanks, and shipping.

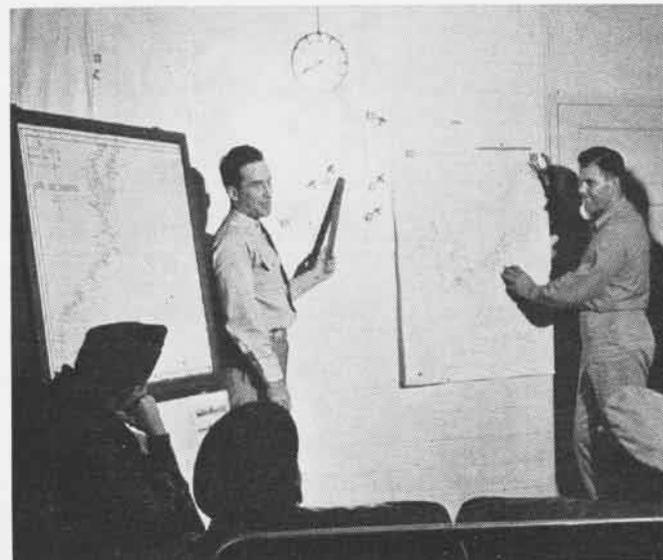
In Marine Corps aviation dive bombing is an old tactic, and two groups rehearse at Bogue and Atlantic, outlying fields. Low and high-level bombings, strafing, intruder tactics, and anti-submarine patrol busy the SBD's. At the present time test hops are being made with SB2C's in view of a possible equipment change. Squadron commanders of these groups favor SB2C's for they have more speed and guns and carry twice as many bombs. Whether or not this change will actually be made has not yet been determined.

Another unit preparing for combat duty is the Night Fighter Group flying PV's, F4U's and F6F's. Night after night Marine fighters take off to master maneuvers. Every squadron has a certain syllabus, and all work closely for cooperation and timing.

Leathernecks in Air Warning, unit handling group control interception, supply early warnings and fighter direction for advanced tactics. Men from various radio schools report to this group to master the intricacies of specialized equipment and to secure further training by practical application.



THIRD Wing constantly prepares for action. Emergency equipment and rubber life rafts are frequently tested for any flaws



SCHOOLED on the ground for action in the air is the working theory of Third Marine Aircraft Wing in preparing for combat



EVERY man rehearses his job in simulated attacks on troops, tanks, and shipping. Third Wing men are ready for orders to go



RAPIDLY NEARING COMPLETION, CHERRY POINT'S STREAMLINED A&R SHOP WILL SOON SERVICE ALL MARINE CORPS AIRCRAFT ON EASTERN COAST

CHERRY POINT'S OVERHAUL BOARD SETS AMBITIOUS PACE

THE THIRD and largest Marine A&R shop is nearing completion at Cherry Point. Plans for this Eastern overhaul base were first drawn up three years ago, and construction started in December, 1942. Designed from blueprints of similar A&R shops, this new project consists of 300,000 square feet of shop space, 38,000 of office space and 105,000 for engine overhaul.

WORK STARTED WITH SMALL STAFF

To develop the ambitious overhaul base, specialists from all parts of the country, war zones, and civilian life started to work over a year ago. Their small staff was composed of 250 enlisted men. A short time later Aircraft Engineering Squadrons 41 and 51 furnished additional help, and 388 civil service employees had reported by November, 1943. By the end of 1944, 3,800 will be working in the shop.

Although A&R is now equipped to handle only minor overhaul, a streamlined production shop working at top speed and low cost will swing into action around the beginning of 1944.

Airplanes entering A&R will first be inspected by an overhaul board. Conclusions reached will determine the extent of disassembly. An estimate of time and cost will be

made, and the plane scheduled for overhaul. To insure absolute efficiency, the project engineer will specify what must be accomplished, the planner will state when, and the shop superintendent will produce on a production schedule. Every department will have a deadline.

Maximum results from employees are expected by A&R, and it is now obtaining the best-trained workers available. Those who need further training report to a vocational training school which has been organized. Both civil service personnel and enlisted people from trade schools are given a shop test to determine extent of their abilities, then receive specialized training. Every person completes a certain number of weeks on the curriculum, then must produce.

WORKERS ASSURED RECOGNITION

Because A&R intends to be an outstanding overhaul base, its workers must not only be expertly trained, but satisfied as well. Working on the well-known theory that good morale promotes peak production, A&R has assured recognition and advancement for all deserving workers through organization of a personnel rating review board.

This group recommends all reclassifications and promotions. If a man feels he can do a better job in another department, he has an opportunity to prove his case. Automatically he is reviewed for promotion every six months, and in many cases circumstances justify a shorter time.

In a few months the four new buildings now being completed will be filled with newest equipment and finest trained personnel. A 24-hour operating schedule maintaining prompt service and excellent workmanship is the keynote of Cherry Point's new plane overhaul and repair base.



OTS-8 MARINE PILOTS, GUNNERS, CREWMEN AND GROUND MECHANICS SERVICE AND TRAIN IN PB4Y PLANES DURING INTENSIVE 8-WEEK COURSE



↑ Marine planes taxi down ramp toward runways and a division takes off for raids over enemy territory, all in a day's work for SouPac bombing squadron

Before scattering for raid, Marine pilots get targets and final instructions. Each pilot receives individual instructions on how to approach target and make dives ↓



SHORE STATIONS

● **NAS, BRUNSWICK**—Although this is a bustling air station, parts of it still harbor big game. Marines on guard at the main gate stared agape one cold, gray dawn recently when a bull moose jogged past them and on into a spruce grove that borders the road just inside the gate.

From then on the moose was reported at various points about the station by Marines walking late posts, security patrols and liberty hounds. The spread of its antlers was revised upward with each sighting, and at last reports each antler had enough points to buy a prewar steak on the open market.

Since the moose didn't seem to care whether he strayed into restricted areas or not, it became evident that he would have to have a pass. Those s-p-r-e-a-d-i-n-g antlers gave the security department some bad moments figuring how to photograph him for the pass and they had only just hit upon the idea of taking his picture with a panoramic camera when the moose settled things himself by going AWOL.

● **NAS, LIVERMORE**—The office of squadron flight counselor was established here recently and assigned the following duties: Discuss with cadets any problems pertaining to flying, answer questions raised by cadets relating to flight training, conduct all formation lectures, serve as coordinator of a "foul weather" schedule for cadets, conduct cadet course rules examinations, and check new cadets out in preparing cadet flight plans. The squadron flight counselor occupies a desk in the cadet ready room and is responsible directly to the chief flight instructor. His relation with cadets, while strictly military, is informal and non-disciplinary. He invites and encourages cadets to discuss their problems.

● **NAS, CORPUS CHRISTI**—A fixture to grind or hone the gyro rotor pivots has been developed by an A&R shop employee who won a cash prize for the beneficial suggestion that is estimated to save from 300 to 350 man-hours per month in the gyro section of the instrument shop. The saving in time is principally in the dynamic balancing of the gyro rotors after they have been ground.

When the pivots have the correct angles to match the ball bearing for which they are designed the rotor can be balanced quite easily, but if the angle is not correct it is impossible to get a good balance and in most cases the rotor cannot be balanced.

This new fixture will always insure a correct angle, can be used on pivots other than those in the rotor and will save some time in the calibration of instruments. It will also prevent the stone from cutting and wearing out the special fixture used to hold the pivot in the lathe.

[DESIGNED BY ALBERT S. KUENTZ]

● **NAS, PASCO**—On the first anniversary of his enlistment, an enlisted man at this station gave a big sigh of relief as he pulled on a pair of shoes that actually fit his feet—the biggest in the Navy.

For nearly a year the Supply Department has been writing shoe manufacturing firms trying to get something made of leather to encase his pedal extremities. Finally, a pair of custom-built shoes arrived. The size was 15AAAA.

● **NPFS, CHAPEL HILL**—A football team representing the U.S.S. *Card* was defeated 13 to 0 by the Marines here recently, but the score of the game was incidental to the background of the men on the visiting eleven.

Prior to the game, newspapers throughout the country carried front page stories about the loss of the *Borie*, an over-age, four-pipe destroyer. And the Navy, revealing with unconcealed pride a story which an official spokesman termed "one of the great epics of the war," doffed its hat to the glorious record which the old destroyer and her running mate, a squat "baby flat-top" called the U.S.S. *Card*, had achieved as a reckless pair of U-boat killers before the *Borie* went down.

In announcing the recent loss of the *Borie*, which took two Nazi U-boats with her the night she went down, the Navy also revealed that a presidential unit citation had been awarded to the *Card*, the *Card's* task unit, composed of the "baby flat-top" herself, her aviation squadrons, and her three escort vessels, and that medals already had been pinned on most of the skippers participating in the running epic of submarine destruction.

Coach of the ship team stated: "Our practice sessions were limited to the ship, with the exception of two days when we were at Casablanca. Our biggest trouble at first was the loss of footballs from the deck of the carrier. We lost 10 before our trainer made us one out of canvas."

Until this game the *Card* players had not worn shoulder or hip pads before.

● **NAS, CLINTON**—A program of indoctrination for officers attached to this station has been set up whereby each officer will have the opportunity of receiving from one-half to one day's instruction by each department head concerning the functions of the particular department.

● **NAS, OTTUMWA**—A rabbit attacked one of the training planes landing on an auxiliary field and caused an eight-inch tear in the fabric on the lower left wing.

Just as the plane was about to land, the rabbit charged. There were no casualties, except for the bunny.

● **NPFS, ATHENS**—"Battalion mothers" they are called in the records office; or the "sisters of the regiment." Each has a battalion for which she records all athletic, academic and military grades for every cadet from the time he reports until he leaves for primary training.

The rivalry between the girls in the records office is just as keen as among the cadets themselves. Each is enormously proud of any of her charges who scores a 4.0 in recognition or breaks a sports record.

These "guardian angels" worry about their sub-swimmers and academic "unsats." They worry about their boys in sick bay, and when their battalion goes out they go on a worrying binge about the ones on the holdover list.

● **NAS, GLENVIEW**—The fellow in the green cap seen down on the "line" is the aviation radioman. This emblem of service was introduced for the benefit of the operational pilot who wants a check on his radio gear just before taking off, or in case he wants to make a trouble report after coming in. With the increased operational program at this activity, there was great need for radiomen on the line who could be rapidly spotted. Incidentally, the color of the cap is no reflection on the ability of the fellow under it.

● **NAS, BUNKER HILL**—The SAT initiated, and A&R executed, a plan of illuminated numbers on night flights which has been a boon to night training. The device provides positive identification of planes and if the night flight officer in checking the incoming flight notes faults, he knows without question which pilot is due for comment or suggestions.

Illumination is given to the blocked figures on the sides of the plane by means of two small shielded lights in the cock-



pit under the luggage compartment. The numbers are translucent, blanked-out figures, which have been covered with clear dope. The lights show the outlined letters, which have one-half-inch sharp black lines to accentuate the blocked figures. A masonite bulkhead put in just after the rear cockpit seat stops the light from filtering through into the cockpit. The lights are 2-12 volt. Detailed drawings will be made available for interested activities.

● **NAS, MEMPHIS**—A large clock, six by seven feet, has been mounted atop the squadron building indicating the time each hop is due in and when it is due out. The time between the hours is indicated at 15-minute intervals. The clock is white on a black background with a red hand indicating the time of the hop due in and a yellow hand the time it is due out. This feature, plus electric clocks facing out-board from the building and in the direction of the schedule board, eliminates trouble. Each cadet and instructor knows exactly what time it is and what time he is due out and due in.

● **BLIMPRON 14, ATLANTIC**—Unable to make headway against a 50-knot wind and with gas supplies running low after 26 hours aloft, an airship from this squadron signaled an Army airfield at 0340 for a forced landing, giving instruction for the ground crew.

Instead of the 120 men the pilot asked for, upon landing he found the control tower operator had called out 300 men, three fire trucks, two ambulances, an HTA pilot, several doctors and nurses, a crash truck and half a dozen asbestos-clad fire fighters, just to be on the safe side. The airship was docked without incident, refueled at the obliging Army field, took off and flew to an auxiliary blimp base.

● **NAS, JACKSONVILLE**—Ground school officers at Cecil Field, naval auxiliary air station near here, received a model plane recently, and attached thereto was a note which brought smiles to the faces of many of them as they read it.

The note read: "The enclosed model is the 41st so far donated to the war effort by Rud Fullerton, lance corporal, Troop B, First Ohio Cavalry, Spanish-American War of 1898, Captain of Commanding Battery C, 322nd Field Artillery, First World War, 1917-18-19, who is now too d . . . old for anything but whittling."

● **NAS, PENSACOLA**—A valuable training aid is being developed at the Naval Air Training Center here, whereby a flight student can manipulate the controls of a plane and have an unobstructed view of the resultant action.

The skin of the fuselage and wings of a cracked-up SNJ is removed, thus giving student a clear view of the response to his control. A 2-horsepower motor and hydraulic pump provide the necessary source of power for the plane, which is placed on jacks.

By use of this trainer, no serviceable aircraft is removed from active duty.

TOKYO TALKS

THESE Japanese broadcasts are recorded by monitors all over the world and released to NANews under the classification RESTRICTED. Tokyo's extravagant claims may be the subject of scorn in America. But it should be remembered that Japan cleverly uses Propaganda as a Weapon; and that her radio utterances are carefully aimed at segments of population whose ears are attuned to distorted reports.

—TO THE PHILIPPINES

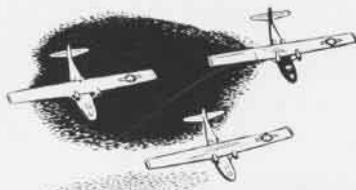
"Many of your people could not break the spell of liberalism and the ideas of American colonization. These people secretly prayed for the return of the Americans, refused to cooperate with the Japanese, spread false information for the purpose of alienating the Filipinos and the Japanese and furthermore joined the guerrilla band to fight against the Japanese. Only those Filipino prisoners have been released who showed signs of understanding the true intentions of the Imperial Japanese Army and awakened to the fact that they are East Asians."

—TO NORTH AMERICA

"Between June 15 and Oct. 20, the Japanese Navy sank 17 cruisers, 18 destroyers, 22 submarines, 70 transports, totaling 320,000 tons, and 70 other war vessels; damaged a number of Allied warships; and shot down 1,618 Allied aircraft, with a loss of six destroyers, 12 other warships, and 415 planes."

SHOW ME THE WAY TO GO HOME

ETA Problem



A PBY squadron departed Suva, Lat. 18°-06' S, Long. 178°-25' W, at ZT 0840, October 1, 1943, destination Canton Island, Lat. 02°-50' S, Long. 171°-40' W, a distance of 1,088 miles, predicted ground speed 124 k.

What is the ZT and date of its estimated time of arrival?

ZT

Date

(Answers on page 29)

—TO SOUTH PACIFIC

There are indications that "Anglo-American leaders" are becoming "seriously alarmed" over the optimistic attitude of their people and are "trying to make them understand that the war will be hard, long, and bloody." The leaders had expected an easy victory, but "now they see the harmful results of their previous propaganda."

—TO ASIA

Marking the first anniversary of the naval battle of the Santa Cruz Islands, a Tokyo broadcast said the Japanese had suffered losses in that action that included "49 planes not yet returned." The speaker exhorted the Japanese to "put forth more fighting effort because the war has reached a new stage of fierceness and is about to become more heated."

—TO JAPAN

The government has announced establishment of an "inventor's council which may well be called a window opener for the presentation of the creative ideas and inventions of the general public."

—TO THE U. S.

Tojo has assured a member of the Diet there would "positively be no conscription of women for industrial work at this time" because the "woman's place is at home with the family. Just because the United States and the British are mobilizing women, there is no need for our country blindly to follow suit."

(Only two days before, a speaker on the Japanese home radio demanded to know how the women of Japan could "remain still" when thousands of American women were engaged in making the "hateful Flying Fortresses.")

—TO THE PHILIPPINES

Tokyo reports that Chungking "guerrillas have been returning in increasing numbers" to interfere with "peace restoration work" in central China.

—TO JAPAN

The captain of a Japanese transport vessel, described as the veteran of "more than 50" attacks by Allied aircraft and submarines, told the Japanese people that "persistent attacks" of Allied war craft in the South Pacific "are above all the greatest worry in sending supplies and in transportation for the front lines. It is no easy matter," he said, "when 50 or 100 Consolidated, Boeing, Curtiss P-40, and other planes carry out raids. When we think of this, the avoidance of bombs, which fall like rain, is due to divine protection. At times, when we made the landings at night, there would again be attacks by the enemy planes when day broke before our landing had ended. At such times our ship was compelled to proceed to another base, swallowing our chagrin." The threat of Allied submarines was so great, he said, "that even those who were suffering from dengue fever served as look-outs."

LOOK OUT FOR ICING!

Don't hope for above-freezing temperatures to melt formations. Planned flight is safer

ON THE MORNING of March 5, 1943, an unusual form of icing was accumulated by a westbound commercial airline flight between Wichita, Kans., and Amarillo, Texas. Ice accumulation was sufficiently tenacious, and meteorological conditions were such that, except for ice removed by de-icing facilities, the formation remained unaltered after landing, permitting detailed examination and photographing.

The flight was made on a forecast of light to moderate icing conditions between 5,000 and 7,000 feet, based on the assumption that a westerly current of Polar Pacific air would reach condensation as a result of lifting along a steepening cold frontal surface, with temperature at or slightly above freezing. The associated turbulence and precipitation would produce a well defined region of icing.

The flight departed Kansas City at 5:32 a.m. From Kansas City to Wichita flight was at 4,000 feet, below the base of a heavy overcast. Light snow was encountered in the vicinity of Wichita. Wind at flight level was approximately 40 mph from the northeast. Temperature varied from 16° to 20°F, increasing as the flight went westward.

The flight passed over Wichita at 6:42 a.m. and climbed to 6,000 feet in the base of the overcast. A light accumulation of ice was observed on the leading edge. Temperature remained 16° to 18°F at this flight level.

GAGE, OKLA., was passed at 7:25 a.m. and as the ice appeared momentarily to become more severe, the pilot decided to climb to 8,000 feet on top of the forecasted icing condition. While climbing between 6,000 and 6,500 feet the temperature suddenly increased to 30°F, and as the rate of ice accretion became severe, the climb could not be continued beyond 7,000 feet. The pilot elected to descend and start on a reverse course. During descent an effort was made to maintain flight at 5,000 feet. This altitude could not be held, however, and the flight was held at 3,000 feet throughout the return trip to Kansas City.

The pilot reported an indicated air speed of 120 mph for a major portion

of the return trip, and ground speed averaged 95 to 100 mph. Considering a headwind of 40 mph, true air speed therefore averaged 135 mph. Ground speed increased, however, as the flight progressed eastward.

Moderate to heavy snow was encountered throughout the return trip to Kansas City. Flight was made ground contact at all times, although visibility was frequently limited to vertical visibility only. This heavy snow condition probably accounted for the lack of evaporation of ice on the aircraft. The flight landed at Kansas City at 11:13 a.m.

THE HISTORY of this icing incident emphasizes the fact that the severity of any icing conditions is determined not alone by amount of available water in cloud form, but by rate of freezing as well. This rate is governed by difference in temperature of the airplane and ambient air, relative humidity of the air at icing level, and speed and angle of attack of the plane. The presence of ice or frost on the plane will also accelerate rate of further ice accretion.

In the selection of a flight path through a known or forecasted icing condition, precautions should be taken to avoid those conditions that would accelerate ice formation.

While no general rule can be established, it is well to remember that most icing conditions can be avoided by careful planning and selection of the flight path. If icing conditions are encountered and it becomes necessary to climb through an inversion to avoid ice, a slow rate of climb should be maintained to allow the plane to assume the changing temperature of its environment.

Don't hope for above-freezing temperatures to melt an ice accumulation. The temperature and speed of the plane may nullify the one or two degrees of above-freezing temperature for a sufficient period during which the accumulation may become critical.

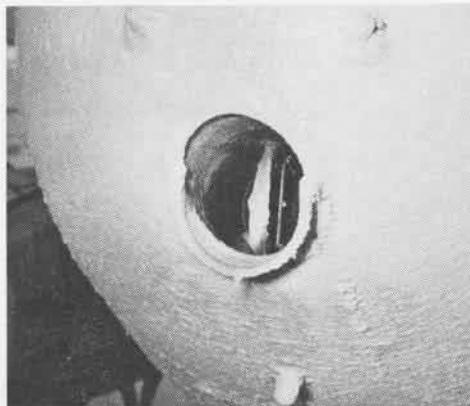
It is well to remember that an accumulation of ice reduces the ceiling as well as the air speed and stability of a plane. As in this instance, the pilot is then confronted with the single alternative of maintaining flight at low level.



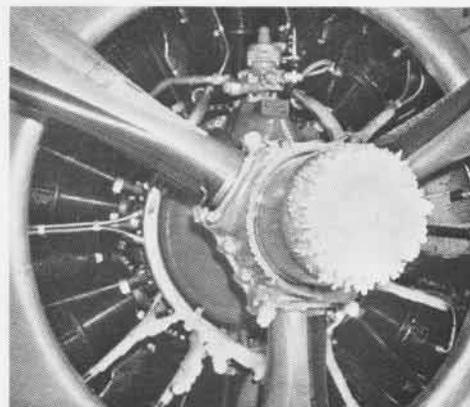
OIL RADIATOR air scoops were partially obstructed by ice. Right nacelle is shown here.



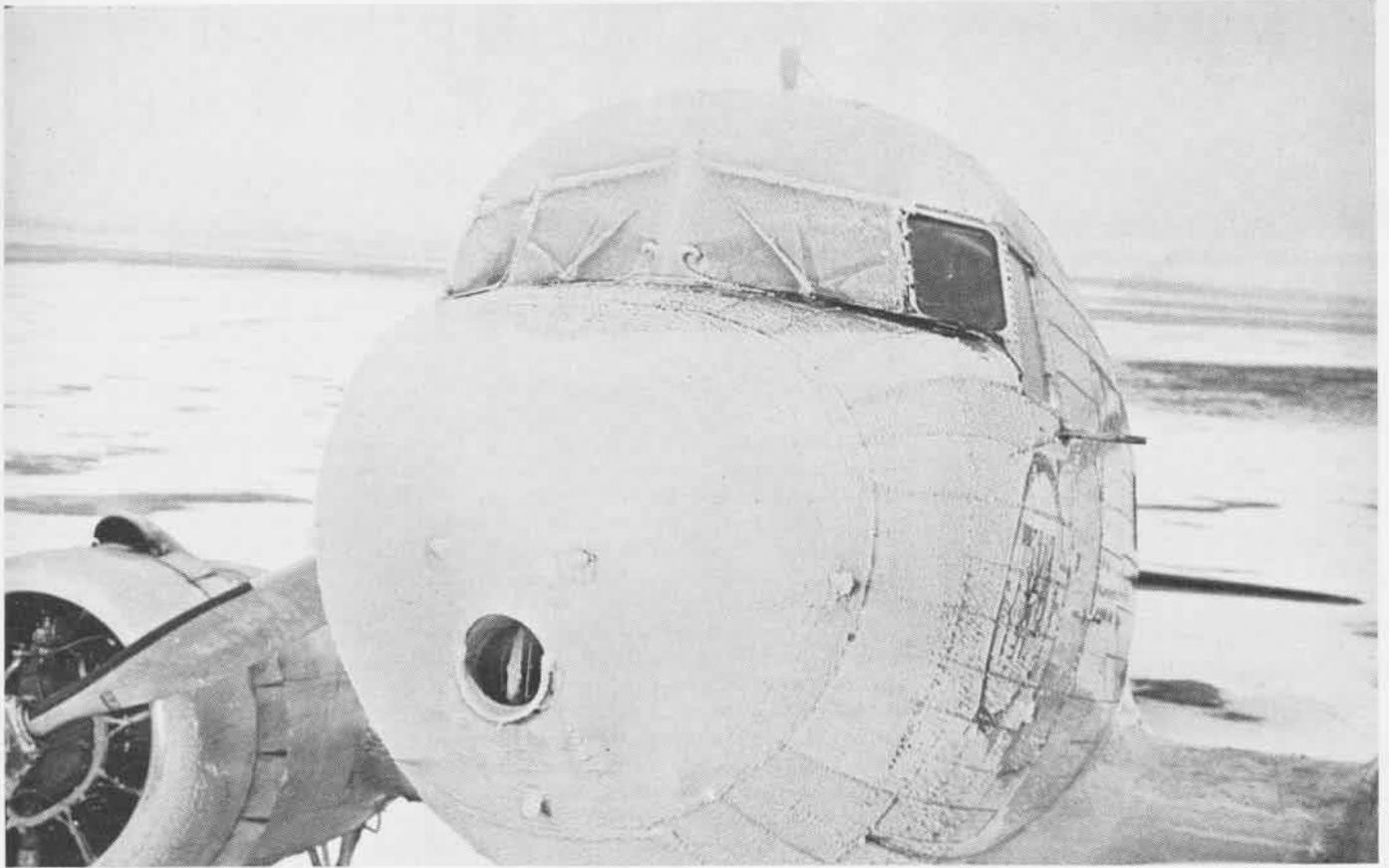
DE-ICERS cleared ice from leading edge but much remained on lower surfaces of wing.



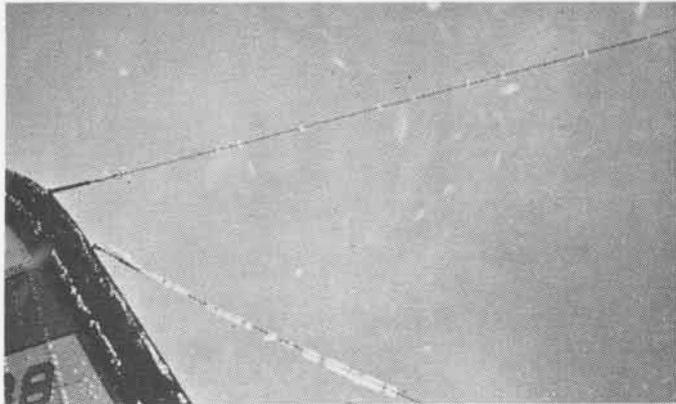
ICE RIMMED ventilation air scoop on nose of fuselage. Maximum thickness was about 1/2 inch.



DE-ICER fluid protected propeller blades, and adequate thrust was available at all times.



WINDSHIELD iced over completely. Pilot made no attempt to keep it clear with alcohol, choosing to conserve his supply for de-icing propeller. Some alcohol was used to keep small forward window on port side clear. Alcohol was put on glass when ice was encountered



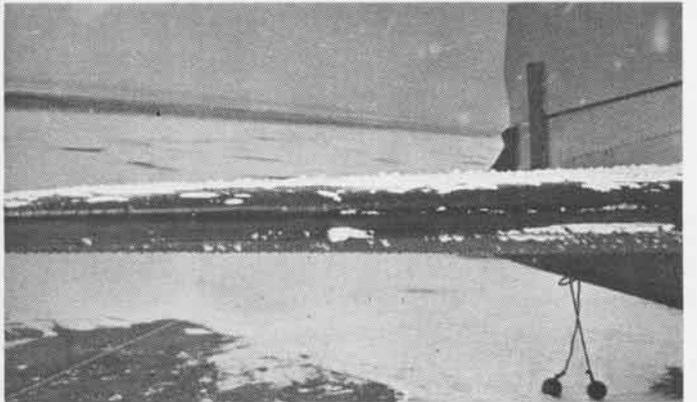
ICE ACCRETION on antennae, while peculiar, constituted little danger. Vertical fin leading edge de-icer boot is also shown



ALCOHOL formed a thin anti-freeze solution on small forward window on port side. Pilot removed ice sheet by hand from side

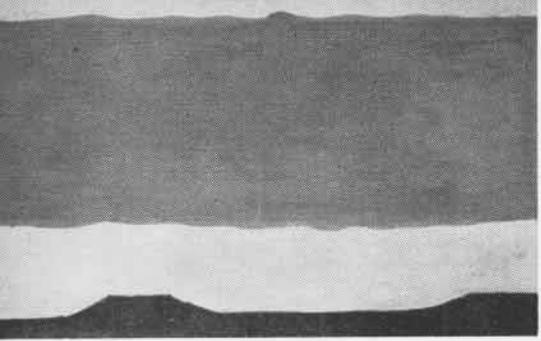


TENACIOUS and hard form of clear ice that coated leading edge proved tough job for de-icers. Ice was still on wing after landing

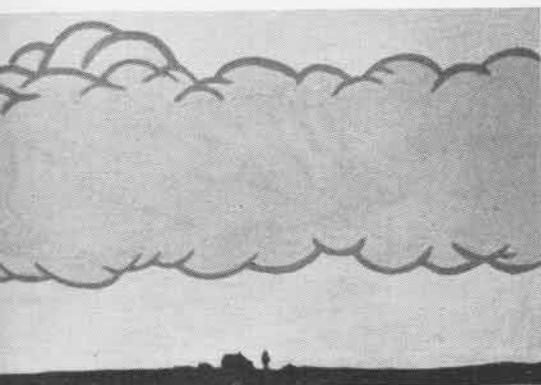


UPPER surface of wing accumulated negligible amount of ice, but there was considerable formation on the top side of the stabilizer

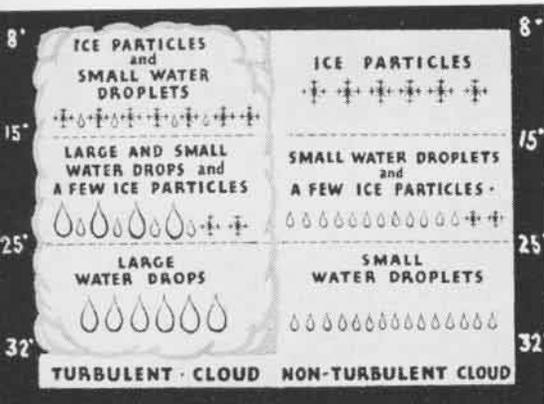
FOUR METHODS ARE RECOMMENDED FOR CONTROLLING OR GETTING RID OF ICE



RIME ICE USUALLY FORMS IN NON-TURBULENT CLOUDS



CLEAR ICING CAN BE EXPECTED IN TURBULENT CLOUDS



DROPS DIFFER IN SIZE ACCORDING TO TYPE OF CLOUD

THERE are two kinds of ice, RIME ICE and CLEAR ICE. RIME ICE consists of white, rough ice crystals which build up and grow out to windward. This is the type ordinarily seen on a refrigerator's coils. CLEAR ICE is hard and glassy and is the type formed in ice

trays. There may be several different grades of these two main divisions, or the ice deposit may be a combination of the two. Of the two main types CLEAR ICE offers the greater hazard to flying.

Before ice can form, two conditions must be fulfilled: 1. There must be moisture present in liquid form, 2. temperature must be at or below freezing. The kind of ice that forms depends upon the size of the water droplets present: RIME ICE forms when the droplets are small, and CLEAR ICE when they are large.

These requirements are met in portions of clouds which extend up into freezing levels. On first thought, it would be expected that this portion of the cloud would consist of ice particles rather than water droplets. But water in liquid form can exist for an indefinite time in an atmosphere many degrees below the freezing point. As these drops assume the temperature of the surrounding air, they are supercooled. In this condition they impinge on an aircraft, part of them freeze immediately at the leading edge while the remainder freeze later. If the drops are small, final freezing occurs quickly, giving RIME TYPE OF ICE; but if the drop is large, final freezing is not so rapid, and the water drop has opportunity to spread out into a thin sheet, thus forming CLEAR ICE.

Most serious of icing conditions is caused by freezing rain. This is met when flying through below-freezing air temperatures into which rain is falling. Drops of rain freeze on impact and a coating of hard CLEAR ICE will form, not only on leading edges, but over entire surface of the plane.

Stable (non-turbulent) clouds will

not sustain large drops of water, and RIME ICE is associated with this type.

IN TURBULENT clouds, because of strong air currents which sustain relatively large droplets, CLEAR ICING can be expected. Actually, ice rarely consists solely of either RIME or CLEAR ICE. Usually, it will be a combination of the two.

Most dangerous temperature zone for icing is between 0°C and -10°C, with severest icing occurring around -4°C. Remember, however, there is danger at all temperatures below freezing. Cases have been reported as low as -29°C.

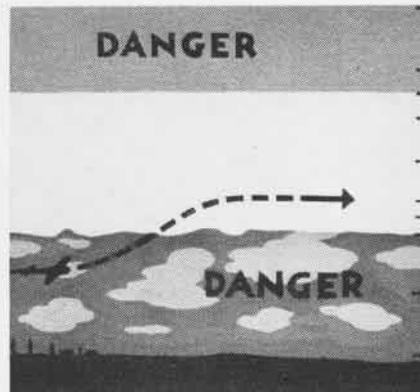
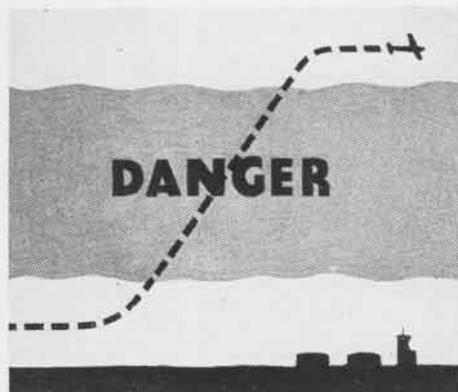
A more subtle danger is formation of ice in the carburetor. Carburetor ice does not depend on visible moisture in the atmosphere, nor on freezing temperatures. It may form when outside temperatures are well above freezing, and in clear air, if humidity is high. Operating experience has indicated that when outside air temperature is around 18°C and relative humidity is high, conditions for carburetor icing are most favorable.

The critical range for this type icing is between 4°C and 27°C, provided the requisite amount of water vapor is present in the air. Carburetor icing is caused by the refrigeration effect following expansion of air and vaporization of gasoline. Temperature difference between outside air and the carburetor adapter may be as much as 17° to 33°C.

► Ice may form on leading edges of wings and tail assembly, decreasing lift by changing shape of air foil and increasing drag.

► It may form on propeller blades, reducing or destroying efficiency by changing shape of blade and increasing drag.

**WEATHER EVENTS
PILOTS MAY ENCOUNTER
IN CROSS-COUNTRY
FLYING**



PILOT CLIMBS THROUGH DANGER AREA TO AVOID ICE GETS INTO ABOVE-FREEZING REGION AND LEVELS

GENERAL ICING RULES FOR PILOTS

SOME general rules for pilots are given below. No specific rules can be laid down for avoiding ice. What to do will depend upon many factors—terrain, plane, visibility, general weather conditions.

1. Remember that the more turbulence in a cloud the heavier the icing.

2. Sleet consists of small particles of frozen water and indicates near-freezing temperatures in the clouds above. Do not fly into clouds from which sleet is falling.

3. Falling snow is an indication that temperatures aloft are well below freezing. Beware of wet snow. It will stick to the plane and form ice at near-freezing temperatures. Climb to an altitude where temperatures are colder and where snow will not adhere so readily.

4. If freezing temperatures exist, be on the alert. If ice starts to form, use de-icers before the deposit becomes too thick for de-icers to function.

5. If de-icer fails to clear the

propeller, increase your rpm periodically. This may throw ice off.

6. If you have ice on the plane, land under power.

7. Avoid having throttle frozen in a dangerous position. If danger exists, move it occasionally.

8. Beware of carburetor icing when temperature of the outside air drops to or below 20°C. First signs will be the loss of power and air speed in level flight. There will be a gradual dropping off of manifold pressure, although in mild cases of carburetor icing this may not be observed. The overall effect is the same as that caused by slowly closing the throttle. It is safe practice always to turn on carburetor preheat or shift to alternate air when the outside temperature drops to about 20°C.

9. If you have to go through an ice region, go as fast as you can.

10. Clean water, frost, and snow off your plane before you take off.

11. Hold seaplane taxiing down to minimum under freezing temperatures.

12. Always remember to maintain your flying speed.

► It may form within or on pitot tube, giving incorrect air speed readings.

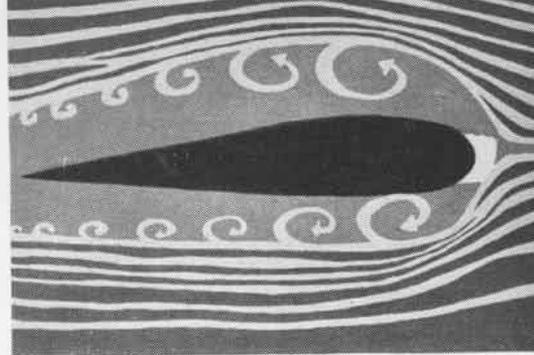
► It may collect on antenna and cause it to break, or bridge over insulators causing antenna to become grounded.

► It may form in the carburetor, causing loss of power or stopping the engine. Carburetor ice may change fuel-air ratio, freeze the throttle in a partly closed position, or interfere with flow of fuel or air and distribution of mixture to the cylinders.

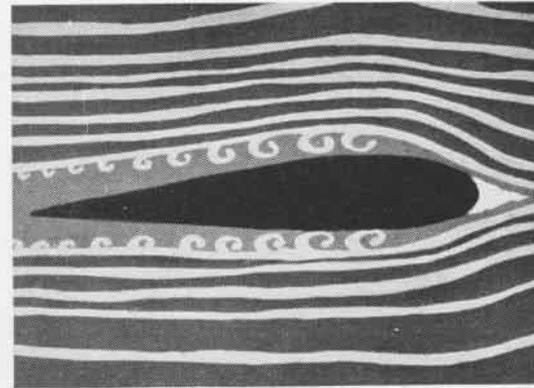
It may cover the whole plane—as in the case of freezing rain—thus dangerously adding to the weight, reducing the lift, or causing the controls to stick.

WHEN ice accretion is observed in flight, the best method of escaping its dangers is to get out of the ice-forming layer at the first possible moment. There are four methods of controlling or getting rid of ice: 1. melting, 2. evaporation, 3. breaking it loose with mechanical devices or using de-icing fluids (alcohol or a solution of alcohol and glycerine), 4. use of pre-heat.

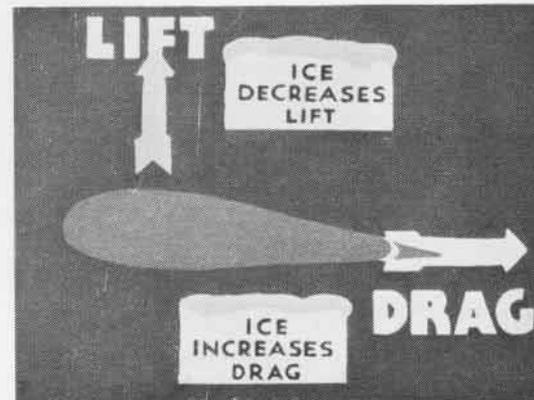
In getting out of an ice-forming layer, a pilot may gain altitude to a point where the air becomes so cold that few water droplets are present. The accretion is slowed up. If he



CLEAR ICE MAKES BLUNT ADDITION TO LEADING EDGE

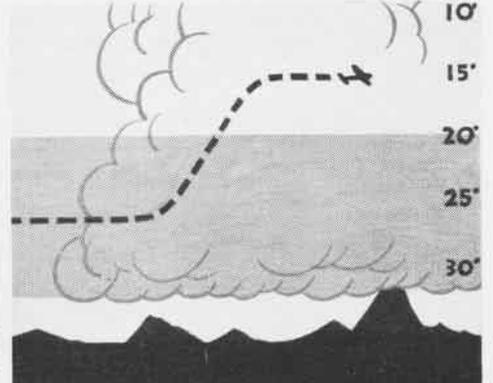
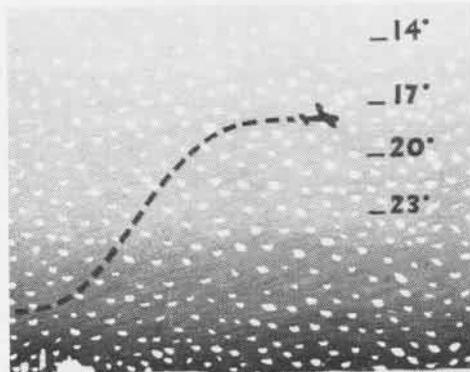
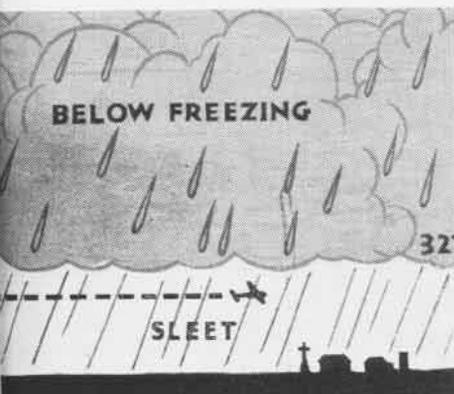


RIME ICE USUALLY FORMS SHARP PROTRUDING RIDGE



TWO DISTINCT FORCES OPERATE ON WING OF AIRPLANE

ascends above the cloud into clear air, the formation will be stopped. The alternative is to descend to a temperature above freezing, and the ice will melt. If he decides to descend, he should be sure he is not getting into a below-freezing air mass into which rain is falling. Here he will meet the most dangerous of all icing—freezing rain.

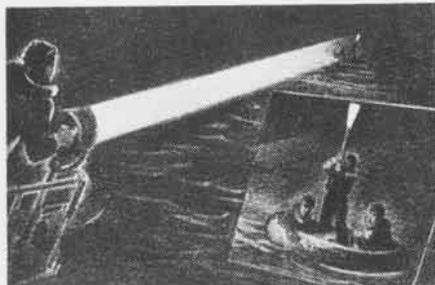


SLEET IS NOT DANGEROUS, SO KEEPS SAME ALTITUDE ASCENDS TO HIGHER, COLDER LEVEL TO AVOID SNOW CHOOSES NON-TURBULENT AREA, LESSER OF TWO EVILS

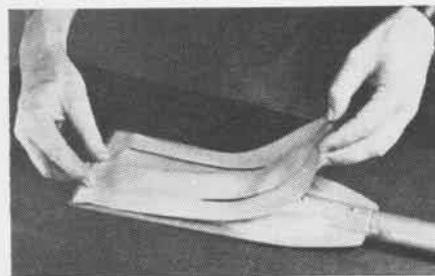
TECHNICALLY SPEAKING

Makes Mirror of an Oar Reflective Material Available

A reflective material for application to life raft oars to help locate men in rafts has been approved and a sufficient



LIFE RAFT AID VISIBLE FROM 1100 FT. AWAY



REFLECTIVE MATERIAL GLUED TO OAR'S FACE

quantity of kits is being made available to all central supply points. Each kit consists of three strips of reflective material to cover the side of the oar blade, cement and complete instructions on how to apply.

Tests have indicated that this reflective material, when applied to an oar, can be easily identified from distances up to 1100 ft. from the light source. The material is not affected by salt water.

BuAer will appreciate comments on the effectiveness of this reflective material under conditions of emergency.

Saratoga Seeks New Stand "Hook On" Platform Is Need

U.S.S. SARATOGA—Suggestion is made that the labor-saving-device department or aircraft maintenance of a carrier, or A&R ashore develop a handy, collapsible workstand, adaptable to TBF's, F6F's and TBD's. One which could "hook on" to the plane would be most acceptable.

► **BuAER COMMENT**—Section "G" allowance lists for CV's, CVL's and CVE's provide "Platform, adjustable, folding field service." Six each are allowed for CV's

and three each for the other two ships. BuAer is aware of a need for a special platform to permit servicing wing gun installations in TBF and F6F with wings folded. Maintenance is working on this. It is not known just what type of stand the *Saratoga* has in mind or what type of work it wants to accomplish.

VC-19 Uses New Type Belt

BuAer Asks Squadron Comment

VC-19 SQUADRON—This squadron has replaced the commercial transport type safety belts installed by the contractor on TBF and TBM bombers' seats with a lap and shoulder type safety belt. The lap part is installed in place of the old belt and the shoulder straps are installed as shown in the photographs. Four $\frac{3}{4}$ " holes are drilled in the back of the seat and a $4\frac{1}{2}$ " x 5" 24ST aluminum alloy plate reinforcement, together with the end fittings of the shoulder straps, are bolted on.

► **BuAER COMMENT**—This installation has been discussed with the contractor, who points out that reinforcement of the seat



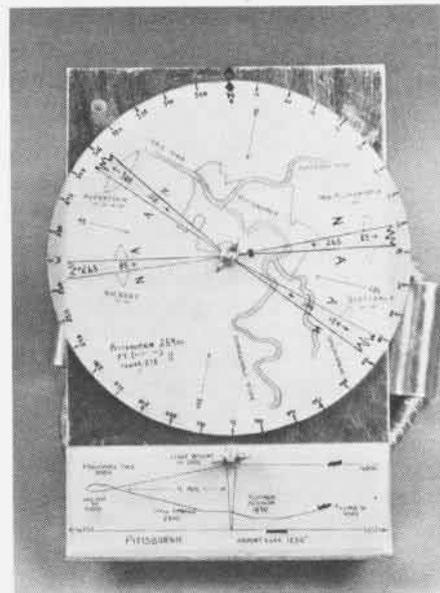
SHOULDER STRAPS ATTACHED TO SAFETY BELT

back and its supports would be necessary to provide adequate anchorage for the shoulder straps. The Bureau will appreciate further comment from units operating TBF and TBM airplanes as to the desirability of initiating action to accomplish a change in the airplanes even at the cost of considerable additional weight in the after part of the fuselage.

It should be noted that installation as made by VC-19 provides only a small additional amount of protection inasmuch as the seat itself is not designed for the use of shoulder straps and cannot be expected to withstand all the load of a crash landing.

Knee Pad Helps Piloting Radio Range Chart Valuable

NAS, PATUXENT RIVER—A universal knee-pad radio range chart to aid pilots in flying range stations, working orien-



KNEE PAD CHART HELPS PILOTS FLYING RANGE

tation problems, and making instrument let-downs and approaches has been made by the Aircraft Experimental and Development Squadron.

Essentially, it is a simplified chart of the radio range, beam legs, prominent landmarks, marker beacons, fan markers, and let-down procedure for the particular airport which appears on the chart. Each radio range station is shown on an individual plexiglass disc which is secured to the knee pad by a bolt stud with a wing nut.

This disc may be rotated through 360° so that after orientation the pilot can align his course with the corresponding leg of the beam that he is on, and then all turns and procedures will be relative to the course he is making and the course shown on the chart.

Just below the range station disc is the instrument let-down and approach procedure for the airport shown on the disc. The discs are made of plexiglass sanded on both sides to a milky-white color. All drawings are made with waterproof ink, and beam legs are shaded with red pencil. The simplified map is drawn with ink on the reverse side of the disc to appear less

vividly than beam legs and pertinent information such as headings. All courses are shown on the beam legs; station frequency is printed on each disc; tower frequency appears for each airport; marker beacon identification signals are shown; average bi-sector headings indicated, and a complete compass rose appears on the outer edge of each disc.

COMMENT—This item is given coverage for the information and possible use by individual pilots or training units who may desire this type of training aid.

EQUIPMENT REVIEW

IN EQUIPMENT and materials, one of the chief developments of 1943 was processing of nylon for parachutes. This synthetic product, chosen as a substitute for Jap-held silk, has proved superior in every detail—for canopy, shroud lines, thread. The parachute was a relatively perfected item when the war began, but it is now an even more reliable item of equipment.

Substantial progress was made in auxiliary equipment. Pararafts have been made available to supplement standard life rafts, while life jackets in service before the war continued to prove essential.

The parachute now carries, in addition to the pararaft, a newly developed back pad kit that provides a wide range of helpful items for emergencies.

A chemical desalination unit, now being made available, permits forced-down personnel to treat sea water so that it becomes fit for drinking.

To make life rafts and jackets more visible to rescuers, such aids as sea marker dye, smoke grenades, mirror-like reflectors, and Very's shells have been developed or improved in the past year.

Another important development is the quick attachable seat type parachute.

Quality and efficiency of electrically heated flying suits have been maintained. These units have kept flight crews comfortable at low operating temperatures. Super-heated suits and heated goggles have been developed for cold chamber use. They can be used in aircraft if necessary and will maintain comfort and efficiency at minus 75° F.

ANSWERS TO ETA PROBLEM

ZT: 1825 — 1828
Date: Sept. 30, 1943

(See page 23)

The safety belt with shoulder harness prevents the pilot from being hurled against the instrument board in crash landings—an accident formerly responsible for many fatalities.

Life saving has become part of the training of every naval aviator.

SPECIAL DEVICES

SPECIAL DEVICES became a division of BuAer in August, 1943. This development gave impetus to the program of production, distribution, and maintenance of synthetic training equipment purchased monthly for naval aviation, the fleet, and the Bureau of Naval Personnel and Ordnance.

Devices were supplied to the Army in substantial quantities, and an excellent relationship was established with corresponding branches in the AAF, as

well as the ground forces. Special Devices division maintained close liaison with Aviation Training division, so that development and supply of training devices could be coordinated with actual needs.

Despite emphasis on quantity production, constant research and engineering development were carried on to keep pace with changes in combat tactics and equipment.

Among the 400 devices in various stages of development or production at year's end, many originated in the field. Combat theaters began intensive training with synthetic devices. In the South Pacific, fliers of the Navy, Marine Corps, Army, and New Zealand Air Forces received refresher training in gunnery and kindred subjects.

Trainers range from \$50,000 refrigerated altitude chambers to miniature plane models costing only a few cents.

Trailer Speeds Paint Job

Portable Unit Handy Device

NAS, PEARL HARBOR—To provide additional facilities for preservation of engines and aircraft, a portable trailer has been designed and constructed at this station which saves man-hours previously expended in moving planes to preservation areas.



PEARL HARBOR BUILDS PRESERVATIVE TRAILER

The unit is constructed on a 10-ton trailer chassis and equipped with electric brakes. On forward deck is mounted a Wisconsin gasoline-driven air compressor, 30 cu. ft. capacity, and auxiliary volume tank to give steady pressure to 12 air outlets in rear of trailer.

On the after deck forward is constructed a cabinet, the lower section of which is a barrel locker holding two standard 55-gal. barrels of preservative. Horizontally racked, preservative spray guns are easily filled from these barrels. Work benches are built on either side of the after deck with lockers below for stowing tools, equipment and materials.

A locker accessible from the outside of the trailer contains two rolls of Sisalcraft suspended on a horizontal spindle, allowing withdrawal directly from the roll in lengths required. Three additional rolls can be stowed in the locker. Above the work benches are mounted 12 air traps easily available from the outside of the trailer for attaching preservative spray guns, and from inside for using equipment at the work bench.

Equipment Fights Oil Fires Mounted on Trucks for Crash Use

NAS, LAMBERT FIELD—Tests conducted here with Bean high-pressure fire-fighting equipment have demonstrated its ability to extinguish oil and gasoline fires.

The machine, which carries only 150 gallons of water in its tank, can develop pressure up to 1,000 lbs. at the nozzle. It produces fog of such density that the fire extinguishing quality of 150 gallons of water is equivalent to 3,000 gallons in the ordinary fire engine pump and hose.

Because of success of demonstrations, it is contemplated that the two units on hand will be mounted on crash trucks for use in fighting plane fires. Simplicity of operation favors this plan.

ATTENTION
SQUADRON COs!

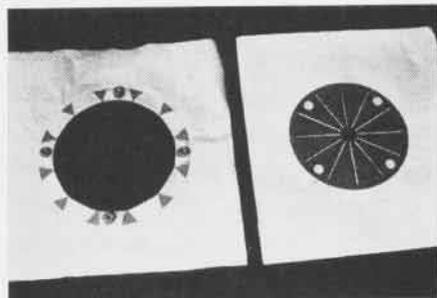
Can each of your PILOTS
START his own ENGINE?



Sewing Inspection Plates New Method Protects Needles

NAS, ST. LOUIS—There are just two operations in sewing circular inspection plates for N2S wings by the method devised at this station.

A disc made of .032 sheet stock is cut with holes and slots laid out to correspond with the four tapping nuts found



USE PATTERN TO CUT NEAT INSPECTION RINGS

on the N2S inspection plate rings. By placing this plate over a square of fabric of sufficient size to have at least three inches on all sides of the plate, a sharp pointed knife is inserted in the slots and the fabric cut to form twelve streamers that are folded over the ring and sewed

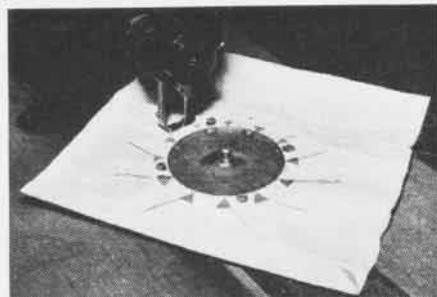
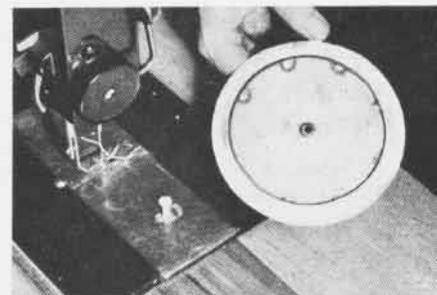


PLATE REVOLVES WITH SEWING MACHINE ACTION

around the outside to hold ring securely in the fabric. The four holes should be marked with a pencil and cut out with a proper size punch so that the holes formed fit snugly over elastic tapping nuts secured to bottom of ring.



DISC KEEPS RINGS AWAY FROM SEWING NEEDLE

A revolving plate jig, with a hole drilled and tapped into the plate, slides over the bobbin on the sewing machine. The ring with the fabric in place is pressed on the revolving plate ready to

sew. The disc being free to turn will revolve by the action of the sewing machine as it pulls the fabric through the hopper. It is impossible to make a mistake and break a needle with this setup because the disc being secured to the machine will not let the metal wander under the needle. Hands are also safe because they may be placed in the lap while sewing is being done.

[DESIGNED BY CORWIN S. ALEXANDER, AMM2c]

Gyro Flux Compass Useful Position Indicator Is Tested

VR-1, PATUXENT RIVER—The gyro flux gate compass and air position indicator installed by engineering in an R5D were used on the last scheduled flight to Iceland. While these instruments have not been in use long enough to permit positive statements as to their value, the navigation officer has drawn the following preliminary conclusions:

The gyro flux compass will be of great advantage in operations in the higher latitudes. The air position indicator is not of any great value in long overland flights because it fails to allow for drift. It undoubtedly would be highly valuable in flights of short duration and extent.

► **BuAER COMMENT**—The air position indicator is admitted to be a no drift position indicating instrument. However, it can prove very useful as a check to navigation if reset at regular intervals by the navigator from known landmarks when available. It would be particularly helpful during evasive action, when the course is variable and the navigator is occupied with other duties.

Stainless Steel Airplane NATS Will Receive New Craft

A twin-engine cargo plane made of stainless steel instead of the usual duraluminum has been manufactured for the Navy by a Philadelphia company as an experimental project. Except for plywood doors and interior floors, the entire plane was built from stainless steel.

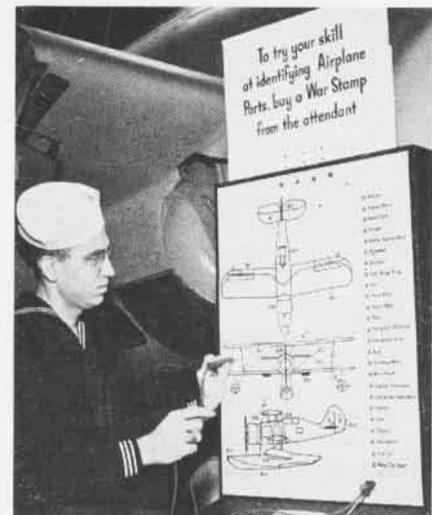
Because of its greater strength in relation to thickness, steel can be used for a plane in thinner sheets than aluminum. It has the advantage of resisting corrosion and being weldable, whereas aluminum has to be riveted, with accompanying weight increase.

When flight tests are completed, the new plane will be turned over to Naval Air Transport Service. Preliminary engineering was done on the plane the day after Pearl Harbor. It is the first airplane the Navy has obtained which was designed entirely with cargo handling, loading, and transportation as its primary mission and not an adaptation.

Board Teaches Terminology Lightens Instructors' Load

NATTC, CHICAGO—Electrical identification boards are now used at Navy Pier to teach aircraft nomenclature. The board, presenting three views of a V-80 Navy plane, has electrical contacts at 25 points. Trainee takes one of the cords in his left hand and touches it to one of these points. With the other cord he selects a term from the list and brings cord into contact with terminal opposite it. If the answer is correct, circuit is completed, and four lights at the top glow and a buzzer sounds. An incorrect contact brings no response.

Board is constructed of 1/4" plywood, with back removable for servicing. A bell transformer brings current down



BUZZER AND LIGHTS INDICATE CORRECT ANSWER

to six volts, just enough to activate lamp and buzzer. Radio jacks at ends of cords are concave to conform to round heads of number 4-48 x 3/4 machine screws used for contact points.

[DESIGNED BY GEORGE GORANSON, SP(T)3C]

Taxi Troubles With TBF's Folded Wings Bring Strains

Information has been received by BuAer that some difficulties have been experienced with TBM and TBF airplanes due to turning engines up at high speeds with the wings folded.

With the Grumman-type wing fold the wing fairing at the fold line is directly in the slip stream and prolonged high speeds during warm-up or engine check may bend this fairing with subsequent further distortion in flight. For this reason, do not turn up engines at high speed, with wings folded, more than is necessary.

On board carriers this may be difficult to avoid but care should be exer-

cised to limit high speed engine turn-up to the shortest practicable time.

Taxing with wings folded, especially at fairly high speeds and over rough ground with the TBM or TBF, results in considerable stresses in the wing-folded mechanism and may not only cause failure of pushrods or cylinders, but also puts considerable overload on the tail wheel, particularly in fast turns.

Whenever possible, extend the wings while taxiing to prevent this possible strain on the folding mechanism. Make it a practice to extend wings as soon as clear of the parking area when taxiing out and to fold them on return to the line only when necessary.

Salvaged Pipe Utilized Scraps Used on Check Stand



MCAS, EL CENTRO—A check stand has been made of salvaged pipe that can be used in combat areas. On the bottom of each leg is a plate that prevents sinking into the ground. It is collapsible and easily transported.

War Information Rooms

Up-to-Date Data Given Students

NATC, CORPUS CHRISTI—War information rooms have been set up by the ground training staff throughout this center to facilitate wider, controlled dissemination of confidential, tactical, and technical material. An officer or qualified enlisted man in charge of each information room is responsible for coordinating the dissemination of a variety of information originating in all divisions of the naval organization.

The information rooms will make available to officers and cadets the latest information from the Fleet, better equipping them to cope with war problems.

Latest war maps, weekly newspapers, up-to-date facts on positions of armies and naval forces will be displayed around the rooms, providing a central place for aviation personnel to follow the "inside" progress of the war as it unfolds around the globe.

Aerology Books Available May Be Secured From CNO

MANY naval activities are addressing requests for aerological publications directly to the U. S. Weather Bureau and the Army Air Forces. It has been decided that each service will supply the needs of its respective units, regardless of which service published the information. This step was necessary to avoid duplication and to effect quicker and more positive delivery.

Naval activities desiring aerological publications not obtainable locally should address requests to the Chief of Naval Operations, Aerological Branch. An attempt is made to keep a surplus supply of all publications at Navy weather centrals, so that it is often possible to obtain a book or pamphlet by calling the nearest central.

Most Hydrographic Office publications containing weather information can be obtained from the nearest H.O. issuing office. Activities should try to obtain them from these offices before addressing a request to the Chief of Naval Operations. NAVAER numbers should be specified when requesting publications.

Following is a list of publications recently made available:

NAVAER NUMBER	TITLE
50-1R-24	<i>Contribution to the Theory of Convection</i> by Dr. Sverre Pettersen.
50-1R-19	<i>Frontal Methods of Weather Analysis Applied to the Australia-New Zealand Area</i> by E. Kidson and J. Holmboe.
50-5TB-1	<i>Hurricanes at Noumea</i> . Confidential Ltr. from Commander South Pacific Area and South Pacific Force.
50-1R-29	<i>Information on Weather Conditions</i>
50-1R-18	<i>Meteorological Behavior and Characteristics of Thunderstorms</i> by G. N. Brancato—April, 1942. U. S. Weather Bureau.
50-25R-2	<i>Preliminary Climatic Atlas of the World</i> , Special Series No. 1.—Army Air Forces publication.
50-1R-41	<i>Preliminary Report on Tornadoes</i> by A. K. Showalter and J. R. Fulks. U. S. Weather Bureau, 1943.
50-1R-30	<i>Some Aspects of Formation and Dissipation of Fog</i> by Dr. Sverre Pettersen.
50-1R-9	<i>Standard Atmosphere—Tables and Data</i> by Walter B. Dielh—National Advisory Committee for Aeronautics Report No. 218.
50-1R-3	<i>Meteorological Factors Affecting Gliding Operations</i> , USN Reprint of British Synoptic Division Technical Memorandum No. 53.
50-1R-15	<i>A Proposed Method for the Computation of the 10,000 Foot Tendency Field</i> by E. H. Miller and W. L. Thompson. University of Chicago Miscellaneous Report No. 1.
50-1R-14	<i>Nonfrontal Thunderstorms</i> by H. R. Byers. University of Chicago Miscellaneous Report No. 3.
50-20T-1	<i>Weather Notes for Pilots, Aleutian Islands—Sept.-Dec.</i> Prepared by Fleet Air Wing Four. Confidential.
None	<i>Weather in the Doldrum Belt of the Atlantic Ocean</i> . Hydrographic Department, British Admiralty. Confidential.
	<i>General Climatic Information Guides</i> . Published by Headquarters, Army Air Forces.
50-10R-2	No. 2 <i>Climate of Naples (Italy)</i> .
50-10R-3	No. 3 <i>Climate of Genoa (Italy)</i> .
50-10R-4	No. 4 <i>Climate of Rome (Italy)</i> .
50-10R-5	No. 5 <i>Climate of Messina (Italy)</i> .
50-10R-6	No. 6 <i>Climate of Marseille (France)</i> .
50-10R-7	No. 7 <i>Climate of Bremen (Germany)</i> .
50-10R-9	No. 9 <i>Climate of Smyrna (Turkey)</i> .
50-10R-10	No. 10 <i>Climate of Mytilini (Aegean Sea)</i> .
50-10R-11	No. 11 <i>Climate of Copenhagen (Denmark)</i> .
50-10R-12	No. 12 <i>Climate of Brest (France)</i> .
50-10R-13	No. 13 <i>Climate of Tokyo (Japan)</i> .
50-10R-14	No. 14 <i>Climate of Venice (Italy)</i> .
50-10R-15	No. 15 <i>Climate of Turin (Italy)</i> .
50-10R-17	No. 17 <i>Climate of Athens (Greece)</i> .
50-10R-18	No. 18 <i>Climate of Trieste (Italy)</i> .
50-10R-19	No. 19 <i>Climate of Shanghai (China)</i> .
50-10R-21	No. 21 <i>Climate of Varna (Bulgaria)</i> .
50-10R-22	No. 22 <i>Climate of Burgas (Bulgaria)</i> .
50-10R-23	No. 23 <i>Climate of the Gulf of Vlorona (Albania)</i> .
50-10R-24	No. 24 <i>Climate of Durazzo (Albania)</i> .
50-10R-26	No. 26 <i>Climate of Skoplje (Yugoslavia)</i> .
50-10R-28	No. 28 <i>Climate of Zagreb (Yugoslavia)</i> .
50-10R-29	No. 29 <i>Climate of Trondheim (Norway)</i> .
50-10R-30	No. 30 <i>Climate of Thessalonike (Greece)</i> .
50-10R-32	No. 32 <i>Climate of Singapore (Straits Settlements)</i> .
50-10R-33	No. 33 <i>Climate of Vladivostok (U. S. S. R.)</i> .
50-10R-34	No. 34 <i>Climate of Hangchow (China)</i> .
50-10R-36	No. 36 <i>Climate of Nakodate (Japan)</i> .
50-10R-37	No. 37 <i>Climate of Sapporo (Japan)</i> .
50-10R-46	No. 46 <i>Climate of Bordeaux (Fr.)</i> .



PRESERVING SELF-SEALING CELLS

SELF-SEALING fuel cells in modern combat aircraft must be kept serviceable as long as possible. Useful life can be greatly prolonged with proper servicing and regular inspection, the purpose of which is to discover failures before they become serious. Visual pre-flight inspections of all cell fittings and connections for signs of leakage, as well as surrounding tank structure, should be made. When accessible, examine inspection doors and drain openings.

Inspection of fuel strainers should be made weekly. Any accumulation of rubber particles on the screen is likely to be definite evidence of advanced deterioration and should be followed by a close inspection of the cell, inside and out.

At regular 60-hour checks, or oftener, interior of the cell should be inspected and a capacity check made by comparing amount of fuel necessary to fill the tank with amount reported on the filler cap. A decrease in capacity of 5 percent or more should be investigated.

After about eight months in service, each cell should be given a thorough inspection inside and out, even if this necessitates removal from plane to ascertain its suitability for continued use. Climatic conditions cause a wide variation in rate of deterioration, the tropical sun being more severe than cooler climates.

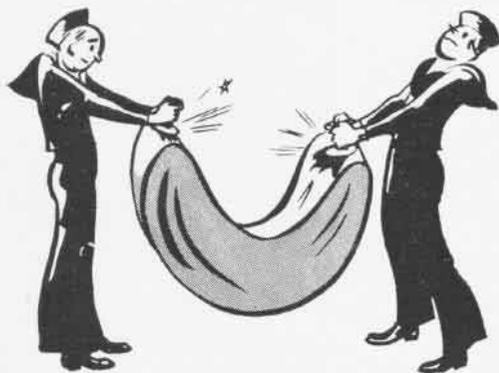
It is possible to inspect the interior of a cell by using a mirror and safety light, examining the lining through the filler neck, inspection door, fuel quantity gauge opening or sump. In this way all sides of the interior may be examined.

Types of failures most common to self-sealing cells during normal and combat service are:

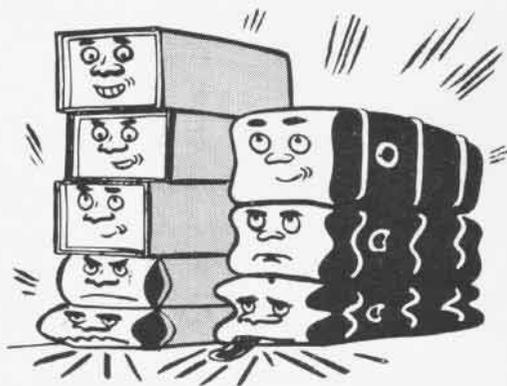
1. Diffusion of liquid through synthetic layer, causing sealant swelling and subsequent deterioration
2. Loosening of seams in the liner
3. Injury by bullets or shell fragments
4. Collapse of the cell
5. Loosening of fittings from the liner
6. Leakage between cell and surrounding structure

DIFFUSION of liquid through synthetic liner, loosening of seams in liner and loosening of fittings are found by visual or hand inspection of the interior of the cell. Any leakage or diffusion is indicated by soft swollen areas on the cell surface, wrinkles in the lining material and separation of the sealing layers from the liner. Leakage to the exterior of cell does not occur except in very advanced stages in which the sealing layers are completely deteriorated.

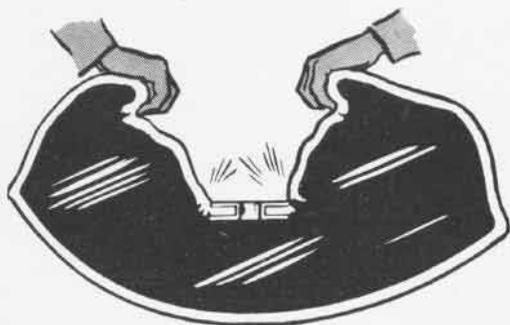
Collapse of the cell may be determined by conducting a capacity check, while leakage of fuel between cell and surrounding structure may be caused by improper attachment of fittings or partial failure of any tank outlet connection. This failure is immediately indicated by leakage of fluid to the outside of the plane, except in the case of cells installed in a sealed structure, where the first indication of this type of failure is collapse of self-sealing cell lining.



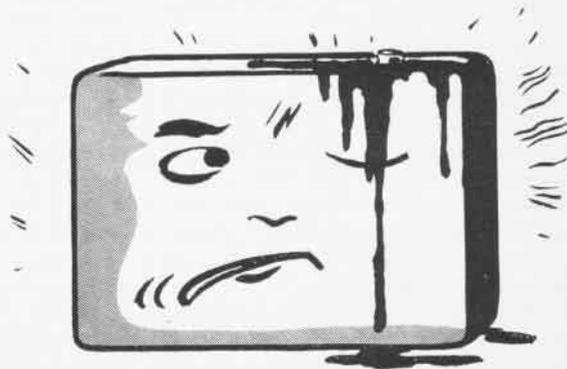
NEVER PICK UP A CELL BY METAL FITTINGS



IMPROPER STACKING WILL CRUSH FUEL CELLS



BENDING CELLS AT FITTINGS CAUSES BREAKS



SHOULD FUEL SPILL, CLEAN IT OFF PROMPTLY

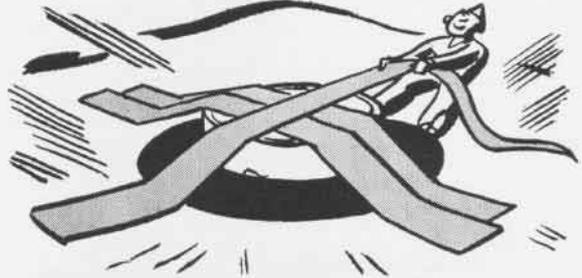
Use Common-Sense Precautions in Handling Cells

THE FOLLOWING general precautions should be observed on removing and installing cells:

1. Remove inner supports or outside stiffeners when necessary to collapse cells to remove or install
2. Be sure that all fittings are disconnected and all parts are removed from the interior
3. Warm cell to room temperature before collapsing and do not allow cell to remain collapsed longer than is absolutely necessary
4. Do not bend cells at fittings or at inspection doors
5. Clean cell as soon as possible when fuel spills over the outside
6. Stiffening rods may be easily replaced by coating with soapy water. Never drive them into place or use oil or grease
7. Never pry on rubber fittings or cells with sharp instruments
8. Never climb into cells with sharp instruments in pockets, always remove shoes and cover bottom with cloth
9. Always use safety light inside cells and never allow hot light bulb to rest on inner surface
10. Seal all openings with masking tape or other suitable material when cell is outside plane
11. In handling cells during installation, jostle them into position, never pull them by their fittings
12. Do not use seam sealing compounds when attaching cell fittings nor apply torque loads greater than 45 inch-pounds to the attaching bolts or screws. (Reference: BuAer T. O. 59-43.)



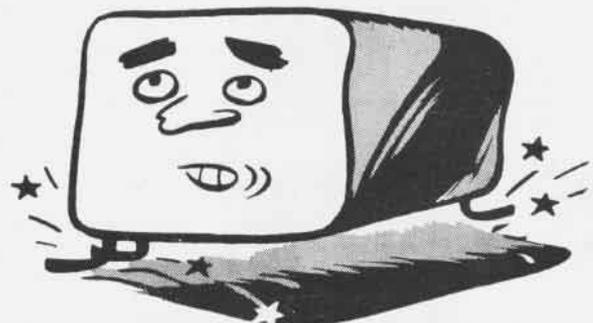
DISCONNECT ALL FITTINGS BEFORE REMOVING



COVER ALL OPENINGS WHEN CELL IS REMOVED



CARRY OR HAUL CELLS INSTEAD OF DRAGGING



CELLS SAG WHEN SET ON PROTRUDING FITTINGS

HEAT, LIGHT AND CARELESSNESS CAUSE FUEL CELL DETERIORATION

IN STORING extra cells it should be remembered that exposure to light, heat, and improper handling causes rapid deterioration. They should be kept in a clean, dry, dark, cool place, in their original containers. Uncrated cells should never be stacked, but, in containers, they may be stacked as high as allowable to prevent collapse of bottom cell.

Uncrated cells may be stored on racks, on the widest side where there are no protruding fittings, with all openings securely covered. Internal and external supports should be installed in all semi-flexible cells to prevent distortion.

Cells should never be picked up by the fittings and, in transporting, should be carried or hauled. Do not drag a cell across the deck or ground. When spare cells are installed, always use the oldest one available to keep the stock fresh.

When repair is necessary as a result of gunfire or cell deterioration, it should be accomplished according to the universal repair instructions in BuAer T. N. 8-43. Most installations require removal of the cell. In case the shell is metal, the damaged section must be patched by riveting or welding. While this is being done the sealing material must not be left unsupported because of a tendency to sag or bulge and hold open any bullet holes.

Whenever an injury to a cell is to be repaired, a careful inspection of the entire cell should be made in order to locate any other less apparent injuries or weaknesses that might be present. These should be repaired at the same time to insure against failure of the cell when it is put back into service.

Careful workmanship is the most important feature of any repair to self-sealing cells. Use proper materials and follow proper procedures when repairing and servicing cell units.

[CONDENSED FROM BUREAU OF AERONAUTICS' TECHNICAL ORDER 89-43]

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Squadron logs and war diaries 4/15 5
Starting tip 10/1 6
Strafing altitude 11/1 5
Strike one 10/1 4
Stunting at low altitude 6/15 4

T
Take-off emergencies 8/15 8
Take-off technique in PV's 5/1 5
Taxi blindness 2/15 9
TBF mid-air collisions 5/15 4
Tell your flight surgeon 10/15 5



The right way 11/1 4
They know how 3/15 8
Tie a string on finger 8/1 6
Torque danger 8/1 6
Towed sleeve warning 1/1 3
Tow pilot warning 10/15 4
Turbulence near hillsides 6/1 7

U
Unauthorized flight 4/15 4
Unbuckled parachute harness 2/15 10
Understand your fuel 3/1 5
Use full runway 2/1 5
Use your bean 12/1 6

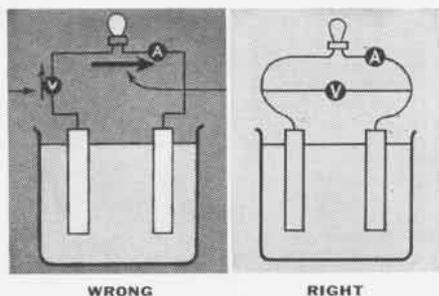
W
Wartime ingenuity 1/1 4
Watch your altitude 1/1 7
Who wakes the guy that wakes the bugler? 4/15 4
Why doesn't somebody tell me? 12/15 5
Winter accidents 12/15 4
Wrong runway 12/1 4

Y
You can lead a horse to water 12/1 6
Your life depends on oxygen 9/1 6

LETTERS

SIRS:

I wish to point to an error in diagram No. 1 of the Basic Electricity Quiz in the December 1 issue of NAVAL AVIATION



NEWS. The voltmeter should be shown parallel to load (lamp, in this case), instead of in series with it, to obtain power consumed by load.

LIUT. (JC), USNR
Washington, D. C.

¶ The writer is correct. Re-drawn, it would appear as at right above.

SIRS:

A patrol plane squadron at this center holds the record in number of rescues effected at sea. Twelve have been recorded since its first day of operation last January.

A few times it was possible to make the rescues with speed and dispatch, one cadet being fished out of the Gulf of Mexico only 45 minutes after a collision in flight.

On one occasion, a plane was landed on a moderately rough and choppy sea to pick up a man. One pilot has successfully completed three rescue missions.

In two other instances, one cadet stayed in the water for 27 hours and another for 24 hours before being rescued by a PBY. The delay was due to difficulty in detection caused by white caps.

Rescue work by this squadron is facilitated by a ready plane, which is detailed to keep a constant watch over operational areas in Mobile Bay and the Gulf. The radioman aboard stands guard on two wave lengths, and the pilot listens on a third frequency. With all hands acting as observers and working in close cooperation with a range boat in the bay, the ready plane is able to arrive at the scene of a crash within a matter of minutes from notification.

COMMANDANT
NATC, Pensacola

BEST ANSWERS
to questions on page 7
1.c 2.c 3.b 4.a 5.b 6.d 7.d

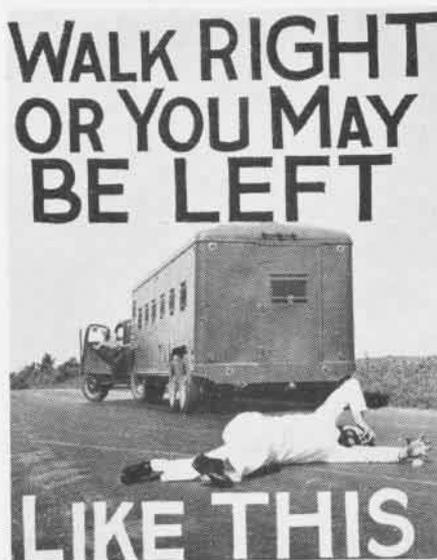
SIRS:

A few copies of NANews have recently made their appearance in the Indian Ocean theater. They have been received very favorably by British Fleet Air Arm Units, and I have been requested to furnish additional copies as they are published. It is therefore requested that this office be placed on the mailing list for NANews and be allotted 12 copies.

SENIOR U.S. NAVAL LIAISON OFFICER
British Eastern Fleet

SIRS:

In an effort to educate personnel at this activity in a vivid manner concerning safety problems, the visual aids officer, in cooperation with the security and safety officers, has developed a series of safety



posters utilizing photography rather than drawings. These photo-type posters have proved extremely effective.

Five subjects have been released and new ones are being planned. Posters are 18" x 22" in size. Layouts and lettering were handled by O. E. Harwood, Pt2c. Photography was done by M. L. Riley, PhoM1c; H. A. Swigert, PhoM2c; and T. W. Danaher, PhoM2c.

COMMANDING OFFICER
NAS, Memphis

Sms:

It is requested that this headquarters be furnished 375 copies of NANews published on the 1st and 15th of each month. It is also requested that back issues of October 1 and October 15 issues be sent.

FOR THE COMMANDING GENERAL
Headquarters, 2nd Air Force
Colorado Springs, Colorado

Aircraft Parts Catalog Supply Depot Issues Listing

NASD, PHILADELPHIA—To simplify the problem of supply officers and others interested in spare aircraft parts, a catalog of hundreds of thousands of aeronautical items is being published by the Aviation Supply Office, Naval Aviation Supply Depot. It is called the *Catalog of Aeronautical Materials, Spare Parts and Equipment*.

The publication furnishes the Navy for the first time with a listing which will help in requisitioning, purchasing, storing, issuing, identifying, and determining interchangeability of aeronautical material. A&R and supply offices will find the catalog valuable since it gives them a common source of information with illustrations, drawings, and cross references.

New Way to Use Computer Short-Cut Used by Squadron

In the event Navy pilots are tired of working navigation problems on Mark VIII computers, they might follow VF-11's idea of using it to find mils lead quickly for all speeds and firing angles.

Set up the computer for the $\frac{2}{3}$ rule thus:

For .50 caliber guns, mils lead equals .666 X function of the target angle X speed. Combine .666 with the sine of the angle and place the value of the moveable part of Mark VIII computer opposite 10 on the fixed scale. Read speed on the fixed scale and mils lead on the moveable scale.

For example: The sine of 90° is 1. Pencil an arrow at 666 on the moveable scale. Place the arrow opposite 10 on the fixed scale and read off mils lead on moveable scale opposite target speed on the fixed scale. The computer may be set up for any angle.

Stowage for Crash Landing Securing Cargo Is Precaution

With Navy planes being used more and more to haul equipment and supplies, the usual hazards of crash landings are increased by shifting cargo and other heavy items, with greater risk of injury or loss of life.

The recommendation has been made that all units conduct thorough investigation and arrange equipment in their planes to guard against these dangers. Quick availability of items must be considered. Fundamental responsibility for proper security of cargo and equipment lies with the senior pilot of each plane.



BLINDFOLD helps ordnanceman to learn quick assembly of .50 cal. machine guns



TEST firing of machine gun into embankment at the malfunction range at Norman



FAST assembly of 'Tommy Gun' is stressed at Norman's aviation ordnance school

TRIGGER MEN OF THE AIR

A RAW "BOOT" in aviation ordnance school today may be a rear gunner in a Navy fighting plane seven months later if he shows the ability and passes physical tests paralleling those of fighter pilots.

At Norman, Okla., he is given rapid and intensive training covering 504 hours of instruction in 14 weeks. In that time the recruit learns to do everything including a limited amount of shotgun firing to establish his basic ability to qualify for aerial gunnery instruction. If qualified he may volunteer for further training in a naval air gunners' school and may later become eligible for aircrewman's wings.

Duties of an ordnanceman being to maintain everything a plane fights with, he needs a thorough knowledge of guns used in aircraft, make-up of bombs and bomb fuses, safety precautions, stowage of small arms, preparation and maintenance of aerial towing equipment, and familiarity with propeller synchronization of machine guns and cannon.

More than that, he must always be right. Machine guns must fire when called upon, bombs must explode and torpedoes must blast their way into holds of enemy ships.

After he has finished his 14-week course, if he can pass a stiff physical, he is given a chance to go to free gunnery school for five more weeks. There he gets practice at actual firing.

FOR THE FIRST three weeks the blue-jackets receive basic indoctrination in blueprint reading, hand tools, basic weapons, elementary mathematics, and basic electricity. Time is divided between classroom and ship. Oral and

visual demonstration of tools and techniques is provided.

During the next three-week period trainees receive practical experience with .30 caliber and .50 caliber machine guns through cleaning and inspecting, loading and unloading, converting guns from fixed to flexible or flexible to fixed, disassembling, replacing worn or dam-



LOADING of bombs in mock-up rack teaches men to handle explosive used in planes

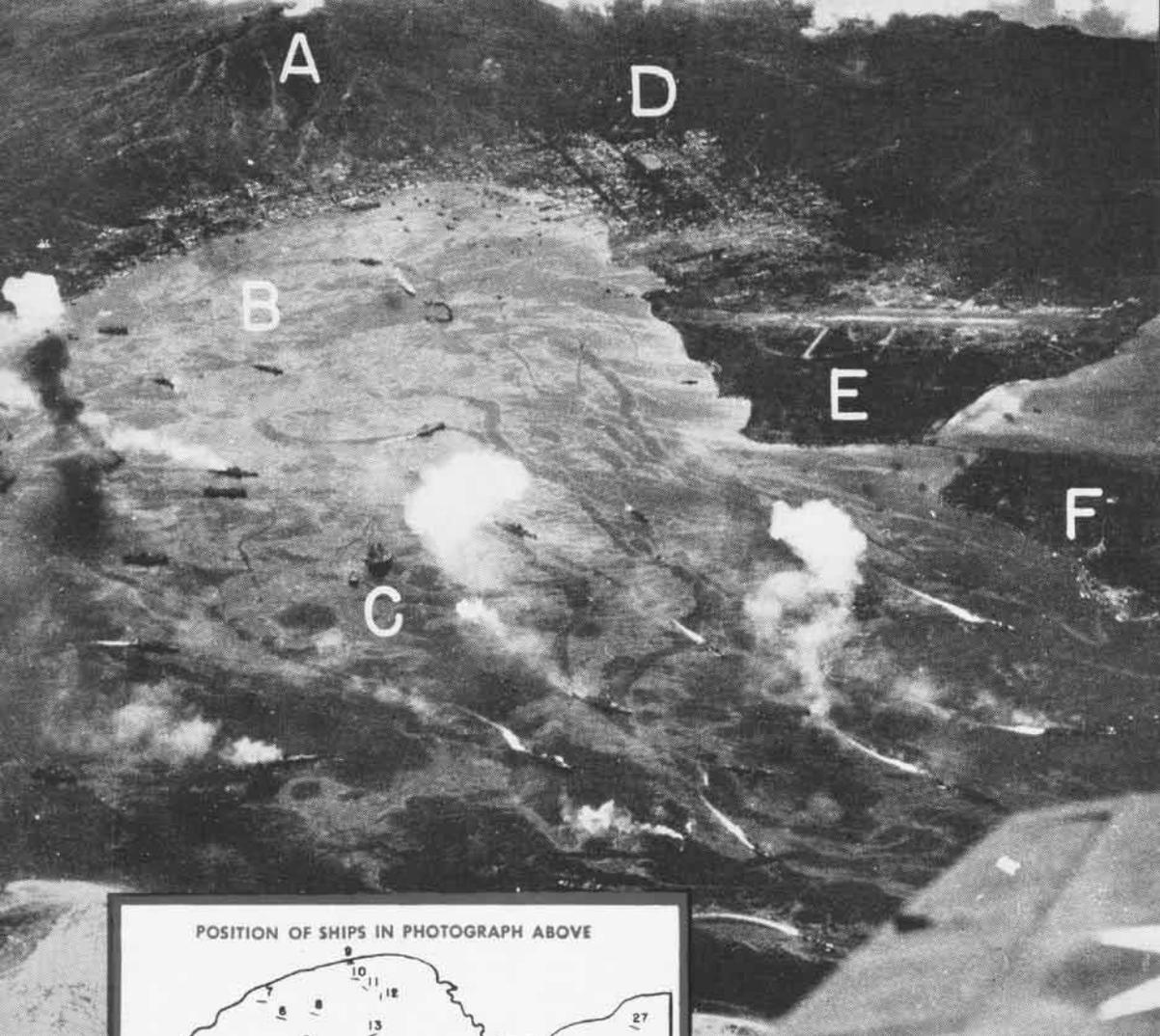
aged parts, and reassembling. AOM's must immediately recognize the functions of each intricate part. Bore-sighting, synchronization, and harmonization of machine guns are daily tasks. AOM's concentrate for one week on one of the newest weapons, the 20 mm gun.

Trainees soon learn there can be no guesswork, no fumbling. The time will come when these men must work with split-second efficiency. Fighter planes returning to a carrier to reload must take off again immediately to intercept the enemy. AOM's are required to remove empty ammunition containers, inspect guns, clean and rearm, all under tremendous time pressure.

During the course students are trained in installation of .30 and .50 caliber fixed guns, .30 and .50 caliber flexible guns, 20 mm guns, and telescopic and illuminated sights. Other tasks include test firing, clearing stoppages, and malfunctions.

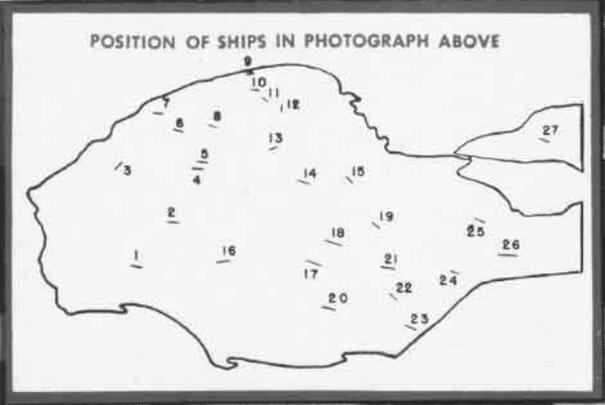
Two weeks are reserved for training in bombs and torpedoes, during which time sailors learn how to break out, handle and store weapons, install, inspect, and service all releasing mechanisms. Pyrotechnics and smoke screen equipment demand practical training drills supplemented by classroom demonstration.

In the final week men are organized into teams for actual performance of duties they will be assigned in squadrons and aboard carriers. Graduating as aviation ordnancemen, third class, or seamen, first class (AOM), technicians are assigned to air stations, carriers, instructor units, or operational groups where they can put their training to use.



- KEY TO PHOTOS**
- A—MT. TOWANUMBATIR
 - B—SIMPSON HARBOR
 - C—"BEEHIVES"
(PROJECTING ROCKS)
 - D—RABAUL
 - E—LAKUNAI AIRFIELD
 - F—MATUPI ISLAND
 - G—GREAT HARBOR
 - H—BLANCHE BAY

- KEY TO SHIPS**
- 1 } CARGO VESSELS
 - 2 }
 - 3 PASSENGER SHIP
 - 4 MODERN TANKER
 - 5 CA ATAGO CLASS
 - 6 CL SENDAI CLASS
 - 7 CARGO VESSEL
 - 8 CL NATORI CLASS
 - 9 CARGO VESSEL
 - 10 CARGO VESSEL
 - 11 HOSPITAL SHIP
 - 12 CARGO VESSEL
 - 13 CARGO VESSEL
 - 14 CA ATAGO CLASS
 - 15 DD
 - 16 CA TONE CLASS
 - 17 UNIDENTIFIED
 - 18 CA ATAGO CLASS
 - 19 DD
 - 20 CARGO VESSEL
 - 21 UNIDENTIFIED
 - 22 TERUTSUKI CLASS
 - 23 CARGO VESSEL
 - 24 DD
 - 25 DD
 - 26 DD
 - 27 WRECK OF CARGO VESSEL



RABAUL UNDER ATTACK



NAVY PHOTOS of recent action in the Rabaul-Bougainville area show the Jap Navy taking a heavy pasting from carrier-based dive and torpedo bombers. Jap losses and damage were severe, and their frantic efforts to escape from shattered Simpson Harbor at Rabaul create an exciting picture.

This excellent harbor, formed by a volcanic eruption, has been a major Jap base in the Pacific since they occupied the area in January, 1942. Buttressed with nearby airfields, it has served as a supply point for operations in New Guinea and the Solomons, from Bougainville to Guadalcanal. The depth of water enables ships to dock at any point along the shore. A ring of hills around the Bay offers strategic sites for AA gun positions which send up a horseshoe barrage of fire—protecting the harbor. Rabaul is a natural fortress.