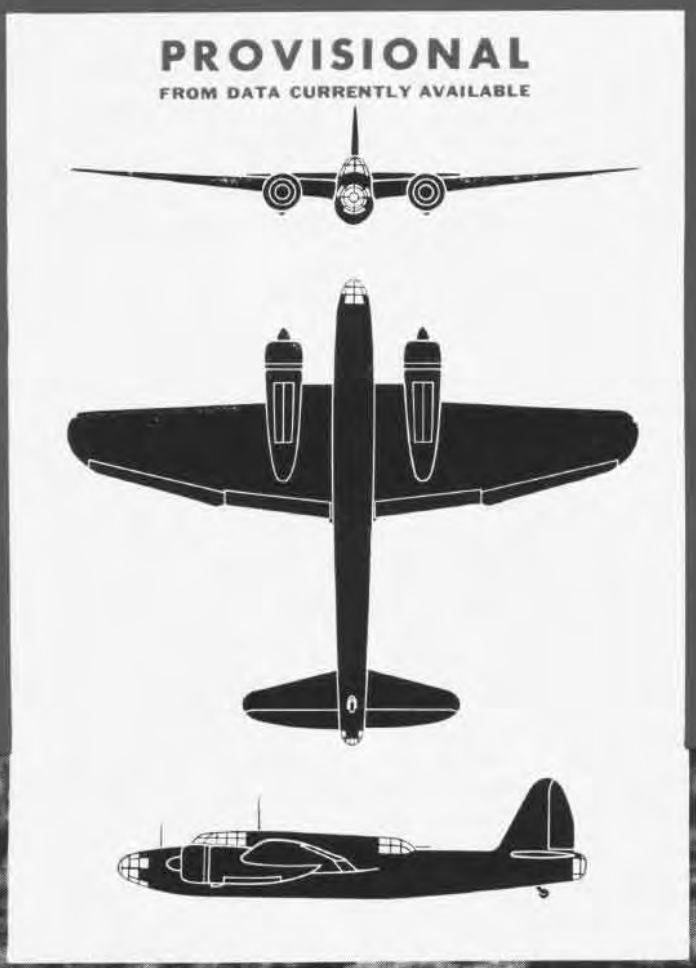
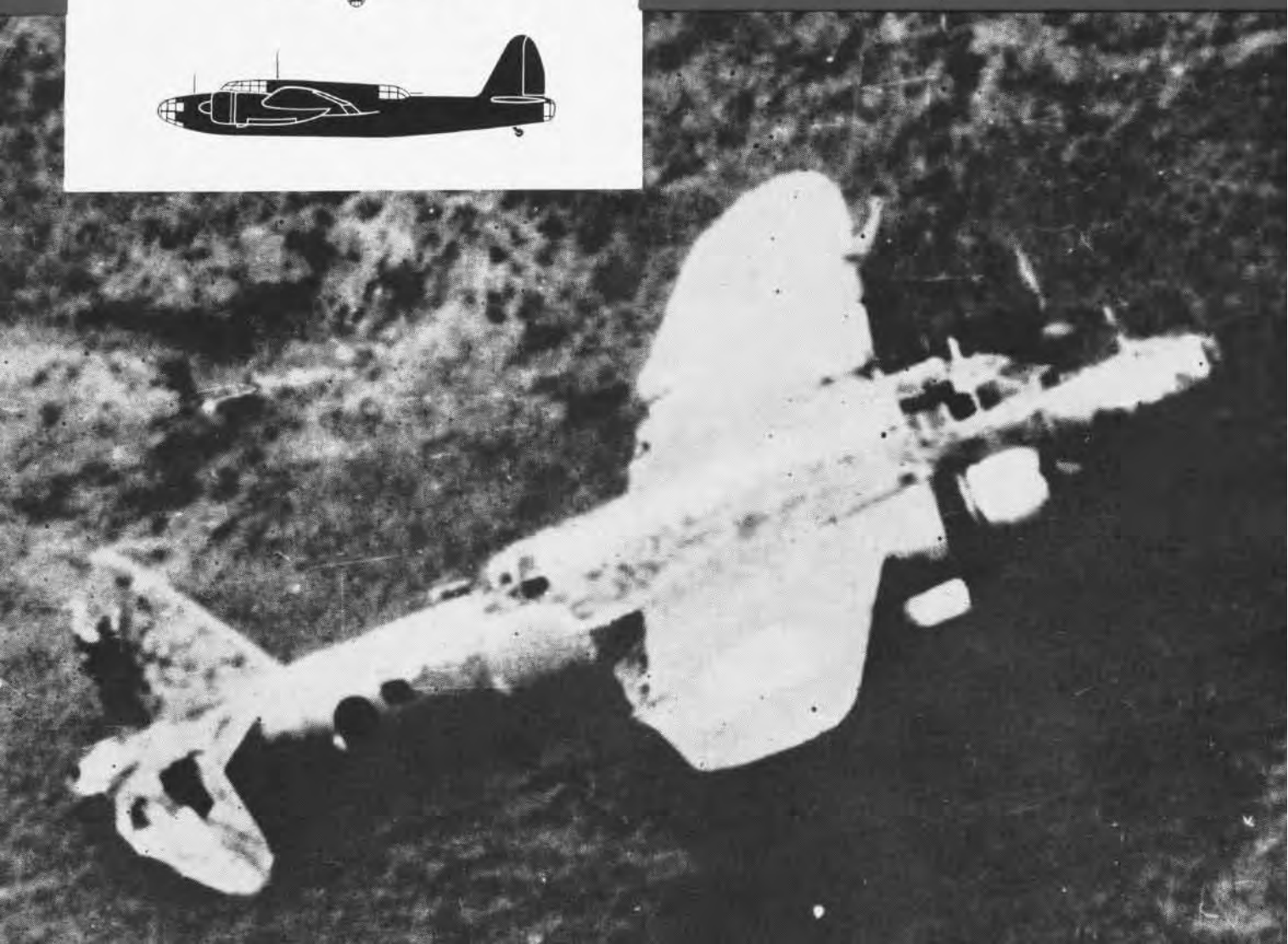
# HELEN TYPE 100 JAP MEDIUM BOMBER

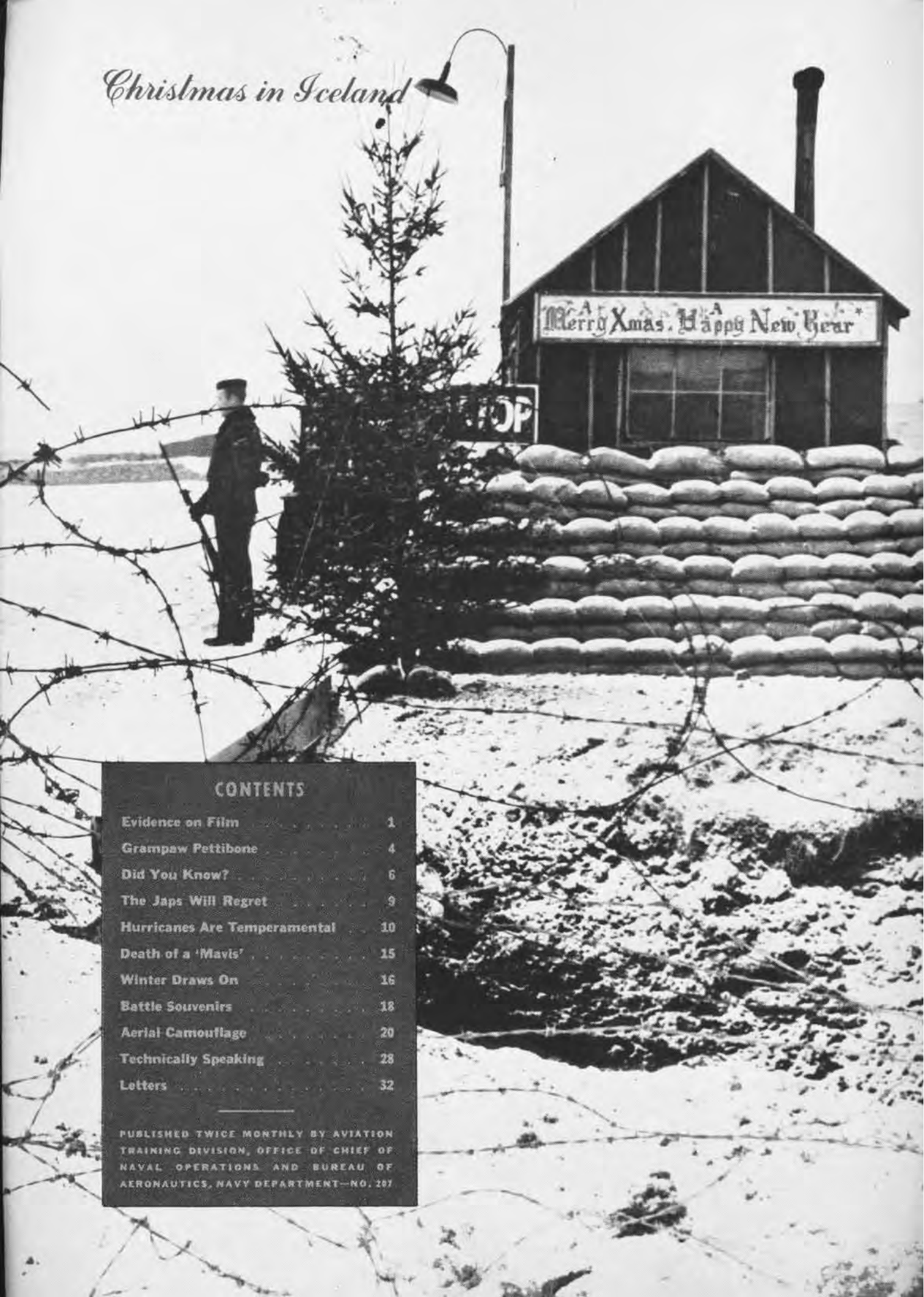



**DISTINGUISHING FEATURES:** Twin-engine mid-wing monoplane. Leading edge inboard of the engines is farther forward than the outer section, like the de Haviland *Mosquito*. Trailing edge of the wing has a double taper ending in a broad rounded tip. Radial engines are underslung. Fuselage decreases in size only slightly toward the tail section, terminating in a gun position. Span is about 68 feet.

**INTEREST:** Though this plane has been in production for some time, it is now appearing in operation over India, Australia, and South Pacific areas. The remains of a few crashed *Helen's* have been examined and recently photographs have been taken, but data are still inadequate to calculate performance.



# *Christmas in Iceland*




## CONTENTS



PUBLISHED TWICE MONTHLY BY AVIATION TRAINING DIVISION, OFFICE OF CHIEF OF NAVAL OPERATIONS AND BUREAU OF AERONAUTICS, NAVY DEPARTMENT—NO. 207

# EVIDENCE ON FILM

## Reconnaissance Pilots Undergo All Hazards of Combat on Hops to Record the Enemy's Position

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DUNKIRK marked the beginning of photographic reconnaissance. After the fall of France, avenues for spy traffic between the continent and the British Isles were closed. Prisoners captured were few, and well disciplined, and the amount of useful information obtained from these sources practically stopped. Then, from dire necessity, there sprang into being, throughout British-held territory, an organized network of photographic reconnaissance squadrons.

After Pearl Harbor, the U. S. took definite steps toward establishing photo reconnaissance squadrons. Specialists were sent to England to study and work with the British PRU. They returned to this country and set up training programs. Today, progress and development in schooling reconnaissance pilots and units in newly developed techniques are considered excellent.

Photo reconnaissance pilots need all the training a bombardment pilot and a bombardier get, because in making a photographic run over a target, almost the same technique is employed as in a bombing run. He also must have complete training as a fighter pilot and must be extremely proficient in the use of evasive tactics. He has to know when to press the button to start off his cameras. This is no mean job, for at the time the photographic run is made, say at 30,000 feet, the pin point area to be covered looks about 1½ inches wide.

Pilots are especially equipped for this precision task. They have been picked for ability as navigators and high altitude fliers, as well as for intestinal fortitude. Their mission is a lone and dangerous one, the plane being always vulnerable to enemy attack. But the mission is not accomplished merely by reaching the objective. The pilot must return with the evidence on film and deliver it to the photo interpretation unit for scanning.

# NAVAL AIR RECONNAISSANCE PAVES WAY FOR ALLIED ATTACK STRATEGY

One of the most interesting theaters of reconnaissance operation is the South Pacific. Units there started from scratch and built the organization to its present finished form.

First efforts were carried on in B-17's with pilots untrained in photographic work. Despite handicaps of material shortages, the reconnaissance teams made considerable progress. The next big advancement was arrival of a PB4Y-1 aerial reconnaissance squadron. Trained for the job, this unit repeatedly flew over enemy territory on mapping missions, on strikes, and on daily coverage of Jap fields such as Munda, Kahili and Buka.

Next came a squadron of F5-A's (Photographic P-38's). These planes had guns stripped and cameras installed in place. They made daily photo reconnaissance of all Jap positions within a 600-mile radius of Guadalcanal. Today other reconnaissance units are replacing the original ones in the field and more are forming in the States.

During Sicilian operations, some 500 photographic sorties were flown, and the entire 12,000 square mile area of the country mapped. This work was extremely difficult, because all last winter and spring the main strength of the Axis air force operated from these bases. Of the 500 sorties, not more than one out of ten was flown without interception by enemy aircraft. Areas like Palermo and Trapani and larger airdromes were exceptionally well defended by AA. The enemy depended, as a general rule, on radio detection to indicate approach of reconnaissance planes and endeavored to get fighters up. When unable to intercept, they sent up heavy box-type barrages of AA. Frequently, the jostling around planes got from AA bursts made it necessary for pilots to re-fly their runs before being certain of a continuous sequence of good photographs.

Two main types of aircraft are used by photo reconnaissance units in operation theaters. First is the familiar long-range four-engine land-based bomber, heavily armed and armored. It makes flights as far as 1,000 miles and back, depending for protection on its own armament. It carries four vertical and oblique cameras mounted in the fuselage.

The second type is the F5-A, used for daily coverage of enemy installations not too far distant. Void of armament, it depends upon high speed, maneuverability and ceiling to evade fire from the ground defenses and fighters. This type mounts one 24-in. camera and two split port and starboard 12-in. cameras for verticals and two split port and starboard 6-in. cameras for obliques. For certain types of vertical reconnaissance a 40-in. camera is substituted for the 24-in.

Other plane types used are B-17, F4F-7, F4U and PBY-5. SBD's and TBF's are flown from carriers.

To date most photographs in advanced operating bases have been made on black and white film. But great strides have been made recently in perfecting and simplifying aerial color photography and, although it probably will never supplant entirely the old-fashioned black and white pictures, it has certain definite advantages, such as detecting camouflage. It is particularly valuable in areas where the enemy relies on natural camouflage, for this film shows up jungle trails and enemy positions that would otherwise never be noted. Camouflage Detection Film is a new type of color film coming into use. It changes the appearance of green foliage to a reddish brown, but leaves man-made camouflage in natural or painted color.

Reconnaissance pilots are called on to fly various types of missions, from tree-top levels to high-altitude oxygen flights over fortified enemy targets. They also are called on to accompany bombing missions, to take photos of bomb hits during the actual attack so that damage may be assessed. Thus a new field has been pioneered in aviation, rapidly proving indispensable.


**VERTICAL** photographs of frequent interval reveal enemy plans and installations. Here the Jap airport on Ballale Island nears completion while eight planes already on the field show activity


**RUNWAY** oiling has been completed in this second reconnaissance photo taken eight days later and 108 enemy aircraft occupy field. Information of this type forewarns against aerial blows


**DICER SHOTS** of Jap installations on Kiska gave photo interpreters pre-invasion close-up of construction activity, types of guns and other vital information. An overlapping series of low obliques may be joined together to present a panoramic view of special areas

**OBLIQUES** of Jap destroyer from mast level show the characteristics of this type and reveal purposes of operation

**MOSAICS** combine vertical photos to compose aerial map of enemy territory showing all features of defensive installations. This mosaic of Wake Island required several passes over the area from constant altitude and with proper spacing between each flight

# GRAMPAW PETTIBONE

## Organizational Errors

A recent crash at a primary training station brought to light several serious errors in operational organization and procedures:

*a.* The pilot had been assigned to the flight list, although he had not officially been returned to flight duty, following a recent illness.

*b.* The pilot took up an unauthorized passenger.

*c.* Pilots were not required to sign Form N.Aer. 3119 (yellow sheet) upon completion of a flight.

*d.* Aircraft were not logged out or in by the tower watch. (Location of tower prevented this.)

*e.* Aircraft were not specifically assigned to plane captains, hence no check was made when planes returned to the line, nor at night, before secure.

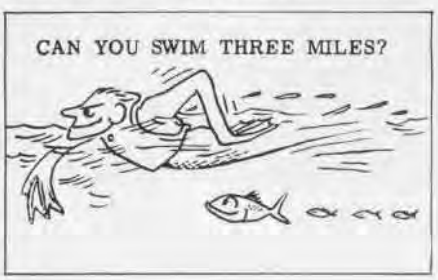
*Grampaw Pettibone says:*

**The station concerned has taken action to correct this slipshod mess, but the information is passed along to warn other squadrons to make a careful check to insure that they do not have some of the same or other similar dangerous operational deficiencies.**

## Scavenging Trouble

A TBF was engaged in high altitude glide bombing. During the fourth dive with engine turning over at 1500 rpm's and with about 10-15" of manifold pressure, a large amount of oil was lost. Oil pressure dropped to 40 pounds and a partial engine failure occurred, necessitating a deferred forced landing during which the aircraft was severely damaged.

*COMMENT*—**Nineteen hundred rpm's are recommended for glides and dives in the *TBF and TBM*. If a lower rpm is used for prolonged glides, the oil in the engine will load up in the nose section and be beaten into a foam which will then result in scavenging trouble and also loss of oil through the breather. Nineteen hundred rpm's are sufficient to prevent this trouble.**




## Winter Accidents

Winter flight operations are fraught with extra hazards. Ice, fog, snow, rain, sleet, frost and obstructed runways are some of nature's contributions to winter accidents. The following cases are typical accidents from last winter's record:

*1.* An SBD pilot on a cross-country flight elected to continue into a snow storm, and crashed. Evidence indicated that both carburetor and structural icing forced the pilot to attempt an immediate landing, during which he lost flying speed.

*2.* An N2S, although developing full power on take-off, was unable to gain sufficient air speed to clear obstructions at the end of the runway. Take-off had been attempted with a thin layer of frost on the upper wing. BuAer Manual warns pilots to inspect aircraft for icing or frost deposits on wings prior to take-off; it states, "A slight deposit that is barely visible may double the wing drag and greatly reduce available lift."

*3.* An SNJ came in for a night landing on the designated course and, after contacting the ground, struck a large pile of snow which had not been cleared from the edge of the runway. There were also several take-off crashes which occurred because runways were only partially cleared of snow.

*4.* An SNJ-4 pilot failed to apply carburetor pre-heat in time to avoid carburetor icing. The engine lost power, necessitating a forced landing which proved fatal.

*5.* A flight of five F4F's took off for carrier qualification and about one minute after leaving the field, flew head-on into a local snow squall which they could have easily avoided. One pilot became disoriented before breaking through the storm. He was seen to go into a steep, diving spiral and crash.

*6.* A PV-1 was landed with one wheel on a clear portion of runway and the other wheel on a strip of ice. When brakes were applied, they were ineffective on the wheel which was on the ice and a very serious groundloop resulted.

*Grampaw Pettibone says:*

**All of these accidents could have been avoided if proper consideration had been given to winter operating conditions.**

**This warning should have been issued sooner, but it is still not too late to close the stable door.**

**The same type accidents will happen again this winter if we don't watch out. Study the special winter hazards and know how to avoid or combat them. Learn about structural and carburetor icing. Stay out of storms if you can, but if you get caught short, go on instruments in time. Be sure your wings are clear of snow or frost before take-off. Be leary of your brakes on icy runways.**

**Flight control groups bear added responsibility at this time. It is mandatory that pilots be furnished accurate weather data for all flights. Also, field management must insure the largest possible area of cleared runways.**

## Attention Patrol Plane Pilots

There is considerably more to being a good patrol plane pilot than being able to fly, as shown by this accident.

A patrol plane commander, 625 hours, landed a PBY-5A in semi-sheltered waters during a period of reduced visibility. He was heavily loaded and experienced considerable difficulty in his take-off when the weather cleared. The pilot apparently considered he handled the ensuing emergency satis-

factorily, but the Trouble Board was not convinced. They reported:

"At about 60 knots he bounced badly and opened up the bottom, so he cut the throttles. Leaking badly, he headed for shore with full power, overheating the engines (300° cyl. head temp. for 10 minutes). He attempted to lower the landing gear while moving at excessive speed, ripping off the nose wheel doors and making the gear inoperative. He finally beached the plane among rocks, staving in the bottom.

"After removing only the bombsight and confidential publications, a guard was posted, and the remainder of the crew departed. All watertight doors were left open and no effort was made to keep the water out of the plane. It consequently filled with the incoming tide, submerging much of the equipment before a salvage party arrived."

## Fire Hazard in Patrol Planes

A PBY-5 airplane was recently lost in the Pacific area due to a gas fire in the mechanic's and navigator's compartment. Upon being notified of a fuel leak in the cabane section, which was flooding the navigation compartment with gas, the pilot ordered the floats lowered in order to make an emergency landing. When the switch was thrown to lower the floats, the float motor sparked, igniting the gas, and resulting in loss of the aircraft and fatal injuries to two crew members.

*COMMENT*—**Crews should be indoctrinated to report immediately to the pilot the detection of gas fumes or leaking gasoline in the fuselage. Upon receipt of such report, the pilot should immediately direct the radioman to cut off all electrical power. Power should be left off until it has been determined that there is no longer any danger of fire.**

**In the event that an emergency landing is necessary, any equipment required for landing which is normally operated electrically should be operated by hand, utilizing the emergency provisions provided.**

## Poor Field Control

An SNJ had received take-off clearance from the tower and had started its take-off. At the same time, three SBD's which had been practicing field carrier landings were taxiing across the upwind end of the runway in use. The SNJ was making an instrument type take-off with the rear seat pilot at the controls. The safety pilot (instructor) was unable to see straight ahead owing to the three-point attitude of his airplane, and relied entirely on tower clearance. He did not see the SBD's and just as his plane was airborne, it struck the wing tip of the second SBD and fell back on the runway. Luckily no one was seriously injured.

It was the opinion of the Trouble Board that this accident was entirely avoidable and occurred as the result of poor field control.

## Sauce for the Gander

Pensacola claims this one:

During a final check in the Intermediate Instructors' School, the instructor ordered the ensign student to raise the flaps after take-off. The student asked the instructor to take over while he carried out the order.

"No, you do it; this is your check," the instructor replied.

"But I can't get the flaps up with one hand," countered the ensign impatiently.

"Well, you'll have to manage somehow. I'm just the passenger and don't know a thing about a plane," the instructor purred.

The ensign, with no choice, managed to carry out the order.

"Now, how do you know they're up?" the instructor asked.

"What the hell do you care!" the ensign snapped. "You're just the passenger!"

## Importance of Prescribed Altitude

Upon returning to base field, a student pilot joined the traffic circle at 400 feet instead of the prescribed 500 feet. Another student was climbing after take-off and instead of leveling off at 300 feet in compliance with course rules, climbed to 400 feet. The two planes collided and fell out of control; neither pilot managed to bail out.

*Grampaw Pettibone says:*

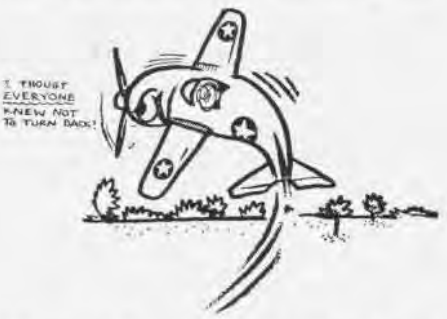
**Now, do you see why it's so important to fly at the exact altitude prescribed in course rules?**


## Don't Turn Back

The engine of an FM-1 failed at about 150 feet on take-off. The pilot tried to turn 90° to get into a clear pasture but stalled and spun in.

*Grampaw Pettibone says:*

**Here is another pilot who was killed because he forgot the emergency procedure taught him in primary training. He knew that if his engine cut out on take-off he should first shove his nose over to keep flying speed and then consider the wind and terrain. But in the excitement of experiencing the *real thing*, he *forgot* the first and most important part of the emergency procedure. He lost flying speed!**




**The record shows that a spin is the most dangerous type of accident. If you can get your wheels on the ground with the airplane still under control, your chances of "walking away from it" are infinitely better than if you lose control and spin in.**

**Better check yourself mentally on this take-off emergency procedure and make sure that you will react in the right way. Remember, the first thing to do is get that nose down and don't start a turn until you have plenty of flying speed.**

## Why Doesn't Somebody Tell Me These Things?

An SNB-1 ferry flight was routed north through Richmond. Upon reaching the vicinity of Richmond, clearance to the north was refused due to "instrument" weather. The pilot was unable to orient himself in this area. Owing to approaching darkness and low fuel supply, he elected to land in the first available field. The emergency landing was a failure. The pilot and passengers received serious injuries and the plane was badly damaged.

Neither the pilot nor co-pilot was aware that the Richmond radio range had been changed. The courses had been realigned and the "A" and "N" quadrants had been reversed. The change had received full publicity, but the pilot had relied upon an old chart.

*Grampaw Pettibone says:*

**Quite possibly this pilot might have been able to orient himself around Richmond had radio ranges been correct.**

# DID YOU KNOW?

## Navy Set for Bond Drive

### *Air Stations Lead All Others*

Having established themselves as leaders in the Navy War Bond program, naval air stations are expected to go after top honors when the Fourth War Loan Drive opens on January 15. Seven major air stations have led all other groups in the Navy program in nine of the ten months up to and including October. Although final figures from Pearl Harbor Day sales were not available, it was indicated that the Navy's goal of $15,000,000 would be topped by a comfortable margin.


In October, the air stations for the seventh successive month led all naval activities with 95.3% of civilian employees investing 15% of payroll. For the Navy as a whole, 91.5% of civilian personnel invested 12.2% of payroll.

Present goal of the aeronautic organization is 90% or more of civilian personnel, and 83% of uniformed personnel.

### *Wanted:* BACK NUMBERS

THERE IS a scarcity of certain back issues of NAVAL AVIATION NEWS: May 1, May 15, June 1. If you have copies of these numbers you can part with, NANEWS would appreciate receiving them to replenish its files. *Thank you!*

## Aviation Offense: Don't Fly Over Restricted Airspace

MEMORANDUM FOR AVIATORS

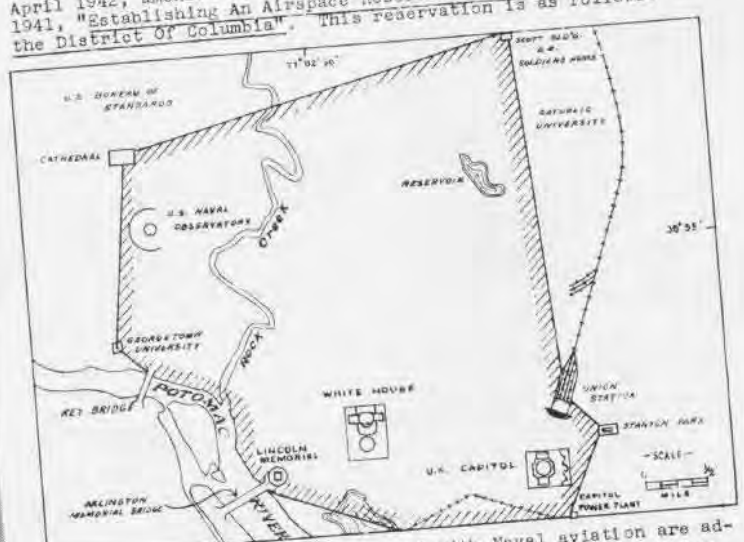
2 August 1943.

No. 108.

DISTRICT OF COLUMBIA; AIRSPACE RESERVATION

Reference: Memorandum for Aviators No. 39 of 16 May 1942.

Executive Order No. 9153, signed by the President on 30 April 1942, amended Executive Order No. 8950 of 26 November 1941, "Establishing An Airspace Reservation Over A Portion Of the District Of Columbia". This reservation is as follows:




Aviators and others concerned with Naval aviation are advised to thoroughly familiarize themselves with the location of this reservation. No Naval aircraft shall be navigated within the confines of such area except by express authority of the Eastern Defense Commander.

C. & G. S. Aeronautical Charts: Washington, 10M, 23DF, 26DF.

G. S. Bryan,
Rear Admiral, U.S. Navy, (Ret.),
Hydrographer.

RESTRICTED

**There have been recent reports of aircraft flying over the District of Columbia Airspace Reservation. This is a serious offense. The attention of all pilots is directed to Memorandum For Aviators, No. 108, which is shown. Aviators should familiarize themselves with this area.**

## A New Discharge Button

### *Navy to Distribute Them Free*

A service button to be worn on civilian clothes has been authorized for men and women separated under honorable conditions from active duty in the Navy,

HONORABLE DISCHARGE BUTTON WILL BE FREE

Marine Corps and Coast Guard. The design is the same as that authorized by the War Department for those honorably discharged from the Army. The button is issued without cost to both officer and enlisted personnel separated from the service since Sept. 9, 1939.

## RAF Has a Fighter School

### *Aces Teach Newest Air Tactics*

With emphasis on low level navigation, the RAF now teaches prospective Squadron Leaders and Wing Commanders the latest fighter tactics in a

Fighter Leaders School, instituted by the RAF Fighter Command.

During the three-week course, a series of exercises are worked out by 25 students flying *Spitfire* VB's, and actual operating conditions are closely simulated. Specially marked *Spitfires* are flown by staff pilots acting as enemy formations in attacking student formations.

Instructions are issued to students prior to each exercise. After the performance, students and staff officers analyze the success of the "action."

## New M-1 Is Mighty Blimp

### *Capacity Is 625,000 Cu. Ft.*

More firepower and bombs are carried in the Navy's new M-1 blimp, largest non-rigid airship ever built, which has been successfully test flown. The airship, half again as big as existing K-type airships currently used by Navy for coastal patrol, was built by the Goodyear Aircraft Corporation, which also is making *Corsairs*.

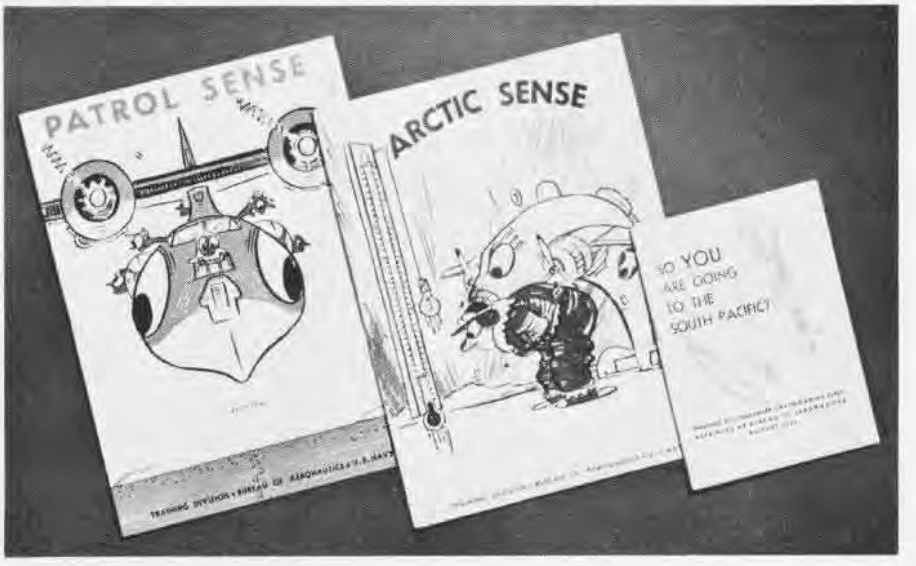
Because of its larger helium capacity, the blimp has a greater cruising range.

**NEW M-1 BLIMP BIGGEST NON-RIGID AIRSHIP**

A distinctive feature is the new car, nearly three times as long as that of the K-ship. It comprises three connecting units, integrated by universal joints to allow freedom of motion in coordination with the flexible envelope above.

**BLIMP'S INTERIOR RESEMBLES MAMMOTH CAVE**

Outriggers carrying two Wasp engines are attached amidships. Forward are machine guns, pilot and co-pilot, bomb bay, navigating and radio rooms, bunks and galleys. In the middle compartment also are machine guns and blowers, while the aft section is mostly for stowage of supplies. The new Navy blimp has a 625,000 cubic foot capacity.




# THREE INFORMATION PAMPHLETS

Additional informative pamphlets—*Patrol Sense*, *Arctic Sense*, and *So You Are Going to the South Pacific?*—are now receiving initial distribution by Aviation Training Division, Office of the Chief of Naval Operations.

**PATROL SENSE** (Restricted)—The first thing to do in preparing for patrol duty is to realize that you must be a reporter as well as an aviator. To fulfill your mission on patrol, you must be quick to observe, and you must recognize the significance of what you observe. Before you ever take a patrol plane out on search, there are some things you should do to indoctrinate yourself. They may sound like kindergarten, but the oldest pilots on offshore patrol do them as part of regular routine.

**ARCTIC SENSE**—In operating airplanes in the Far North there are several manners, customs, and usages to be practiced which are useful in keeping you from making an egg of yourself in front of the Eskimos. In spite of anything glamorous you may have read by Jack London or Robert W. Service, it's no picnic to spend the night in the open during an Arctic winter. On the ground and in the air, *Arctic Sense* points out certain practices you should observe.

**SO YOU ARE GOING TO THE SOUTH PACIFIC?**—The purpose of this pamphlet is to present certain elementary rules regarding camp sanitation and individual health and to indicate what uniforms and personal gear and equipment have been considered necessary or useful by those who have been at our advanced bases south of the Equator. Included are useful suggestions on entertainment, recommended bibliography, and check list of equipment and gear to be procured before leaving your station for the West Coast.

## USE THIS FORM TO ORDER PAMPHLETS

**Regular distribution is in process. Coupon should be used for those whose copies may have gone astray.**

**FROM:** _____
(Unit commander)

**TO:** Office of the Chief of Naval Operations

**SUBJECT:** Pamphlets—Request for.

**It is requested that copies of new pamphlets be sent as indicated to this activity.**

| COPIES | PAMPHLET |
|---|---|
| _____ | Patrol Sense (Restricted) |
| _____ | Arctic Sense |
| _____ | So You Are Going to the South Pacific? |

**SIGNED:** _____

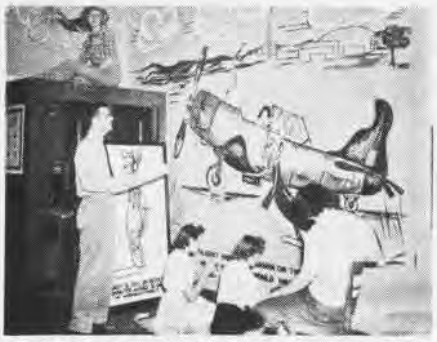
**Delivery Address:** _____

Cut here ✂ _____

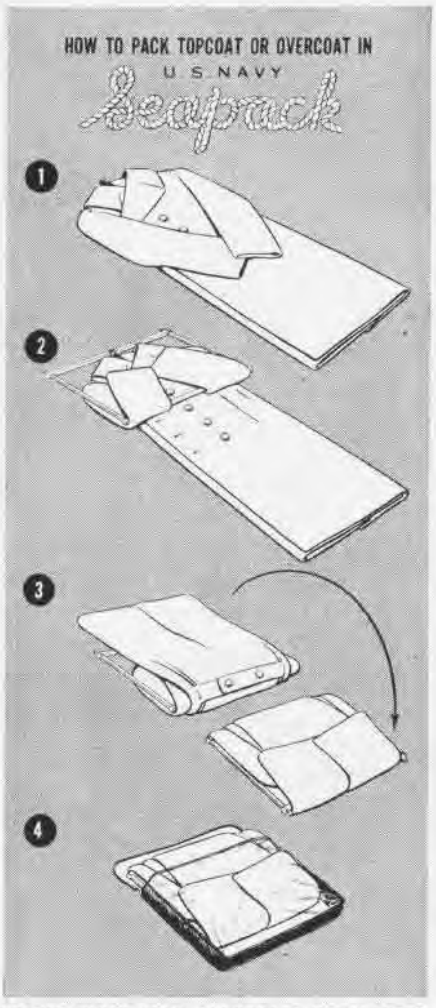
## Co-ed Art Brightens Meals

### *Murals Depict Dilbert Blunders*

NAS, DELAND—Painted by a bevy of art students from nearby Stetson University, a set of Dilbert murals enlivens the interior of the ship's service at this station. The student artists did the work as a semester project, at a cost of about $15 for paint, brushes and canvasses, which were furnished by the Navy. Their work was done entirely outside of classroom hours. The murals serve as a reminder to students of what not to do in emergencies.



ARTISTS PAINT MURALS IN SHIP'S SERVICE




FOLDED RIGHT WAY, OVERCOATS FIT SEAPACK

## NATS Planes Get Insigne

### *Anchor and Wings Win Prize*

Big transports of the Naval Air Transport Service now may bear an official insigne recently selected after a contest was held to bring in proposed designs.

The insigne comprises a circle bordered by rope. In the circle is the traditional Navy fouled anchor, on which is placed a pair of modified Navy aviation wings. On the wings, the words "Naval Air Transport Service" appear. Also in the circle, above and to either side of the anchor, is a white, five-pointed star.

The background of the design is cobalt blue, the bordering rope dark blue and white, the anchor gray, the wings white bordered with dark blue, with the name of the service also in dark blue. The insigne was designed for planes but probably will find its way informally on some clothing of NATS personnel, although official uniform regulations do not provide for it.


NAVAL AIR TRANSPORT'S NEW PRIZE INSIGNE

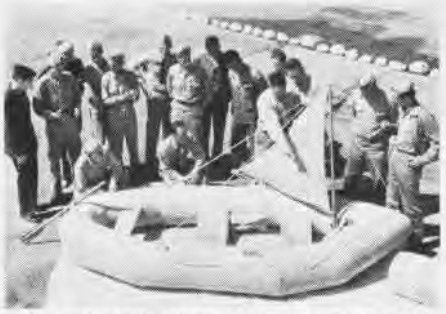
## Protects Feet of Swimmers

### *Conducting Test in Coral Sea*

A protective swimming shoe has been developed to meet the needs of naval aviation personnel in the Coral Sea, and a shipment has been made to that area to test them under actual conditions.

LIGHTWEIGHT SHOES PROTECT SWIMMERS' FEET

The swimming shoes were the result of considerable experimentation, and the selection was made from many samples submitted by leading manufacturers. Considerable information for improvement is expected from tests.



FAMILIARIZATION PAYS, SAYS MANY A SURVIVOR

"Show How" followed by "Try Now" meant "Know How" for officers who prepared for overseas duty at MAG-15's ground school. Proper procedure for use of rubber life saving boat and equipment was demonstrated on dry land and in the large swimming pool at Camp Elliot.

## Navy Gets "Grasshopper"

### *Army Turns Over Several Dozen*

The Army has made available to the Navy several dozen of their Vultee Sentinel planes, designated L-5 and used for artillery spotting and liaison work.

The planes will all be delivered before the end of the year and will be known as OY-1's in the Navy. These highly maneuverable little two-seaters are powered by 185-hp engines.

ARMY TURNS OVER LIGHT AIRCRAFT TO NAVY

## Types of Planes Plentiful

### *Rodd Field Is Kept on Watch*

NAAS, RODD FIELD—This field claims the record of having more different types of aircraft operating on it than any other auxiliary training station in the Navy.

Seven types can be found almost any time in the traffic circle—SNB-1's, SNB-2's, SNJ-4's, SNV-1's, NCN-3's, N2T-1's, and NE-1's. Having so many different types, each with own landing speed, keeps the traffic control tower on its toes.

It was expected that normal landings by SNB's would damage asphalt runways in hot weather, but despite their weight they actually do less damage than the lighter N3N's.

# JAPAN WILL REGRET THESE TACTICS

MARINE CORPS REPORT

A MARINE FIRST LIEUTENANT *recently back from the South Pacific related a tale of how a Jap fighter pilot made four strafing runs on him while he was parachuting from 20,000 feet, cutting off parts of his feet with the propeller blade.*

•

I WAS over the Russell Islands and after circling for some time I heard F.D. say there were enemy planes at 26,000 feet and 20 miles west. I climbed to about 25,000 feet and headed west. I thought I saw three *Zeros* below and ahead of me, so I went for them. As I closed in, one broke off and the other two went the other way. I saw they were *Zeros* after a P-40.

One *Zero* was on the P-40's tail and I headed towards those two planes. They were in a steep diving turn, and I followed them down at high speed, trying to close in on the tail of the *Zero*. When I was about 500 yards away, my plane suddenly began to vibrate.

I pulled up the nose, but it continued to stall and shake worse than ever. I hadn't seen any tracers into my plane but then, after I slowed down a little, I turned around and saw that my rudder was mostly shot away and that I had very little elevator control. The nose kept dropping over, no matter what I did. Suddenly, I saw a *Zero* go past me. I hadn't known one was there.

The plane was getting out of control so I opened the greenhouse, got out, and crawled back along the fuselage, clear to the tail. I didn't have a chin strap on my helmet, so it blew off with my goggles, and for a while I couldn't see a thing. I made the mistake of pulling my rip cord too soon. [See *Parachute Sense*]. It worked OK and I started down in my chute. I think I was at about 20,000 feet, but I'm not sure.

I WAS trying to pull up into the seat of the chute when I heard kind of a "put-put" behind me, then the noise of machine gun fire. I swung around in my chute and saw a *Zero* making a run on me from behind, firing with two 7.7's. He missed with guns, and he went so close under me that I had to jerk up my feet to avoid being hit by the prop. When he passed by, he did a wing-over and made a second run on me. I was trying to collapse the chute to speed up my descent, but couldn't do it. I was still pretty high, and weak from the lack of oxygen, I think. He missed again, though, then wheeled around and came back, with both guns firing.

I was busy trying to spill the air out of the chute, and I now had it partially collapsed; I didn't think to pull up my feet this time though. The prop hit me. I thought at first that both my feet were gone, but then saw that only the heel had been taken off my left foot.

He made another run on me, or maybe more, before a P-40 came along and chased him off. It seemed to take ages for me to get to the water. I had to keep fighting to keep from passing out. The P-40, I learned, was piloted by the same man whom I had helped.

I SEEMED to come to a bit when I hit the water. It took me about fifteen minutes to get my rubber boat inflated. Several F4U's and P-40's were around, so I figured that I'd be picked up soon.

I put a tourniquet on my right leg. The big toe and the one next to it were still on, but all the outside and the rest were cut off just above the ankle—kind of a sidewise cut. My left heel was cut too. I gave myself two morphine surettes and I took four sulfa tablets. The morphine started to do its work, things began to go dim, and I lay back in the boat and relaxed. I had already taken some green dye from my jacket and put it in the water. I saw a duck (J2F plane) coming and I flashed a mirror at it. The plane saw me and landed nearby.

# HURRICANES ARE TEMPERAMENTAL

HURRICANES in the northern hemisphere normally move westward in low latitudes at a velocity of 9 to 11 knots, then slow down and head northward, and finally recurve to the northeast, picking up speed. However, there are times when the track is different. Reports of several of these freak storms are presented here.

In the latter part of July the Texas coast suffered severe damage in a hurricane which came in from the Gulf. As a result, Texans were alert on September 15 when another storm was reported heading for the coast. The experts figured it would hit Freeport, where the wind rose to 55 knots on September 16. The Weather Bureau issued hurricane warnings, and everyone got set for a big blow. The wind subsided, however, and the weather returned to an almost normal condition. Apprehension remained, for the storm was still in the Gulf. But it was not following the prescribed hurricane rules.

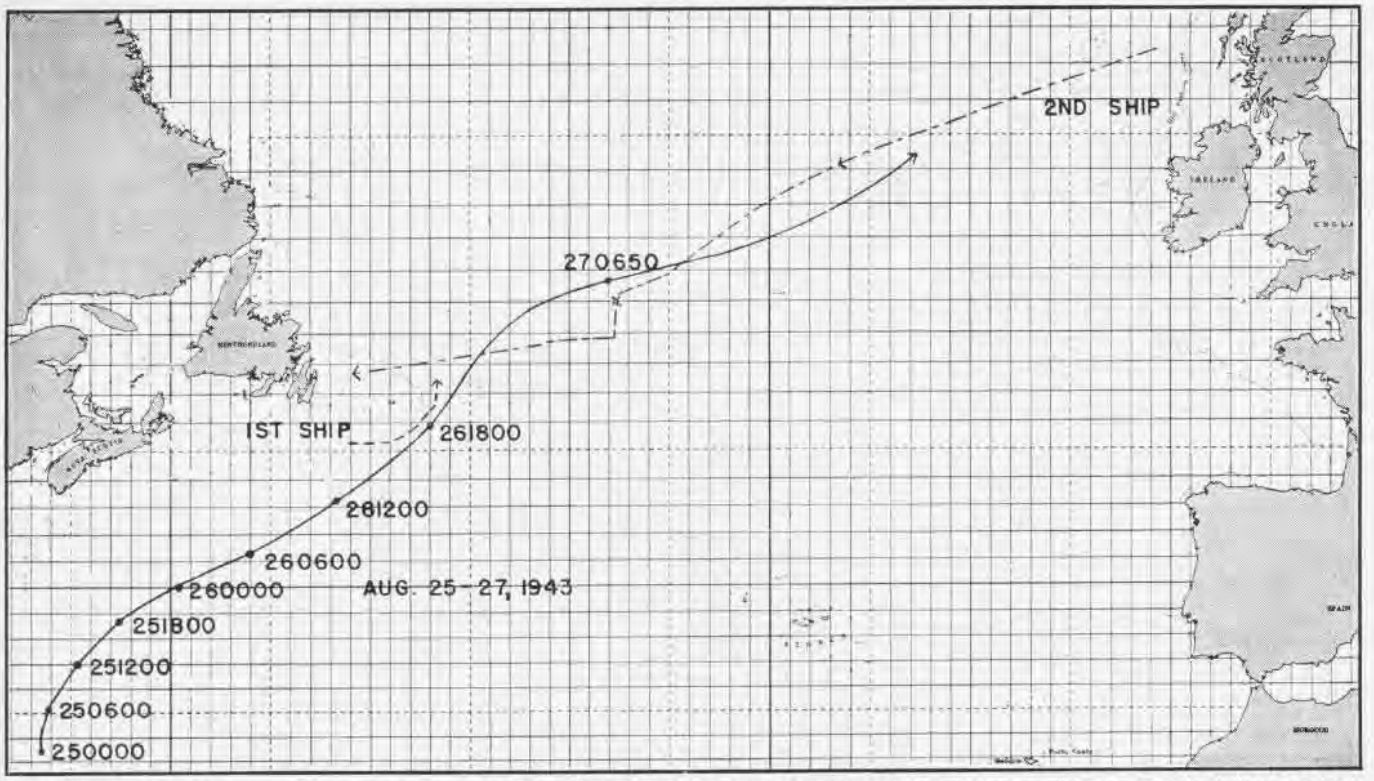
When the hurricane was about 150 miles from the coast it turned south, southeast, then east, crossing its original path and taking a north-northwesterly course. This time it seemed to be headed for Galveston. Winds and rains along the coast were not as severe as they had been two days before. Finally on the 19th, after having turned to the northeast, this *unconventional* hurricane eased into the Louisiana coast, only a shadow of its former self.

The famous 1910 storm is the best known example of this freak movement. It crossed the western end of Cuba going northwest, described a loop, and hit the same place again—this time from a southwesterly direction. The second time this storm hit the Florida coast it travelled northward across the peninsula, causing considerable damage.

ANOTHER hurricane which was definitely *unconventional* occurred in the Atlantic last August. It differed from the usual type in that it travelled at an irregularly accelerated speed and appeared to deepen somewhat between 45° and 50° N. There are two accounts of this storm by ships that had to change course to avoid passing through the center of it. Even at that they encountered winds as high as 100 knots in gusts.

The first ship was steaming eastward on August 26 at 17 knots when the first real evidence of the hurricane was felt. It was thought that this was the result of an approaching low pressure area in which a wave was centered, but it soon became evident that the storm was of greater intensity than a mere frontal storm. The ship changed course to nearly northeast to avoid the center of the storm. The hurricane overtook the ship, and the center passed about 12 miles southeast of it. Before the center passed the winds had been shifting between east and east-northeast and had not exceeded 50 knots, except for occasional gusts. At this time the winds dropped to 21 knots and shifted from northeast to northwest.

The ship's barograph indicated 962 mb. pressure at the lowest point, and it was estimated that the pressure in the center of the storm was about 960 mb. The wind backed to west-northwest and remained from this direction. Later the wind picked up to 60 knots




**HURRICANES USUALLY FOLLOW TRACEABLE PATTERN BUT NOW AND AGAIN ROMP OFF BEATEN TRACK AND APPEAR IN GUISE OF UNCONVENTIONAL STORM**

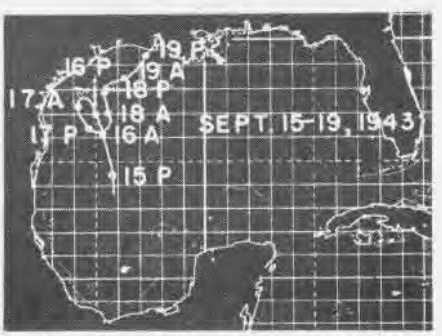
and was as high as 85 in gusts.

The first ship reported intermittent rain and fog, and the second reported reduced visibility owing to salt particles in the air during high winds.

On August 26 the second ship was several miles northeast of the first ship and had received warnings of a hurricane recurving north of Bermuda. Its course was nearly southwest at 18 knots. Weather sequence encountered at this time was attributed to the frontal system mentioned before. At 0115 on August 27 this ship encountered gusty winds from the south-southwest, indicating that the hurricane was approaching and that the ship was close to the storm's path and in the dangerous front quadrant. The ship changed course to due south and reduced her speed to 8 knots. The wind gradually shifted clockwise through 40° with a velocity of 65 knots, reaching 90 in gusts. The barometer was falling fast—at the rate of 7.1 mb. per hour. When the lowest pressure was reached, 964 mb., wind velocity was 75 knots, with 100 in gusts. It was estimated that pressure in the center was 955 mb., and the center was about 70 miles north-northwest of the ship.

Weather sequences observed were overcast skies and steady rain with reduced visibility at first. Then rain became intermittent and visibility worse. Clouds were stratus and nimbo-stratus with bases from 1,500 to 600 feet, remaining at the lower level until it began to clear. Early on the 27th the wind decreased appreciably, the atmosphere became oppressive, and there was lightning for one and a half hours. The seas became very rough and the waves were as high as 55 feet, with a steep slope to the forward sides and a speed of 28 knots at the time the storm passed. Wave length was estimated at 450 feet, increasing to 500 feet. After the trough passed, a swell from southwest was distinguished and the wind decreased to 50 knots. Later the after-storm swell appeared from about the same direction, travelling about 33 knots. Radio reception was considerably impaired.

Estimates of the location and speed of the storm were made by the first ship from midnight GCT, August 24, to midnight, August 26. At the beginning of this period the storm had started moving due north at about 14-18 knots. It then swung to the northeast, then back into north, increasing its speed at a steady rate during this period.




**TEXANS WERE READY BUT BIG BLOW FIZZLED OUT**

From the second ship's calculations, it would appear that although this storm was accelerated, it actually deepened during this time as it was definitely more intense on the 27th than on the 26th, when encountered by the first ship. It is possible that the second ship was nearer the center of the storm than the first and as a result the effects observed were more intense—in spite of the apparent discrepancies in estimates.

Both accounts of this storm state that there was no unusual swell ahead of the storm such as is normally encountered in front of a hurricane. However, the first ship states that after the center passed, the sea became heavy with a strong swell and the ship changed course to due north. Early the next morning the wind reduced to 26 knots.

THE BEST known signs of an approaching hurricane are the gradual fall in pressure, increased sea swell and cirrus clouds stretching in convergent bands in the direction of the storm center. As the storm gets closer, the swell increases, clouds lower, their direction changes counterclockwise, winds increase and become gustier, and the barometer falls faster.

For pilots the best advice on hurricanes is to avoid them. Many have flown through hurricanes, a few intentionally, and have come out of them. As this is not normally recommended, the advice to avoid them still holds, for the danger of turbulence alone is enough reason to stay away from the area.

# SHORE STATIONS

● BLIMPRON 31, PACIFIC—All the gentlemen of girth here have their names on a chart and are organized into a FAB club. "FAB" stands for a touchingly intimate, but unprintable, nickname for gentlemen of poundage. The member who takes off the most wins a buck from all the other members. Weight losses are on a percentage basis. With continued progress a little more helium can be saved.

● NAS, GROSSE ILE—After experiments with Deck Signals NAF No. 88593-1 have been made, it has been found that about 500% more light is obtained if sides of the wands are "roughed" with 1/10 emery cloth while ends should be polished. Experiments with "roughed" wands have proved satisfactory by testing during routine night flying.

● NATC, CORPUS CHRISTI—There's a hangar at NAS full of machines that make the usual "coin robbers" of penny arcade look like nursery toys. Only people don't play at these, they work at 'em. And they don't require a nickel to start the ball rolling. Just the OK of the training officer, a flick of a switch, and things begin to happen.

All this is at Special Devices, a phase of flight training once called Synthetic Training, a name borrowed from the RAF, which first developed this type of hangar flying. Here it isn't synthetic, but a workable way to train pilots better and faster.

● NAS, HUTCHINSON—After a thorough test, the assembly line method of overhauling engines in the A&R Department has proved highly successful and far speedier than the old method under which the same crew followed the engine through all stages of renovation. The principal advantage of the new system is saving of time in training overhaul mechanics. When the same crew performed all operations, the mechanics had to become expert in every phase of engine overhaul.

Under the assembly line method, the crewmen must learn only one operation, thus saving much training time. The engine overhaul shop is divided into six departments, each with a specific task and with men especially trained to perform it. The shop is laid out on an assembly line basis. From production of approximately one engine per day under the old system, output under the assembly line method is nearing three engines per day, with prospects that this figure will be increased in the near future.

● NAPTC, KANSAS CITY—Every officer in this command is expected to participate in 1 hour of physical training per day in order to prepare himself for combat duty abroad. Under certain circumstances, the pressure of the training program and the work to be accomplished at times makes this schedule impossible. When this occurs the officers engage in a minimum of 4 hours of physical exercise each week, not to exceed 1½ hours daily.

● NATS, ATLANTIC—Since Coronados started making the run from La Guardia Field to South America, across the South Atlantic and up the west African coast to Lyautey, much time and thought has been given to the problem of feeding aircrewmen and passengers aboard the flying boats assigned to this route.

Fifteen years of progressive experience in serving meals to passengers while aloft, plus the culinary advances made possible by wartime enterprise, have enabled Pan American's commissary personnel to make considerable headway in ironing out the wrinkles inherent in the establishment of feeding arrangements for a long-range flying project. Already senior and junior stewards are being put through a special course of instruction pointed towards fitting them for flight assignments aboard a Navy plane.

School for these men is a down-to-earth study that takes them into the kitchens to work with the staffs manning the facilities used to prepare food for employees and passengers. During the three weeks of training the stewards work with the fry cook, learning how to prepare certain meats and vegetables, then study under the sauce cook. Carving is taught by the chef, while the baker furnishes an insight into the baking of cakes and pastries. Other tricks of the trade are learned. The art of cooking canned foods so that the flavor is retained, the knack of opening a thoroughly heated tin of food, are among the prosaic pointers handed down to the neophytes by the steward-instructors.

● NAS, JACKSONVILLE—The VPB squadron in operational training here is convinced that each student pilot should carry a small notebook containing information on PBY-5 radio gear, engines, ignition system, carburetors, propellers, ordnance equipment, radio aids to navigation, weather maps and codes, signal flares, and aircraft identification.

With the help of all departments, such a notebook was prepared and is now in use, representing another new idea intended to groom men for fleet operations.

● NAS, LAKEHURST—A fine example of how rumors start and spread occurred here recently. This example concerned the story of a man who had supposedly been cut to pieces by a propeller.

The story was repeated hundreds of times, at the officers' club, in the general mess, and in shops and offices the story was passed on. In some versions the man had walked into an airplane propeller, another version had the man stepping into the prop of one of the blimps.

The story was carried ashore, and newspaper reporters started calling.

Here are the facts: An instructor in the enlisted airship training school was moving a propeller in hangar No. 1 when it slipped and fell on his foot. The dispensary diagnosed his injury as "a simple fracture of his left great toe." That's all there was to it.

● NPFS, IOWA CITY—Although naval censorship usually forbids telling just exactly where a torpedo or bomb hits a ship, permission has been obtained to reveal that the USS Fieldhouse at this station suffered damage to its super-structure here recently.

First indication that the USS Fieldhouse might be crumbling came when the overhead in the radio room began caving in shortly before noon. Cadets taking code paid no heed to the falling bricks and concrete, thinking it was another trick to teach them endurance and bomb-dodging agility at pre-flight.

When sp's and officers began roping off space outside the Fieldhouse, fearing the cornice might topple on passersby, the cadets were persuaded to abandon ship.

● NAS, CLINTON—A transparent display case which holds three of the War Dept.'s "News Maps" has been installed in the officers' mess. These maps can be read from both sides. A similar case for the enlisted men's mess is under construction. Another educational aid is a series of eight weekly lectures for all officers attached to NAS. These lectures are to be given by men who have had service in combat zones, thus giving first hand information to officers who have as yet to see the sea.

● NAS, BUNKER HILL—By placing an old brake drum in the body of a ½-ton truck, this station, at very little expense, has devised a tow truck to haul disabled aircraft off the landing mat. Most stations have experienced trouble of this sort, encountered when a student fails to keep his engine running on landing and subsequent attempts fail to get it started immediately.

Included in the rig is a dolly which can be placed under flat tires caused by ground loops. It permits wheel to be placed on dolly, secured, then rapidly moved off mat.

(Photographs and plans supplied on request)

● NATC, CORPUS CHRISTI—A free-for-all fishing derby, sponsored by the Physical Training Department and a Corpus Christi newspaper, attracted considerable interest at the station. It was held on three consecutive Sundays. The derby was opened to all enlisted personnel of NATC and it was divided into three sections.

● NAS, NORMAN—In an effort to improve weather meteorological facilities, a plan was devised for covering local weather conditions through a staff of 160 volunteer observers within a 100 air-mile radius of the station. Under this plan field men would report high winds, tornadoes, hail storms or sleet in their communities. This auxiliary service was brought to the attention of the director of the regional U. S. Weather Bureau at Dallas, and it was incorporated in the Bureau's activity.

Under the Weather Bureau's sponsorship, the system will offer the greatest benefits to the largest number of air fields. As the plan is now set up, volunteer observers will contact the Oklahoma City bureau, which will relay all warnings to a score of activities.

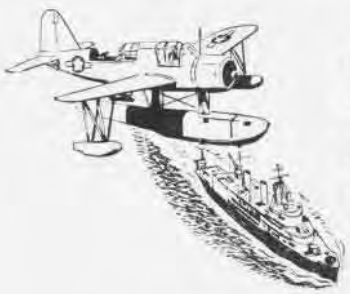
● NATC, PENSACOLA—Out of 4,856 flight students undergoing low pressure chamber tests up to 30,000 ft. during a period of three months, it has been revealed that only 1.8 per cent were physically unable to go the full route.

During the same period, 3,943 students were taken to an altitude of 35,000 ft. with only a seven per cent failure. The higher percentage of failures in the 35,000-ft. hop is easily noted because of the additional hazards.

In the initial test, given the first week the student comes aboard, the men go up to an altitude of 18,000 ft. before donning the oxygen mask. Three weeks later, the men come back for the 35,000-ft. test.

## SHOW ME THE WAY TO GO HOME

# Dead Reckoning Problem



You are ordered to depart Geraldton, Lat. 28°-47′ S, Long. 114°-35′ E, and rendezvous with a tender whose approximate position is Lat. 29°-28′ S, Long. 111°-53′ E, 15 minutes before sunrise June 1, 1943. What is the (-) 8 ZT of sunrise at the rendezvous position?

1. **LCT** .....
2. **Long. Corr.** .....
3. **ZT sunrise** .....
4. **ZT rendezvous** .....

What is the course, distance and time of departure to arrive at rendezvous at 0700 assuming a ground speed of 110 knots?

5. **Course** .....
6. **Distance** .....
7. **Time of departure** .....

(Answers on page 29)

# TOKYO TALKS

—TO JAPAN

"We cannot allow our air forces to feel that 'if we had another 200 planes, we wouldn't have let the enemy air forces do what they have just done.' . . . The men at the fronts are saying they would like to have the same amount of planes and ammunition as the enemy. . . . If the enemy has sent 7,000 more extra planes, we must somehow send more than that."

—TO SOUTH PACIFIC

Tokyo radio recently told its listeners that Jap navy units had attacked "the enemy base at Munda" and the "enemy base at Finschhafen." Listeners must have been a little confused, for Tokyo radio has not yet told the Japanese people flatly of the loss of former bases at Munda on New Georgia Island and Lae, Salamaua, and Finschhafen on New Guinea.

—TO AUSTRALIA

U. S. claims regarding achievements of the battleship *South Dakota* in what Tokyo terms "the third Battle of the Solomons" are refuted. "The 32 planes the *South Dakota* is supposed to have shot down actually were lost in crash dives into enemy objectives."

—TO ARGENTINA

Iwataro Uchiyama, former Minister of Japan to Argentina, speaking in Spanish, makes excuses for the Pearl Harbor attack and says, "I have reason to believe that you, the Latin American people, continue to be our friends. We are not at all interested in the South American countries being involved in this war, not having the slightest hostile feeling against them."

—TO ASIA

A broadcaster declared recently that the Emperor of Japan was entitled to be "Emperor of the World" under the Japanese jingoistic principle of "Hakko Ichiu," which is translated as "Eight Corners Under One Roof." The broadcaster explained that under this principle the Emperor, whom the Japs consider to be a direct descendant of the Sun Goddess Amaterasu, was authorized to extend the rule of "peace and happiness" to the entire world. "To have the 'Eight Corners' liberated is the traditional desire of each Emperor of Japan. Hence, judging from its principle, the Emperor of Japan has the entire world as his dwelling. His majesty takes entire responsibility."

—TO JAPAN

The Japanese, who last December devoted a full week to celebrating the first anniversary of the attack on Pearl Harbor, will hold no "formal functions" on the anniversary this year "in view of the importance of the war situation." Under this restriction, it was explained, the "Dai Nippon Grass-Cutting Contest" was cancelled.

# 25 YEARS AGO
## THIS MONTH

### Naval Aviation December 1918

*Dec. 6*–The Day-Wing (Marines) sailed from St. Nazaire, France, for the United States.

*Dec. 12*–Plane piloted by Lt. A. W. Redfield released from C type non-rigid piloted by Lt. George Crompton from an altitude of 3,000 ft. over Rockaway Beach, Long Island.

*Dec. 20*–Day-Wing Northern Bombing Group (Marines) arrived in Norfolk from France on the U.S.S. *Mercury*. Landed at Newport News on the following day.

*Dec. 24*–Ensign T. E. Mayhem, USNR, established new endurance record for Navy non-rigids engined by Curtiss OX. Time: 40 hours, 48 minutes.

*Dec. 30*–Lt. T. C. Rodman, USNRF, competed for the Curtiss Marine Trophy awarded to contestant covering greatest mileage in 10 consecutive hours of flight. Weather was unfavorable with low lying clouds and unsteady air conditions. Flight started at 6:50 a.m. and proceeded continuously until 4:02 p.m. with the exception of one landing for gasoline. Cross winds from 24 to 28 mph lessened ground speed. Actual mileage covered was 581 nautical miles.

According to rules of contest, additional credits of mileage were allowed for extra passengers, and therefore gross mileage covered amounted to 842 nautical miles or 970 statute miles. The flight was made in an H-16, A-3481. Eleven passengers were carried besides the pilot. The prize was officially awarded to Lt. T. C. Rodman, USNRF, by the Aero Club of America.

RODMAN FLEW 970 MILES TO WIN THIS TROPHY

*1918 Statistics:* The Naval Air Station at Pensacola flew a total of 37,000 hrs. during the year. One hundred and forty-eight crashes resulted–one every 250 hours, a completely wrecked plane every 1,208 and a fatality every 3,152.

NAVAL AIR STATION AT PENSACOLA IN 1918 HARDLY IN CLASS WITH TODAY'S BIG ESTABLISHMENT

## Power Plant Data Issued

### *New Bulletins Distributed*

To facilitate distribution of information on aircraft power plant accessories, several new series of bulletins are being issued under the title "Power Plant Accessories," with the following subtitles:

STARTERS • STARTING SYSTEM ACCESSORIES (*other than starters*) • FUEL PUMPS • AIR (*vacuum*) SYSTEM ACCESSORIES • FUEL SYSTEM ACCESSORIES (*other than pumps*) • LUBRICATING SYSTEM ACCESSORIES • HYDRAULIC PUMPS (*Engine-driven types only*) • TURBO-SUPERCHARGERS • MISCELLANEOUS ACCESSORIES.

The bulletins will be designated by the above titles (excluding italicized portions in parentheses) and each series will be numbered chronologically, for example: *Power Plant Accessories, Hydraulic Pump Bulletin 1-43*. The form used for the bulletins will be similar to that now used for engine bulletins.

## Navy Planes, Sub Battle

### *U-Boat Sunk After 10 Hours*

New, heavily armed U-boats are proving tough foes in surface combat, six Navy planes, a blimp and an Army B-18 battling for 10 hours recently before sinking one in the Caribbean. One Navy *Mariner* was shot down in the battle, two others damaged considerably, and the blimp lost when it ran out of fuel on its way back to the base.

The first Navy plane to sight the sub damaged it so that it could not submerge, but was shot down in the fight. For 10 hours the U-boat fought it out with its deck guns, taking bomb after bomb from the attacking planes which dropped flares as night drew on.

At 11 p.m. a *Mariner* finally finished off the sub. A destroyer which arrived early in the morning picked up 40 Germans. They reported the first attack crippled it and subsequent attacks finally flooded the U-boat so badly it sank.

## Carriers to Get More Jeeps

### *Tractor Quota Also Increased*

Based on recent requests from the fleet, allowances of tractors and jeeps for aircraft carriers, which are supplied by BuAer, have been increased. Henceforth the CV's will be allowed seven tractors and four jeeps, the CVL's four tractors and two jeeps and escort carriers three tractors and two jeeps. The previous allotments were five tractors and three jeeps for CV's, and two tractors and one jeep for the other two types of ship. Combat experience indicated need for greater numbers.

# THE DEATH OF MAVIS

1

MORTALLY WOUNDED BY THE BLAZING GUNS OF A PB4Y, THE JAP MAVIS LEAVES A TRAIL OF SMOKE BEHIND AS SHE GOES INTO A SHALLOW DIVE

IN THIS series of pictures, the destruction of a Japanese *Mavis* flying boat is graphically shown. The action took place north of Kavieng on New Ireland Island last August when the enemy plane encountered a PB4Y on a snooper mission. But *Mavis* was no match for the heavy fire power of the Navy *Liberator* and before she could get out of range of the .50 caliber machine guns trained on her, crippling blows had been inflicted. The story of what happened afterward is told photographically.

2 **WING TIP** with Jap markings plainly visible is sheared off in violent explosion as plane enters cloud layer

3 **FLAMES** break out as Mavis heads down, hopelessly out of control

4 **SMOKE** traces graceful spiral as flying boat falls toward the sea

5 **SPLASH** marks point of contact as Mavis sinks beneath the surface

# WINTER DRAWS ON

## THE 'SPANDULES' ARE FEATURED IN ARMY AIR FORCES BOOKLET

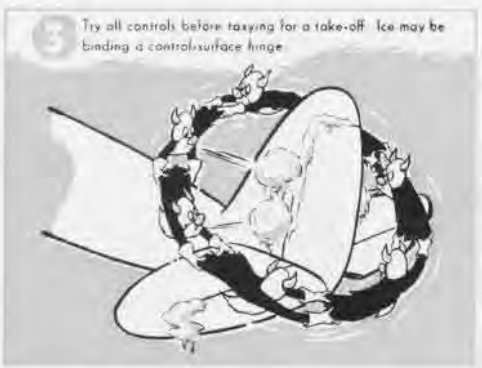
[ILLUSTRATIONS ON THESE PAGES ARE COPYRIGHTED 1943 BY WALT DISNEY PRODUCTIONS]

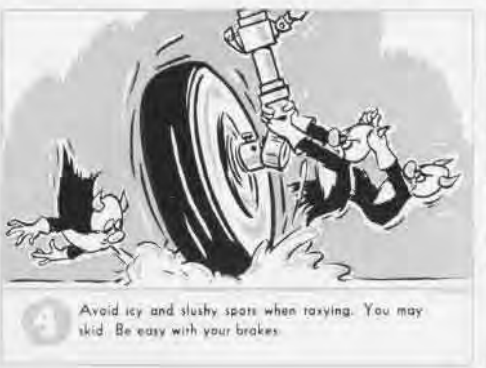
WINTER DRAWS ON is a booklet published by Army Air Forces to introduce the SPANDULE, a close relative of the gremlin. Walt Disney did the illustrations, which are shown on these pages. These little fellows inhabit the air space above 30,000 feet except in the wintertime, when they come down lower and have been known to play around on the ground.

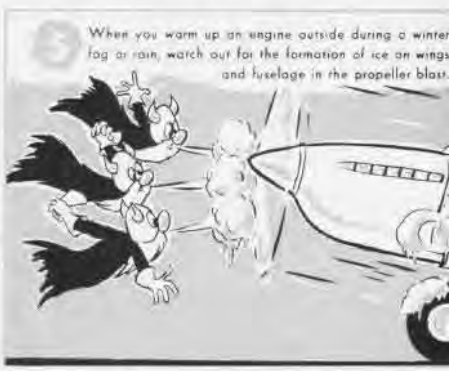
Whenever an airplane enters their domain they pounce aboard. They like to test a guy out. If he is on his toes they probably won't bother much; but if he looks sound asleep or a little thick between the ears, they are almost sure to plaster his wings with ice, load down his propeller, do tricks that can be real serious.

*Winter Draws On* is a project of the Office of Flying Safety, Safety Education Division, Army Air Forces Headquarters.

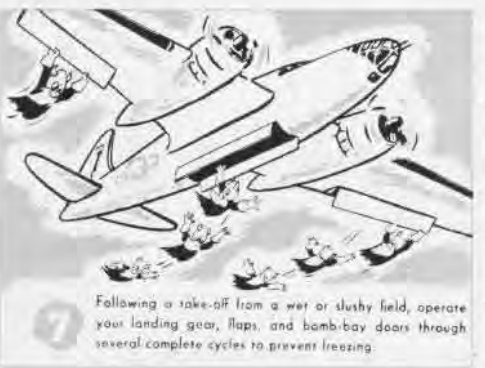




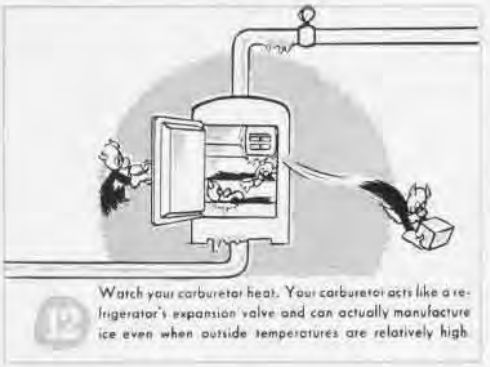





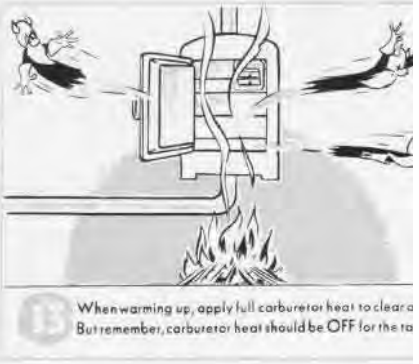





11 Cumulus clouds are dangerous in winter at low altitudes. Glaze ice may form if you fly through them.



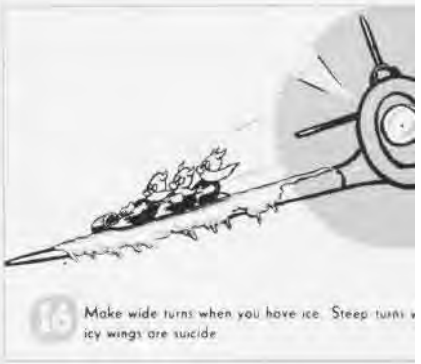
12 Watch your carburetor heat. Your carburetor acts like a refrigerator's expansion valve and can actually manufacture ice even when outside temperatures are relatively high.



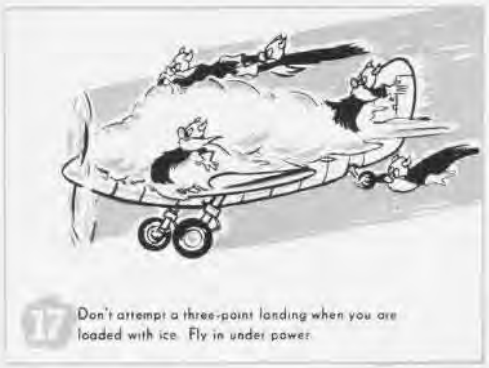
13 When warming up, apply full carburetor heat to clear a But remember, carburetor heat should be OFF for the ta

14 Watch your airspeed. Don't try to climb too fast with a load of ice. A plane's stalling speed increases when ice forms.

15 Check your wing de-icers. If the ice is not coming off cleanly it is better to run them intermittently.

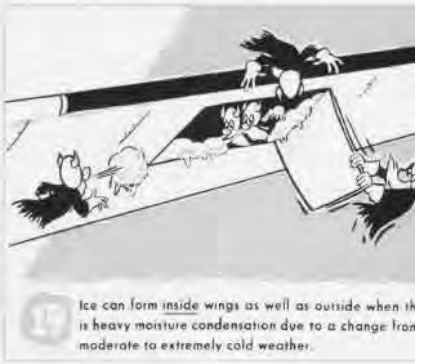


16 Make wide turns when you have ice. Steep turns icy wings are suicide.



17 Don't attempt a three-point landing when you are loaded with ice. Fly in under power.

18 Don't land with your wing de-icers on. They will act as "spoilers."



19 Ice can form inside wings as well as outside when th is heavy moisture condensation due to a change fro moderate to extremely cold weather.

## COLD WEATHER NOTES

WING AND fuselage ice can form at any temperature below 32° F, and has been known to form at temperatures as high as 40° F. Heaviest wing and fuselage icing usually occurs in the temperature range between 15° and 32° F.

Carburetors, on the other hand, can ice when the outside temperature is as high as 80° or 90°. A carburetor functions a great deal like the expansion valve in a mechanical refrigerator, and a temperature difference of as much as 50° may exist between the outside air temperature and carburetor temperature. Make sure that carburetor heat is available if needed, even in summer.

Water condensation in cold weather can seal fuel tank air vents by freezing them shut. If the vents are closed, no fuel can flow from the tanks.

During extremely cold weather, condensation of moisture in oil and fuel tanks requires frequent draining of the pumps.

Moisture also forms quickly on spark plugs during cold starts. If three or four starting attempts are unsuccessful, remove one plug from each cylinder and heat them until they are just comfortably warm to the hand.

When there has been a light blowing snow, wings and fuselage sections in the vicinity of any openings should be inspected before take-off for accumulated snow. Light snow can sift in through the smallest openings.

Temperature inversions are common occurrences during the winter. The air near the ground may be 80° F colder than the air at an altitude. Watch out for excessive engine cooling when letting down. Regulate the shutters to maintain proper engine heat.

When a plane is parked on cold nights, a hatch or some other opening should be left open to allow a free circulation of air and prevent the windshield and windows from frosting over.

Brakes should be left "OFF" on parked airplanes to prevent them from locking due to ice that is formed by condensation.

20 Before approaching for a landing, make sure ice is jamming the carburetor butterfly valve. Test by mo your throttle back and forth several times.

## COLD WEATHER HEALTH

FATS AND sugar are heat-producing foods. Eat more of them during the cold months. Get as much exercise as your flying schedule will allow. Winter exercise is even more important than summer exercise. Remember to watch your ears, nose and throat.

# COLLECTING SOUVENIRS

## New Navy and Customs Rules Tighten Control Over Sending Explosives from Battle Areas

MARINES CAPTURED THIS JAPANESE 7.7 MM. MACHINE GUN ON GUADALCANAL; GI

THE U. S. mails have been so full of hand grenades, Jap battle flags, shell fragments and pieces of *Zero* wreckage that the Navy, together with the Treasury Department's Bureau of Customs, has issued orders clamping down on the practice.

Not that the Navy does not want its men on battlefronts to have souvenirs of their combat experiences! But too much valuable, and sometimes dangerous, enemy equipment is being sent to the folks back home. Often it is matériel the Navy would like to get its hands on for test and analysis.

Under the new set-up, naval personnel can bring back or send back small items of enemy equipment excepting name plates, items which contain any explosives and other objects whose usefulness to the service or whose importance as critical matériel outweighs their value as trophies, as determined by the commanders of various theaters of operation.

They may mail to friends or relatives in the United States small items of enemy equipment excepting the articles listed above, inflammables, and firearms capable of being concealed on the person. The ban on explosives had to be put in because too many grenades, shells and guns were flowing back from battlefronts, sometimes endangering lives of those who had to deliver them, as well as the recipients.

Previous orders have been issued covering general procedure to be followed with reference to return of enemy equipment, but the question of disposition of souvenir items never has been completely outlined. Such equipment now is seized by customs authorities at ports of entry and turned over to district intelligence officers for final disposition, thus depriving many owners of items they prize highly.

The flow of enemy matériel via these channels is rapidly increasing, but in view of the morale factor involved, confiscation of all souvenirs is not considered wholly desirable. To facilitate the sending of souvenirs, the Navy has set up a system whereby those in the field can send or bring them back.

A Navy man coming back to the United States with such items in his possession must have a certificate in duplicate signed by his commanding officer stating that he is officially authorized by the theater commander to retain the articles.

He will surrender the copy of this certificate to the customs officers at the port of entry at the time he declares


JAP OCCUPATION MONEY IS POPULAR SOUVENIR

INTELLIGENCE WANTS DIALS OF RADIO SETS

MAJ. ROOSEVELT WITH JAP FLAG FROM MAKIN

VANDEGRIFT GAVE IT TO ADMIRAL HALSEY, WHO IN TURN GAVE IT TO NAVAL ACADEMY AT ANNAPOLIS

or enters the souvenirs. All parcels containing captured enemy matériel mailed from overseas also will contain a certificate in duplicate signed by the commanding officer stating that the sender is officially authorized to mail the articles listed. Arrangements have been made with the Bureau of Customs to accept the signed certificate as evidence that the articles are the personal property of the sender. If he is mailing it as a gift rather than to himself at his home address, he also will need a certificate saying that it is a bona fide gift.

UNDER this arrangement, naval personnel can keep souvenirs having proper clearance certificates, while those mailed from abroad also containing such certificates will be mailed immediately to their destination. Even souvenirs which are confiscated by the authorities for examination may be returned to owners after the war provided they were not destroyed in making the analysis.

Naval authorities who drafted the new rules stated that no official list of approved or disapproved souvenirs could be released because the list would vary from week to week. The Navy, for instance, might want samples of a certain kind of Japanese equipment for testing or training use. As long as this want is unfilled, no souvenirs of that type will be permitted to be sent out of the battle areas. The final judge is the theater commander and the unit's commanding officer.

Periodic tests are made of enemy equipment to see if the quality of materials used in it has deteriorated or if any improvements in design have been effected. This necessary data could not be gathered if all new pieces of equipment were sent home for souvenirs and none turned in for analysis. Effects of sea blockades can be determined sometimes by watching closely what materials the enemy is using to manufacture battle equipment.

A nameplate from a downed *Zero* may give Navy intelligence new and valuable data on factory locations or plane types. An enemy uniform or shoes may reveal that the country's supply of a certain material is low and a substitute was being used. Wrecked *Zeros* or tanks can be analyzed by technical intelligence experts who seek the latest information on what the foe is doing to improve his fighting weapons. Enemy documents may contain worthwhile data on his future plans.

The nameplate of radio equipment may reveal which companies are making it, information that later may be valuable to bombing planes raiding the enemy country to hit those factories.

Large pieces of equipment have salvage value as scrap. Machine guns and rifles usually are too bulky for good souvenirs but battle areas yield many interesting gadgets to collectors—some with booby traps attached which promptly kill the souvenir hunter.

The urge to collect souvenirs is strong, even when the enemy equipment is large. Early in the war a Jap *Zero* was shot down almost intact. It was shipped to a rear base in Australia for analysis and study, but by the time it arrived souvenir hunters had reduced it almost to its framework and it was almost valueless for intelligence uses.

FLAGS are coveted, as witness a recent story from the South Pacific about the Marine colonel who paid $35 for a fine Japanese war flag. Weeks later a couple of Jap interpreters happened to inspect the flag and were startled to read on its face such Japanese phrases as HANDLE WITH CARE, FRAGILE, and MADE IN YOKAHOMA. Investigation revealed that the Seabee who sold it to the colonel had made the flag himself and copied the Jap writing off some nearby boxes. The officer is still hunting the Seabee.

JAPS and Germans know the weakness of Americans for souvenirs and have sprinkled booby traps liberally around places being evacuated, hoping to kill a few of the incautious invaders. Helmets, lugers, watches, flags and grenades are popular "bait." Reports from Italy and the South Pacific tell of the daily toll these traps take of Americans.

One confirmed souvenir hunter with a grim sense of humor brought back three Japanese skulls, mementoes most fighters probably would hardly care to put on the family mantel. Occasionally a wounded man returning from a battle zone may bring with him bits of shrapnel or bullets taken from his anatomy by the doctor. Such enemy ordnance probably will not be confiscated by customs officers.

One youth sent his mother a live hand grenade. For her protection, he sent along a letter advising her not to put it on a shelf "because it might fall off and kill someone." Customs authorities saved her the trouble in advance by intercepting the deadly present.

JAP MARINE FLAG, GAS MASK SOUVENIRS

PATUXENT AIRCRAFT LABORATORY DRAFTS CAMOUFLAGE SCHEMES AFTER VIEWING MODEL AIRPLANES PAINTED IN VARIOUS COLORS AND SHADINGS

# AIRCRAFT CAMOUFLAGE

An American aviator returned from a photographic reconnaissance mission over the Japanese-held Bougainville area and reported that he had completed his trip without seeing an enemy aircraft. When his films were developed, however, close inspection of one photograph showed three Jap *Zeros* flying about a thousand feet below his airplane.

His failure to see the enemy might have been caused by carelessness. Probably it was caused by an effective camouflage of the *Zeros*' upper surfaces which made them hard to detect over jungle-covered Bougainville terrain.

Today most aircraft camouflage is low-visibility type like that on the *Zeros*. This type reduces visibility of aircraft against normal sky, sea and land backgrounds. Visibility of aircraft is measured in terms of the greatest distance at which they can be seen. The purpose of all low-visibility camouflage is to bring this distance down to a minimum. In any specific case the particular nature of the mission and of operating conditions have to be taken into account. If the mission depends on surprising the enemy, low-visibility camouflage acquires a high value.

The Navy's Aircraft Camouflage Section was established in the Bureau of Aeronautics in the late summer of 1942. To coordinate development of both design and material aspects of aircraft camouflage, this section was placed in the Equipment and Materials Branch of BuAer's Engineering Division. Liaison is maintained with all other cognizant sections of the Bureau and of the Bureaus of Ships and Yards and Docks. Close contact is maintained also with the Army, RAF, and many scientific agencies, civil and military, which contribute to the science of seeing.

The section's field laboratory is at NAS, Patuxent River, where for administrative purposes it is assigned to the Aircraft Experimental and Development Squadron.

Colors and designs used on naval aircraft are first studied and developed there, under varying visibility conditions of natural illumination and background. There also are developed methods of camouflage painting that least interfere with the aerodynamic efficiency of aircraft surfaces and performance of the aircraft itself. Officers and enlisted men assigned to this work have all had previous training in the fields of art and science.

Because there was nothing available suited for the laboratory's use, however, it has had to build some of the more important items of its equipment. Among these are a rotating viewing stand for model observation and a viewing protractor designed mainly for use in flight.

Present installations include a drafting room and a workroom, paint spraying machinery, instruments for measuring light and gloss, and a stock of paints and lacquers. For use in flight observation and in full-scale experiments, the laboratory has assigned two SNJ airplanes.

The station has a good location. Water lies around it and there are sea, sky, and open country for backgrounds. There is hangar space for work indoors and for the painting of aircraft. For the outdoor observation of models and of aircraft in flight an observation post has been set up at the tip of Cedar Point. On an island off the point, the laboratory has the use of an old lighthouse which had been abandoned and had been taken over by bats.

On first thought it might seem a simple task to camouflage an airplane so that it is hard to see. On second thought it might seem impossible to do this. The truth of the matter lies somewhere between. Generally, the more varied the conditions under which an airplane has to operate, the more of a compromise its camouflage must be. What would do well over the jungle and under a tropical sky

EARLY BOEING FLYING FORTRESS WITH PATTERN TYPE CAMOUFLAGE

may do poorly over glaciers and under a gray overcast.

Obviously the number one tenet of low-visibility aircraft camouflage is to make the aircraft as nearly as possible the same color and brightness as the backgrounds against which it is to be seen. Nature has its familiar examples of animals protected by a color which matches their normal background. A zebra's stripes blend into shrub and shadow of its habitat. The scale pattern of the desert rattlesnake is lost against rock and sand. And the chameleon, by special endowment, can change its color to suit its surroundings.

An airplane in flight is an extremely mobile object. Since it may be seen from any side, the potential variations in its background are almost limitless. Obviously no single scheme can cut down its visibility under all these conditions, nor can the airplane change its color as a chameleon does. Compromises to meet average operating conditions have to be made.

Camouflage for maximum concealment against both sea and sky is not always necessary. When camouflage for only one of these backgrounds is required, it can be made the more effective. If, for example, the principal enemy opposition or observation is from the land or water surface, only camouflage for sky background is needed. Such sky camouflage for aircraft is found in the light schemes developed by the Aircraft Camouflage Laboratory and now being used for anti-submarine operations. News stories from the South Pacific say that some *Zeros* are painted a muddy brown all over. This seems to show that the Japs are trying to hide them on the ground only.

ZEBRAS' STRIPES SHOW NATURAL CAMOUFLAGE, BLENDING WITH HABITAT

# NEW PAINT SCHEMES HELP HIDE AIRCRAFT

ANY OBJECT can be seen because it is big enough, because its color and brightness are different from that of its background, because there is light enough to see it by, because there is enough time to look for it. These are the main factors which determine visibility. Only one of them can be controlled to any extent in the effort to reduce the visibility of aircraft. That factor is contrast with the color and brightness of the background.

Reduction can be effected in two ways. The first is by coloring the aircraft like the average background against which it has to operate. The second is by using tactics that will take the best advantage of that camouflage. Some sections of the sky, for example, will allow a much nearer approach to an enemy—or a much quicker evasion, if necessary—than others, because they fit better with the scheme. Tactics should be used which take advantage of this fact.

Under uniformly overcast conditions an airplane will be about equally visible in all directions. On a sunny day, or when there is a dominant light from one direction, visibility changes widely with differences in attitude of the airplane and with its position in the sky relative to observer and to light source. Changes in relative altitudes of sun, aircraft, and observer also greatly influence the amount of contrast with background and consequent visibility.

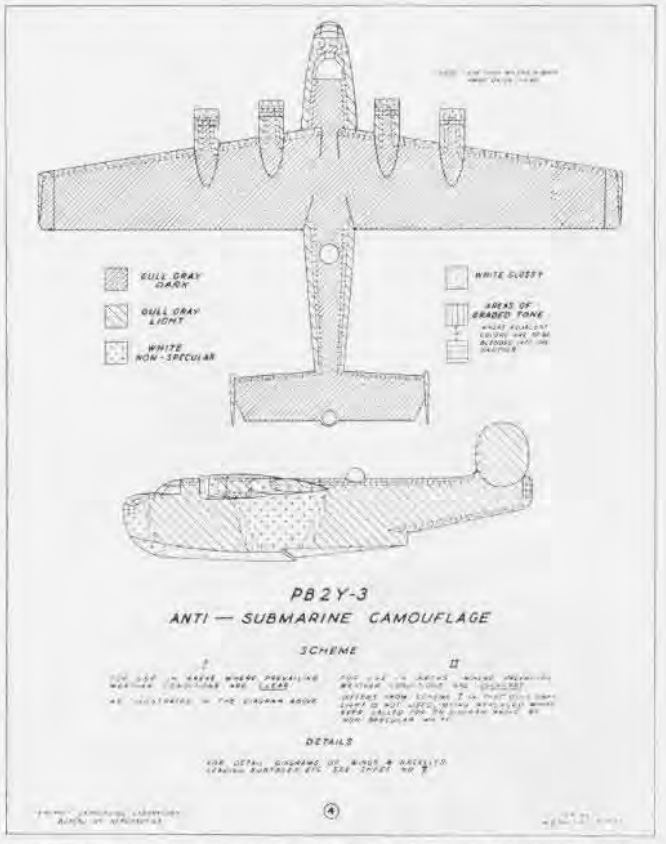
There are two large and radically different kinds of backgrounds against which aircraft can be seen. These are sky, and land or sea. Sky background usually is so bright that up to an altitude of about 15,000 feet the underside of even a white object appears dark when seen against it. For this reason, undersides of most Navy aircraft are painted white. Land and sea, when viewed vertically, are very dark. Upper surfaces of Navy aircraft are painted dark to match sea and land when seen from above.

Ultimate effectiveness of aircraft camouflage depends on its tactical use for the purpose intended and under the conditions for which it is designed. The more specific the purpose and the conditions, the less effective will be that camouflage if not so used. Certain aircraft are painted black and intended for night operations. Used in the daytime, they would have highest possible visibility.

NAVY AIRCRAFT now are being camouflaged for low visibility against sky, sea, and carrier deck. In the first World War, however, camouflage used on aircraft, and also that on ships, was of high-visibility type. The main attempt then was not to conceal, but rather, by use of bold patterns of contrasting colors, to confuse the enemy as to the airplane's distance, direction and speed of movement, type and identity. Huge zigzags were painted on sides of ships and on wings and fuselages of airplanes. A checkerboard pattern was laid on some early Navy fighters and is being used in Italy today on some planes to aid recognition.

Between World Wars I and II emphasis shifted, in both ships and aircraft camouflage, from high- to low-visibility type. On aircraft, patterns were still used, but colors were not sharp in contrast and were chosen to imitate in character land, sea, or sky. The British, and the U. S. Army to some extent, still use such patterned low-visibility schemes.

Shortly before the present war started, the Navy began using aircraft camouflage of the low-visibility type, without pattern. The current countershaded and countershadowed basic camouflage is of this type. Navy's lighter anti-submarine schemes are also of the low-visibility type. As their name implies, they are intended not for general use but for a specific purpose and for definite operating conditions.




PATUXENT LAB DRAWS UP ANTI-SUBMARINE CAMOUFLAGE PLAN FOR PB2Y3


PHOTOS OF MODELS PAINTED IN CORRECT PLAN SENT OUT TO SQUADRONS

# HOW CAMOUFLAGE SCHEME IS CREATED

1 **PAPER** work first step in drafting camouflage scheme at Patuxent

2 **MODEL** planes of wood are painted with laboratory spray gun

3 **REFLECTION** power of paint surface is measured by this device

4 **VIEWING** circle shows up good points of each scheme as officers inspect models painted in various hues

5 **PAINT** scheme then applied to aircraft for more tests after scheme is tried out on paper and on models

6 **ACTUAL** planes painted in scheme studied while flying to test visibility from all sides and angles

7 **DIFFERENT** paint jobs show up strong points in flight; eyes and cameras gauge effectiveness by plane flight

**JAP ZERO** when captured in Aleutians had overall gray as paint job; here it changes spots to U. S. Navy camouflage

**GERMAN** Messerschmitt 110, with captured markings, showing upper and lower camouflage, with sharp side dividing line

# CAMOUFLAGE VARIES WITH WAR THEATER

ALLIED aircraft are not the only ones with low-visibility camouflage to fit particular operating conditions. Japanese airplanes have been found both in the Aleutians and in the South Pacific specially camouflaged for low visibility in these areas. German aircraft follow the same general schemes as the Allies, but most are camouflaged to operate over forest and desert areas.

How is an aircraft camouflage decided? The first questions to be answered are ones like these: What type or types of aircraft are to be considered? In what weather conditions will they operate? Will they operate on night or day missions? What kind of enemy opposition are they apt to encounter? Where will they be based?

Schemes of camouflage are first laid out on paper. Small-scale models of the aircraft are then painted with the schemes proposed. The models are rigged for preliminary observation in a viewing frame at Cedar Point where the background is open sky, sea, and low-lying land.


The headings and attitudes of the model aircraft can be adjusted. The frame swings on a central pivot and models can be studied at all relative bearings with the sun, at all altitudes of the sun, and at all angles of view. The observation record is made and the proposed schemes are rated for relative visibility.

BUT STUDY of models in a viewing frame is not a final test. It can help to refine some schemes of camouflage and it can help to eliminate others. However, the look of actual aircraft at a distance through the atmosphere cannot be safely judged by the appearance of models. Proposed schemes are applied to aircraft and these are studied in flight.

Certain kinds of problems cannot be given preliminary study with models. One of these is the problem of visibility at high altitudes. Conditions of the air and of the backgrounds above 15,000 feet cannot be simulated at sea level.

Besides working on development of large schemes of camouflage, the laboratory has to take up many problems which, though of smaller scale, are important in the visibility of naval aircraft.

The dark bull's-eye of an engine cowling tends to make an airplane in head-on attitude more easily seen. It was found that this could be helped by white paint on the inner portion of the propeller blades. Rough surface was noticed on many aircraft where dark and light colors were blended. Ways had to be found to smooth these and remove a possible detriment to performance.

There was trouble in some theaters of operation from the white circle of insignia and its inscribed blue star. Field range tests were taken up at the laboratory. The star and bar scheme was finally proposed because it resolved at a distance to the shape of a single bar, distinguishable from insignia of enemies and distinguishable at ranges close to those at which the airplane itself can be seen clearly. Sometimes recognition is such a problem the entire tail surface has been painted a checkerboard pattern.

Shore establishments may be completely hidden by ingenious camouflage, but the invisible airplane is still a schoolboy's dream. These machines moving against the sky or across sea and land cannot be concealed. They are always more or less visible. The work of aircraft camouflage is to make them somewhat harder to see, to make them come into sight later, and go out of sight sooner. The work of aviators is to take advantage of the color of their skin and fly from the best hiding place over the sea or under the sky.

# PLANE'S JOB GOVERNS CAMOUFLAGE SCHEME

BEFORE an accurate camouflage can be worked out for a plane, the theater in which it will operate must be known. A night fighter obviously would be painted differently from an anti-submarine aircraft, while one operating over green jungles would need a different topside paint job from one which will fly over brown desert or snow.

**LOCKHEED PV-3,** painted in anti-submarine scheme, shows how light tone blends with snow beneath it

**BEAUFIGHTER** carries brunt of Britain's fighting at night so is painted jet black to cut down on its visibility

# BE A GAS MISER

## . . . and stay DRY!

GAS IS LIFEBLOOD *to planes taking off to make a strike. By sudden unexpected events, tanks are quickly drained—chance enemy skirmishes, deck crashes that keep other planes upstairs, slips in navigation. Below, NAOTC Jacksonville cautions student pilots on the wisdom of hoarding gas and urges maximum endurance by economizing on use of the precious "yellow gold."*

•

BEING A MISER with your fuel probably doesn't mean much to you while you're still in the States. But it's a long way between filling stations at sea, and the water is plenty wet, deep, and salty in between. So, when you get to the Fleet and start operating from a carrier, or from some South Pacific island, the gasoline in your tank is going to be worth more to you than gold, platinum and diamonds all put together.

If you're smart, you'll learn how to get the most miles, or the most hours, out of your slender supply of fuel the easy way—before a dunking startles you into realizing that HIGH RPM and AUTO RICH MAKE DILBERT. . . .

When you're operating from a carrier, or over a jungle, this business of fuel economy is no joke. In the Fleet it's serious. You will be expected to fly your hops without using any more gas than the best man in your flight. This means good formation flying so that you can stay where you belong without pumping your throttle back and forth every few minutes. Also, it means knowing the best practical power settings for your engine for various loading conditions, and for altitudes at which you will be required to operate to maintain required speeds with minimum fuel.

On a combat mission you will have just so many gallons to reach your target, fight at high power, and get back home. And for some peculiar reason most of the targets will be at just about the extreme limit of the operating radius of your plane. When you are actually fighting you may have the throttle against the stop, but it's a cinch you won't have time to worry about the amount of fuel you're burning. You'll burn it fast, all right! Consequently, any time you are in a combat area, or are making a long hop, you'd better play it on the safe side and operate economically while you can.

OF COURSE, all your hops will be scheduled to bring you back with a reasonable margin of safety—say 30 to 40 gallons to spare. But things happen every now and then. You may make a slip in navigation. Or there may be a deck crash that will keep you in the landing circle for an extra half hour. Or, as happened to one squadron, just about the time you get in the groove to come aboard, a flock of Jap dive bombers and torpedo planes may come in to work the carrier over. You may have been patting yourself on the back because you still have 20 gallons left, but if you have to fight with it, or, if your ammunition is gone and you have to fly off 10 or 15 miles and sweat it out until the attack is over, that 20 gallons will disappear in no time.

ALL THIS adds up to the simple fact that you can never count on being able to land when you expect to. You must always be prepared to fly that unexpected extra hour or fly full power when chasing a "snooper." If you don't hoard your gas like a miser, your chances of getting a dunking and losing a valuable airplane are excellent.

If you are saving, you'll make it your business to learn what *maximum endurance* and *maximum range air speeds* are for your airplane at various loadings. You'll also learn corresponding *power settings* for your plane before you leave the States, where there's plenty of dry land and lots of emergency fields. Learn gas economy the cheap way while you can, before you have to know it—not the expensive way, after it's too late.

# JETTISON THAT HOOD!

FAILURE TO JETTISON *the hood from his plane before making a water landing near a South Pacific island nearly cost a naval aviator his life recently, when his parachute jammed inside the cockpit while he was vainly trying to get loose under water. The following remarks are from his report.*

•

I LANDED in deep water 100 yards offshore. It was a neat landing. I held her off as long as possible and hit the water just as she stalled. The shoulder straps held me like the old rocking chair.

The hood slammed closed just as I had expected it would, but I opened it again quickly, and everything was just dandy except that I was in terror of being strafed. The plane was floating at a 70° angle, with the water about three feet ahead of the cockpit.

As I climbed out I had my left hand on the windshield and my right hand on the hood. After I had my body over the side, the chute caught on the *inside* of the cockpit, and the jar that I felt when it caught knocked my goggles halfway down over my eyes, so that I couldn't see. When I took my right hand away from the hood in order to fix the goggle situation, the hood slammed back between the chute and me. I was hanging on the side of the plane against the leg straps, which, by this time, were so tight that I was unable to get enough slack to enable me to undo the buckle. My back was to the plane, and while I was able to reach the hood control, I didn't have enough leverage to force it open. NOW YOU KNOW WHY YOU SHOULD JETTISON THE HOOD BEFORE MAKING A WATER LANDING!

As the plane began to sink, I looked long and hard at the blue sky, the fluffy white clouds, and the islands on the horizon, took a deep breath of fresh air as we went under and decided, come hell or high water, I was going to free myself. It was easier than I had expected. As soon as we submerged I began to float upwards, releasing the tension on the leg straps, and I was able to get out in a hurry. The Mae West worked well, and I was going hell-bent to the surface when—the damned strap from the boat to the jacket stopped me short! I had quite a time finding the snap which was all mixed up in my shirt tail, but I took my time and finally reached the top. I was blowing and sputtering like a whale.

The empennage of the plane was still above the water and I held on to it until it sank, at which time the chute popped right up beside me. I got the boat out O.K., but had the devil's own time finding the $CO_2$ cylinder, which I expected to find at the bow but which was, in reality, halfway back on the starboard outboard side.

I STRONGLY suggest that you open your boat and jungle pack; get used to them and know them forwards and backwards. Then, too, get some exercise on your off-flying days. I was in such rotten shape and so damned exhausted that when six planes came over, looking just like *Zeros*, I couldn't get up the energy to care whether they strafed me or not. Tired—whew! Instead, I decided to sit still in my boat to see what kind of shots they were. However, they turned out to be P-40's, and certainly were a welcome sight. I got ashore without incident and was picked up by an *LST* that came along four hours later.

## BEST ANSWERS

### XII—Naval History

*Pick the best choice to complete the statements below, then check your answers on page 32.*

1. **Farragut is justly famous for the naval victories he won during the Civil War. He should also be remembered for—**

- ☐ *a*—his advocacy of the monitor
- ☐ *b*—becoming the second admiral of the Navy
- ☐ *c*—his part in the Spanish-American War
- ☐ *d*—the training and example he gave to young naval officers such as Dewey
- ☐ *e*—his work as a diplomat in the Mediterranean

2. **From 1900 to 1917 our Navy successfully backed the diplomatic policy of our country on two notable occasions. These were the—**

- ☐ *a*—sinking of the *Lusitania* (1915) and annexation of Hawaii
- ☐ *b*—difficulties created by the Germans in the Philippines and in Brazil
- ☐ *c*—difficulties created by the Japanese in Hawaii and during the war with Russia
- ☐ *d*—dispute over the Panama Canal and the anti-submarine campaign of 1915
- ☐ *e*—Venezuelan Affair and the anti-American sentiment in Japan, 1907-08

3. **During the first World War, American advocacy of two ideas had an important effect upon the outcome of the anti-submarine struggle. These were—**

- ☐ *a*—the Y-gun and sending battleships to Scapa Flow
- ☐ *b*—air patrols over the North Sea and mounting guns on merchantmen
- ☐ *c*—the convoy system and the North Sea mine barrage
- ☐ *d*—the depth bomb and the Q-boat
- ☐ *e*—fast troop transport and using submarines against submarines

# TECHNICALLY SPEAKING

## Use Tail Wheel Tow Bar

### *Handles Carrier Planes Easily*

A new type of tow bar, easily attached to the tail wheel of carrier based airplanes to facilitate handling, has been devised, originating from the U.S.S. *Yorktown*. Salient features claimed for this device are:

1. Lightness: Easily handled by one man for steering or towing.

2. Simplicity of construction.

3. Low upkeep: No machined working parts.

4. Easily and quickly attached to planes.

5. Tow bar can be used on TBF's and F6F's with the pin through the hollow tail wheel axle and on SBD's by using tail wheel axles with a small extension on either side.

▶ ***BuAER COMMENT*—Judging from the photographs, this design appears to have good possibilities and several similar tow bars will be manufactured for further test on carriers. Although universality for carrier tail wheel aircraft is apparently not achieved in this design, it may prove feasible to adapt it to models other than those indicated.**

Other types of tow bars are undergoing tests and the Bureau is desirous of obtaining reports from carriers on towing practice in order that such information can be coordinated among various activities.

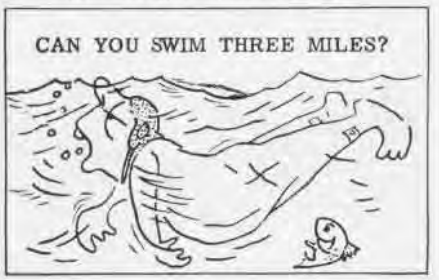

ONE-MAN TOW BAR IS SIMPLE TO CONSTRUCT

*(Succeeds list of October 15, 1943)*

LAST SERVICE AND OBSOLESCENT AIRPLANE BULLETINS AND CHANGES (CONTRACT CHANGES ARE NOT INCLUDED)

*November 15, 1943*

| Airplane | Bulletin | Date | Change | Date |
|---|---|---|---|---|
| BD–2 | 6 | 5–22–43 | 24 | 10–23–43 |
| F4F–3 | 44 | 10–28–43 | 134 | 9–22–43 |
| F4F–3A | 37 | 10–28–43 | 109 | 9–1–43 |
| F4F–4 | 39 | 10–12–43 | 94 | 9–22–43 |
| F4F–7 | 12 | 10–28–43 | 38 | 9–22–43 |
| F6F–3 | 15 | 10–5–43 | 36 | 10–30–43 |
| FM–1 | 20 | 10–12–43 | 39 | 9–22–43 |
| F4U–1 | 23 | 10–28–43 | 76 | 11–1–43 |
| GH–1 | 6 | 5–22–43 | 24 | 10–23–43 |
| JRB–1 | 12 | 10–25–43 | 12 | 4–8–43 |
| JRB–2 | 11 | 10–25–43 | 13 | 4–8–43 |
| JRF–5 | 4 | 7–23–43 | 6 | 10–14–43 |
| N3N–3 | 19 | 10–8–43 | 37 | 3–30–43 |
| N2S–5 | 2 | 9–14–43 | 3 | 9–14–43 |
| N2T–1 | 4 | 10–9–43 | 25 | 10–9–43 |
| OS2U–3 | 51 | 8–25–43 | 62 | 9–9–43 |
| PV–1 | 21 | 10–30–43 | 75 | 10–29–43 |
| PBM–3 | 33 | 11–2–43 | 102 | 11–9–43 |
| PBM–3C | 29 | 11–2–43 | 60 | 11–9–43 |
| PBM–3R | 25 | 11–2–43 | 97 | 11–9–43 |
| PBM–3S | 7 | 11–2–43 | 26 | 11–9–43 |
| PBY–5 | 37 | 10–17–43 | 138 | 9–20–43 |
| PBY–5A | 42 | 10–17–43 | 127 | 9–20–43 |
| PB2Y–3 | 10 | 10–12–43 | 109 | 11–9–43 |
| PB2Y–3R | 10 | 10–12–43 | 92 | 10–29–43 |
| PB4Y–1 | 27 | 10–28–43 | 53 | 10–25–43 |
| R4D–1 | 15 | 10–27–43 | 15 | 10–30–43 |
| R4D–5 | 7 | 10–5–43 | 1 | 8–6–43 |
| R5C–1 | 2 | 10–9–43 | 7 | 10–28–43 |
| R5D–1 | 6 | 9–8–43 | 42 | 10–8–43 |
| SBD–3 | 76 | 9–22–43 | 138 | 10–2–43 |
| SBD–3P | 62 | 9–22–43 | 120 | 10–2–43 |
| SBD–4 | 32 | 10–16–43 | 47 | 10–1–43 |
| SBD–5 | 27 | 10–27–43 | 26 | 10–1–43 |
| SB2A–4 | 7 | 10–18–43 | 82 | 10–22–43 |
| SB2C–1 | 19 | 10–20–43 | 10 | 9–3–43 |
| SNB–1 | 11 | 10–14–43 | 16 | 10–14–43 |
| SNB–2 | 10 | 10–14–43 | 9 | 9–8–43 |
| SNJ–4 | 18 | 7–30–43 | 19 | 10–29–43 |
| SNV–1 | 9 | 11–1–43 | 39 | 10–29–43 |
| SO3C–1 | 27 | 11–2–43 | 6 | 10–5–43 |
| SO3C–2 | 18 | 11–2–43 | 43 | 10–5–43 |
| SO3C–2C | 5 | 10–5–43 | 5 | 8–26–43 |
| SO3C–3 | 3 | 7–23–43 | 2 | 8–18–43 |
| TBF–1 | 75 | 11–3–43 | 152 | 10–13–43 |




## A Portable Laundry Unit

### *Serves 1,000 Men Every Week*

NAVY No. 128—A portable laundry unit capable of serving 1,000 men each week was recently completed by the public works department of this station for use at advanced bases. Mounted on two trailers, the unit is composed of the following equipment:

1 MOUNTED ON T.E.C. 4-WHEEL, 10-TON TRAILER, ELECTRIC BRAKES—One Zephyr washer, size 44" x 48", 125 lbs. wet wash • One Zephyr extractor, size 32" • Two Hammond tumbler driers, model T-36 x 30 • One Columbia boiler, 6 hp with Johnson oil burner No. tip •

One portable Iron Horse pump, model X-52, for drawing water from creeks or rivers for washer water.

II MOUNTED ON POWERS 4-WHEEL, 4-TON TRAILER, ELECTRIC BRAKES—One Bell Gossett booster feed water pump, size 1" (mounted beneath trailer) • One U. S. Motors Corp. gasoline driven generator, 3 phase, 60 cycle, 15 KW, for current to

LAUNDRY PROBLEM LICKED BY MOBILE OUTFIT

operate above machinery, approximately 14 electrical hp • One gasoline tank 12" x 24" x 30" for generator prime mover • One fuel oil tank 12" x 24" x 72" for boiler • One service feed water tank 12" x 24" x 144" • One reserve water tank 12" x 30" x 72". These tanks are mounted about generator. Necessary water, fuel, and power connections with washing unit, together with hose to draw water from nearest available source.

Clothes are dumped in washer, hot water for which has been drawn from boiler; power for revolving washer comes from its own electric motor. Clothes are then placed in electrically driven extractor, next in tumbler driers. Steam for heating driers comes from boiling.

The unit has been tested and proven highly satisfactory for work under conditions for which designed. Drawings are available from this station.

## Carburetor Vise Designed

### *Simplifies Wire Removal*

NAS, MINNEAPOLIS—An economically constructed carburetor vise designed at this station speeds repair operations and makes for higher quality work inasmuch as it frees the operator's hands for loosening or tightening obstinate jets and screws. Mounted close to the edge of the bench, the vise simplifies the job of removing and installing safety wire.

Because the air horn and throttle body mounting flange of most carburetors is square, slotted holding plate permits installations of any size carburetor in either upright or inverted positions by use of carburetor studs or cap screws. After securing carburetor to plate, unit may be assembled or disassembled without removing from plate.

[DESIGNED BY F. F. BURKLEO, AMM2c]

**ANSWERS TO DEAD RECKONING PROBLEM**

| | |
|---|---|
| 1. 0646 | 5. 254 |
| 2. + 32 | 6. 149 |
| 3. 0718 | 7. 0539 |
| 4. 0703 | |

NOTE: Tolerances of two or three miles or two or three degrees from the answers are considered correct.

(See page 13)

**ANSWERS TO MAINTENANCE QUIZ**
on inside back cover

1.2 2.3 3.1 4.2 5.4 6.2

Visual quizzer films are available from BuAer's Special Devices Division. Standard slide film versions may be obtained from Training Films.

## $CO_2$ Purge of Fuel Tanks Guards Against Fire, Explosion

A new method of purging fuel tanks with $CO_2$ gas is described in Technical Order 95-43. When repair of the airplane is required but the work does not involve actual repair to fuel tanks, the following procedure is used to protect against fire or explosion when necessary to bring the plane into the shop.

*1.* Drain tanks completely through drain valve, at lowest point in system.

*2.* Fill tanks slowly with $CO_2$ by placing hose at bottom of tank. When $CO_2$ begins to come out of drain, blank it off. Allow air to escape out vent and filler openings. Since $CO_2$ is heavier than air, the air will be forced out at top. Particular care must be taken to control the pressure within the tank so as not to rupture the tank and it must not exceed one pound at any time during this procedure. Use of a hand valve and an 0.064" orifice in the $CO_2$ inlet line is recommended as a means of keeping the pressure under control. Small tanks may require an 0.040" orifice.

*3.* Take readings on an explosion meter throughout interior of tank. When 100 percent inexplosive readings are obtained throughout, the remainder of this procedure may be carried out.

*4.* Put on filler cap, but do not seal vent openings.

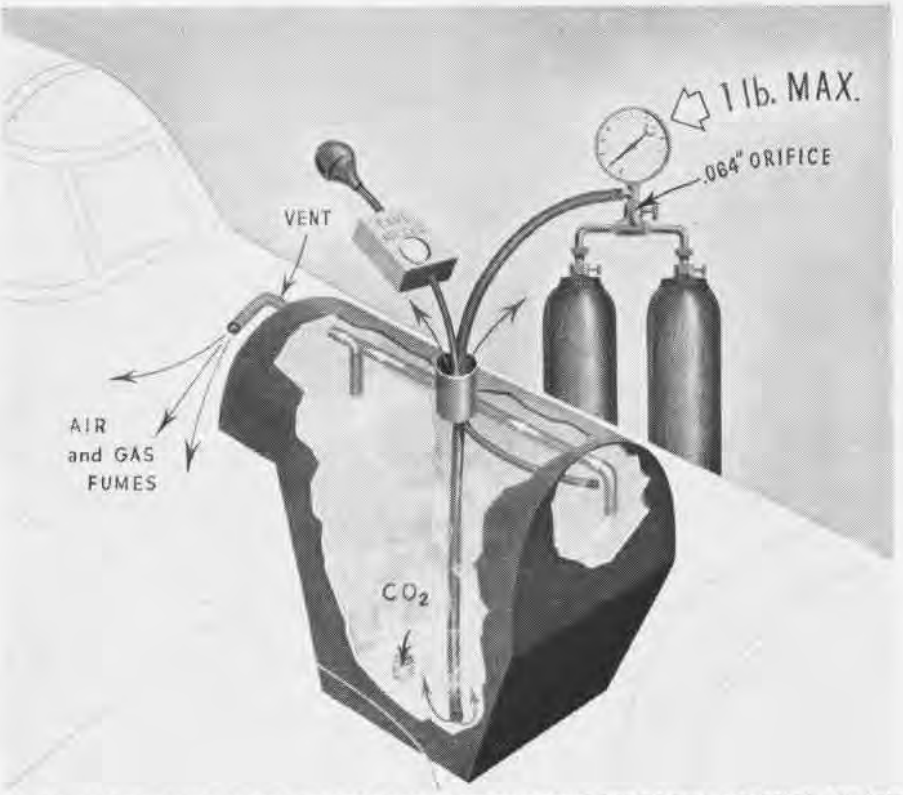
*5.* A red "danger" tag shall be attached to tank until operations *1.* to *4.* above are accomplished, at which time a white inspection tag, bearing date of purging and signature of inspector, shall be added.

*6.* Check tanks every six days with explosion meter. Refill with $CO_2$ if meter indicates necessity and note result of check on white inspection tag.

*7.* $CO_2$ purging will not interfere with recommissioning of airplane. When ready for recommissioning, fueling may be accomplished without further reference to tank.

*8.* This $CO_2$ purging procedure is not used if tanks themselves require any inspection or work in the shop or if lines to tank must be broken for work in shop.

Included also in Technical Order 95-43 are safety rules for preparation of fuel and oil tanks for repair, including metal, droppable, and both self-sealing and non-self-sealing rubber tanks.




CARBON DIOXIDE GAS FLOWING INTO TANK REPLACES EXPLOSIVE MIXTURE OF GAS FUMES AND AIR

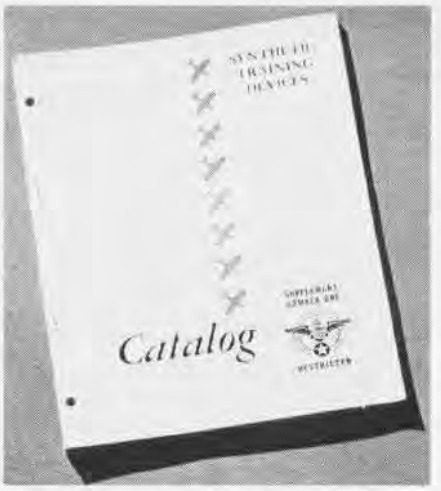
## Chill Chamber in Operation

### *Tests Men's Allergy to Altitude*

NAS, Jacksonville—A new oxygen chamber which simulates temperature conditions at different altitudes is a recent innovation at this station. With the installation of communications gear, the new device, known as a "chill chamber," will be complete.

Station officials say the chamber will be valuable in two ways. First, it will be used to eliminate gunners and operational cadets who are peculiarly sensitive to low temperatures and should not do high altitude flying. The men are taken, in the chamber, to a simulated altitude of 35,000 feet for 50 minutes with a temperature of —45° C. Those who show unusually ill effects are assigned to lower altitude missions.

The second use of the chamber is to indoctrinate pilots and crews in use of electrically heated suits and similar low temperature flying equipment. Numerous accidents have resulted from ignorance of this type of equipment.




COMPREHENSIVE SUPPLEMENT IS DISTRIBUTED TO ACTIVITIES RECEIVING ORIGINAL CATALOG

## Mallets From Plexiglass

### *Metalsmiths Use Up Scraps*

MCAS, El Centro—By using all paralyn and plexiglass scrap pieces on hand, sealing with acetic acid and working to shape on the metal lathe, metalsmiths at this station make their own plastic mallets.

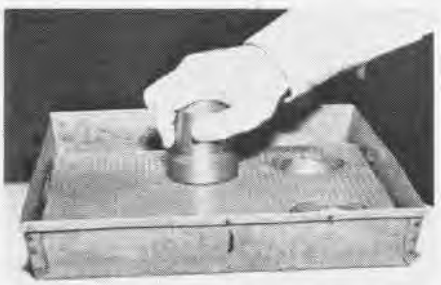
The main point in "welding" the scraps together is to squeeze all air bubbles from between them to insure a strong joint. The 1¼" mallet seems to be most widely used. By turning threads on the end of the block corresponding with those of the mallet body, it is possible to change heads to suit the type of job being done.

The body of the mallet is made of scrap aluminum with threads tapped in each end. Plexiglass works out better than paralyn as it is softer, does not chip or crack so easily, and takes less acetic acid to get an effective weld.

## Civilian Perfects Devices to Aid Auxiliary Overhaul

NAS, Corpus Christi—The following devices for expediting overhaul of Eclipse NEP-1 auxiliary power units have been developed at this station:

*1.* Piston Ring Lapping Tool—Tool was developed to provide a convenient method of reducing thickness of piston rings to give required clearance in ring groove. Prior to use of this tool, a large percentage of auxiliary power unit rings required machining to provide necessary clearance, involving much time in setting up a machine to handle job and in routing rings to and from shop.



METHOD FOR REDUCING THICKNESS OF RINGS

New tool performs lapping operation in one shop, insuring positive fit in short time. Tool consists of a steel holder recessed on its lower surface to hold piston ring by means of its own tension. After ring is inserted in tool, it is lapped to required dimension on surface plate by using crocus or emery cloth as abrasive. 15 man-hours per month are saved.

2. Starting Pulley Installation Tool—Considerable trouble has been encountered in mounting starting pulley on crankshaft due to spring loaded clutch pawls which must be forced into their retracted position before pulley will slip into place.

LEATHER PARTS PROTECTED BY TAPERED TOOL

New installation tool slips over end of engine crankshaft to form a guide and spread clutch pawls during assembly operation. It eliminates danger of damage to starting clutch resulting from prying pawls back by screw driver. Saves 20 man-hours per month.

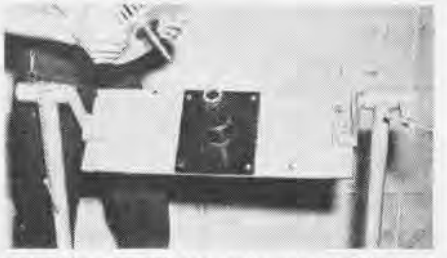
3. Drive Shaft Bearing Removing Tool—Consists of heavy steel base in which are mounted three pins, spaced to match and extend through holes in drive gear where they bear against bearing race. Pulling operation is accomplished simply by placing gear and bearing assembly on tool and forcing bearing off by means of an arbor press. Eliminates danger of damage to shaft, bearing or gear. Saves at least 15 man-hours per month.

IMPROVES OUTPUT

4. Oil Sealing Installation Tool (Oil Pump Drive)—Purpose is to allow installation of oil pump drive shaft oil seal without damage to its delicate parts. Consists of a thimble designed to slip over end of pump drive shaft and bear against shaft shoulder to give a flush surface over which seal may be slipped. The taper incorporated in the tool prevents damage to seal's leather parts, saving about 1 seal per overhaul.

TOOL ELIMINATES DANGER TO STARTING CLUTCH

5. Power Unit Assembly and Disassembly Stand—Device consists of a tilting stand upon which is mounted a holding jig for rear section of auxiliary power unit. Jig, bored and keyed to receive crankshaft end, facilitates disassembly and assembly operation and practically eliminates danger to unit resulting from dropping or rough handling on the bench. Saves 15 to 20 man-hours per month.



JIG, BORED AND KEYED, RECEIVES CRANKSHAFT

(Developed by Jack Beebe)

▶ *BuAER COMMENT*—Items 2, 3, and 4 are new ideas; items 1 and 5 are adaptations of tools used in overhaul of larger units.

## Instructor Speech Better

### *Engine Roar Drowned Orders*

NAS, New Orleans—By teaching flight instructors to speak more plainly above engine roar, the instructors' school at this station believes it has helped cut the number of potential pilots washed out.

If the student cannot hear his instructor's voice plainly above the 130 decibels of sound from the engine, he cannot be expected to learn the things he is being told over the gosport. Consequently, he may make fatal errors.

When the laboratory played back the steel-tape records of instructors' voices, it was found that some were naturally easy to hear above plane noises but the majority ran from average to bad.

INSTRUCTORS "TAKE DICTATION" WITH NOISE

Not until an instructor's voice can be heard clearly and distinctly above the mock plane sounds does he get an okay to teach. Sometimes one high voice will get through the uproar clear as a bell, it was found, while another high voice may be completely absorbed.

INSTRUCTORS HEAR OWN VOICES PLAYED BACK

Some Dixie accents carry better than a sharp New England twang.

Each instructor makes adjustments until he finds his best "plane voice," then gets the feel of it rather than the sound, because sometimes he cannot hear his own words. It also was found there was no connection between ability to hear faint noises in a dead-still room and to distinguish the human voice above a terrific interference. Steps are being taken to simplify and clarify instructors' terminology to prevent confusion with other words they may use.

## Works Masked Inside Blimp

### *Deflation Now May Be Avoided*

New techniques in working inside a helium-filled blimp recently were reported by the Inspector of Naval Aircraft at Akron. By using an oxygen mask with exterior air supply, a worker at blimp factory spent forty minutes inside a blimp, repairing a jammed blocking cord for the superheat meter.

A direct air mask was connected to pressure air line system and flow of air adjusted to suit the man, expelled air being exhausted into the bag. The man found that the mask worked well, no ill effects from the gas being noticeable.

MASK ENABLES MEN TO WORK INSIDE BLIMP

It was suggested that if work is to be lengthy, purity of gas inside can be maintained with a return air line attached to mask, instead of user exhaling in the envelope. Operations should involve two men in the envelope, one to watch the other.

By using the masks, inspection inside the blimp after long periods of service can be maintained, in some instances saving deflation at overhaul. Repair work can be accomplished and photography conducted from the inside of the envelope, it was demonstrated.

## Bearing Greaser Improved

### *Exerts Pressure to Various Sizes*

NAS, Lambert Field—The A&R Department here has improved on a convenient device for greasing bearings. Basically the device is not new. The difference and improvement lie in the conical or beveled interior surface which allows grease pressure to be applied to various sizes of bearings.

*(Succeeds list of October 14, 1943)*

**LATEST NUMBERS OF ENGINE, AUXILIARY POWER PLANT, AND PROPELLER BULLETINS**

*November 15, 1943*

| Engine | Bulletin | Date |
|---|---|---|
| **Pratt & Whitney** | | |
| R-1690 | 200 | 3-15-43 |
| R-1690 | 201 | 7-20-43 |
| R-1690 | 202 | 9-22-43 |
| R-1830 | 336 | Being issued |
| R-1830 | 337 | Being issued |
| R-1830 | 338 | Being issued |
| R-1830 | 339 | Being issued |
| R-1830 | 340 | Being issued |
| R-1830 | 341 | 11-2-43 |
| R-2000 | 46 | Being issued |
| R-2000 | 47 | Being issued |
| R-2000 | 48 | Being issued |
| R-2000 | 49 | 11-2-43 |
| R-2000 | 50 | 11-4-43 |
| R-2800 | 95 | Being issued |
| R-2800 | 96 | Being issued |
| R-2800 | 97 | 10-17-43 |
| R-2800 | 98 | Being issued |
| R-2800 | 99 | Being issued |
| R-2800 | 100 | Being issued |
| R-2800 | 101 | Being issued |
| R-2800 | 102 | 11-4-43 |
| **Wright** | | |
| R-760 | 78 | 9-29-43 |
| R-760 | 79 | 6-10-43 |
| R-760 | 80 | 6-18-43 |
| R-760 | 81 | 9-8-43 |
| R-975 | 18 | 7-29-43 |
| R-975 | 19 | 6-10-43 |
| R-975 | 20 | 6-18-43 |
| R-975 | 21 | 9-8-43 |
| R-2600 | 110 | 10-20-43 |
| R-3350 | 18 | Being issued |
| R-3350 | 19 | 7-8-43 |
| **Continental** | | |
| R-670 | 12 | 9-25-43 |

| Engine | Bulletin | Date |
|---|---|---|
| **Lycoming** | | |
| R-680 | 8 | 10-25-43 |
| R-440 | 1 | 3-13-43 |
| R-449 | 2 | 8-13-43 |

| Auxiliary Power Plant Bulletin | Date |
|---|---|
| 2 | Being issued |
| 3 | 8-26-43 |
| 4 | 8-15-43 |
| 5 | Being issued |
| 6 | 11-1-43 |
| 7 | 11-2-43 |
| 8 | 10-6-43 |

| Curtiss Propeller Bulletin | Date |
|---|---|
| 3 | Being issued |
| 4 | 10-13-43 |
| 5 | 10-16-43 |
| 6 | 10-21-43 |
| 7 | 10-18-43 |

| General Propeller Bulletin | Date |
|---|---|
| 2 | Being issued |
| 3 | 10-5-43 |
| 5 | 10-13-43 |
| 6 | 10-27-43 |

# LETTERS

SIRS:

One of the *Saratoga's* most ingenious officers conceived the idea of the possibility of an arresting wire higher than the normal wires, which would catch floaters before they hit the barrier. The emergency arresting wire would be actuated by an electric eye, the beam to be broken by the floater passing over the deck.

COMMANDING OFFICER
U.S.S. *Saratoga*

An experimental arresting wire booster was installed in the *Saratoga* for No. 8 wire for a short time during 1938 and further developments and tests were conducted at Naval Aircraft Factory. To prevent the wire from being knocked off the booster by the main wheels, it is necessary that the wire be raised immediately after the passage of the wheels in time for engagement by the hook. The maximum time is about ⅝ second. As such timing precludes manual operation, the electric eye and a trigger cord ahead of the wire, to be actuated by the wheels, were studied. The scheme was discarded because of mechanical and electrical complexities.

SIRS:

We are interested in aircraft maintenance and aeronautical engineering. Will you please add us to the mailing list for NANEWS?

EXECUTIVE OFFICE
*AAF, Air Service Command*
Patterson Field, Fairfield, O.

SIRS:

The "Dead Reckoning and Celestial Navigation Problems" in NANEWS are both interesting and instructive, especially the one in the November 15, 1943, issue, which involves crossing the international date line.

I find it difficult to obtain an *American Air Almanac* of the date of the problem, and imagine others do too, so why not use dates in the current *Almanac*?

L. W. MCLAUGHLIN
*Boatswain, USN*
NAS, Norfolk

SIRS:

Your account of the adventures of Staff Sergeant C in NANEWS for November 15, 1943, page 9, tells of his encounter with a large lizard which he described as "a terrible looking monster . . . standing on the beach, ready to strike like a snake, his tongue spitting out at me. To my great relief, he did not attempt to follow me."

For the information of others who may be in a similar situation: Lizards do not "strike" and no poisonous varieties are found anywhere except in the Southwestern United States, Mexico, and portions of Central and South America. Most lizards are good emergency food, some excellent. Hindquarters and tail are the best meat. The larger ones have sharp teeth but are not aggressive. Despite its "terrible" appearance, Staff Sergeant C's lizard might have furnished him with a good meal, had he contrived to kill and cook it.

LIEUT., *USNR*
DCNO (Air), Washington, D. C.


PARODY ON CONDITIONS ABOARD CARRIER AS DELINEATED BY ARTIST CREWMAN ON ONE OF THEM

## Removing Rims Simplified

### *Puller Works on TBF Wheel*

MCAS, EL CENTRO—A gunner and lieutenant from service squadron made up a rim puller for wheels on TBF type

RIM PULLER DEVELOPED AT EL CENTRO BASE

planes to eliminate previous difficulties encountered when removing rims from wheels. Puller consists of arms with hooks attached which jerk rim off without damage to rim, tire or wheel.

## 148 Planes Serviced Quickly

### *Secret: Production Line Methods*

NAS, PEARL HARBOR—The A&R Department here has perfected production line methods to handle de-preserve, service and re-preserve planes shipped from the mainland that are wanted for quick action.

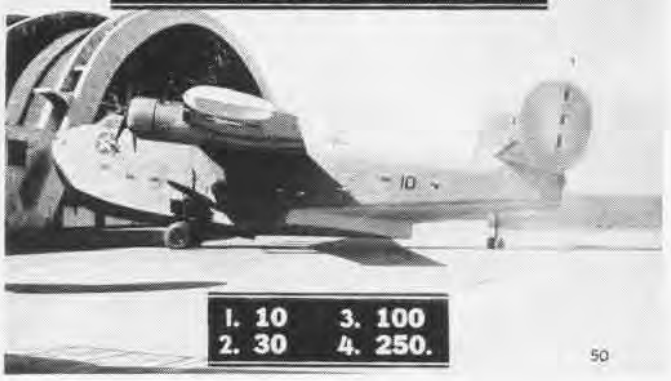
The system was necessitated by arrival of 148 planes for servicing. To handle the job 35 men were divided into three groups: Team A removing cylinders and de-preserving; Team B running-in on clear gas; and Team C re-preserving. A production line was set up to do these operations with assembly line precision and sequence.

The 148 planes of several types were completely serviced in 22 working days. Work included removal of 44 cylinders, checking planes for shipping damage and making numerous repairs to dented wing tips, damaged trim tabs, and broken antennas.

Engines found in good condition were de-preserved, run-in with clear gas with preservation in the oil, complying in all respects with BuAer T.N. 16-43 (over 30-day storage). Thirteen engines were changed, as corrosion was so bad overhaul was necessary. (The corrosion was found in link rods, counter balances, and crankshafts.)

**BEST ANSWERS**
to questions on page 27
1.d 2.e 3.c

**1** After how many flying hours should the flight control system be inspected?

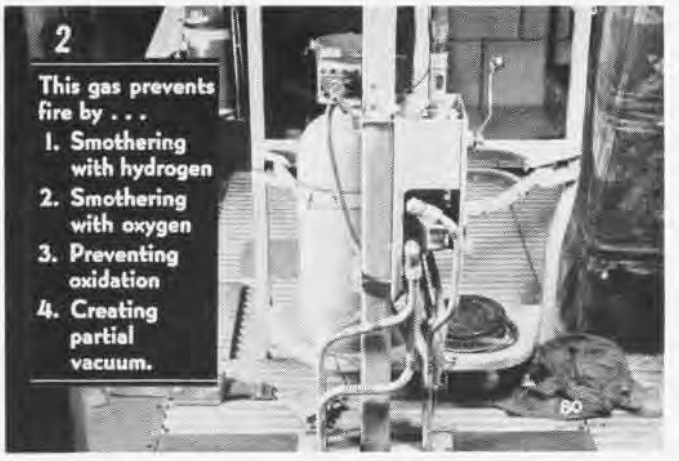


1. 10
2. 30
3. 100
4. 250.

50

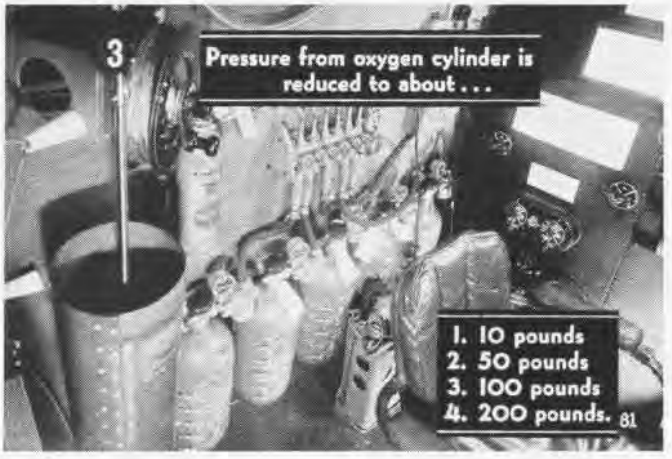
**2** This gas prevents fire by . . .

1. Smothering with hydrogen
2. Smothering with oxygen
3. Preventing oxidation
4. Creating partial vacuum.



80

**3** Pressure from oxygen cylinder is reduced to about . . .



1. 10 pounds
2. 50 pounds
3. 100 pounds
4. 200 pounds. 81

# What Do You Know About MAINTENANCE?

Performance records of naval aircraft are due in no small measure to the Navy's highly specialized technical training program. The men who keep the planes in first-class condition know their jobs and do them well. Try this mechanical quiz, then see the answers on p. 29.

*Write answers here*

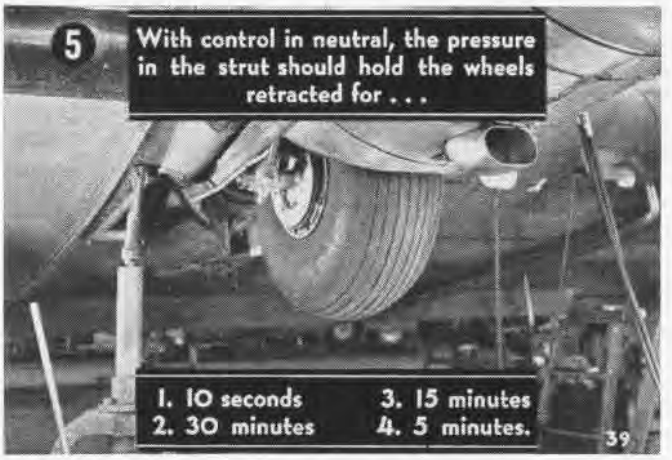
1 . . . . . .
2 . . . . . .
3 . . . . . .
4 . . . . . .
5 . . . . . .
6 . . . . . .

**4** Creeping of these dive flaps is caused by . . .

1. Too high pressure
2. Leakage of fluid
3. Air leak in the accumulator
4. Mechanical failure.

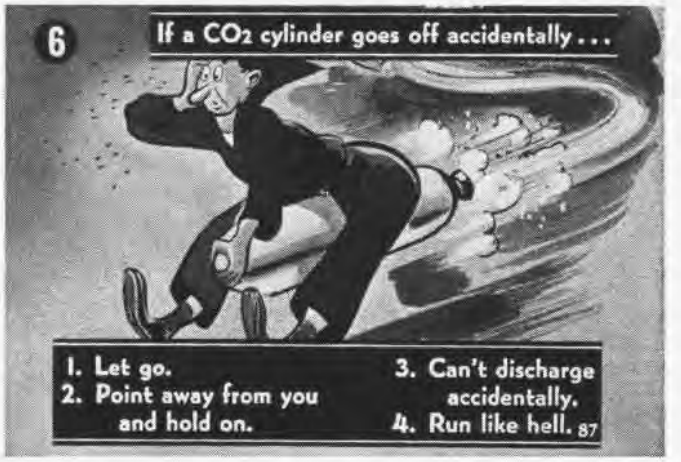
31

**5** With control in neutral, the pressure in the strut should hold the wheels retracted for . . .



1. 10 seconds
2. 30 minutes
3. 15 minutes
4. 5 minutes. 39

**6** If a $CO_2$ cylinder goes off accidentally . . .



1. Let go.
2. Point away from you and hold on.
3. Can't discharge accidentally.
4. Run like hell. 87

# NAVAL AVIATION NEWS


Evidence on Film
Death of a 'Mavis'
Battle Souvenirs
Aerial Camouflage

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