

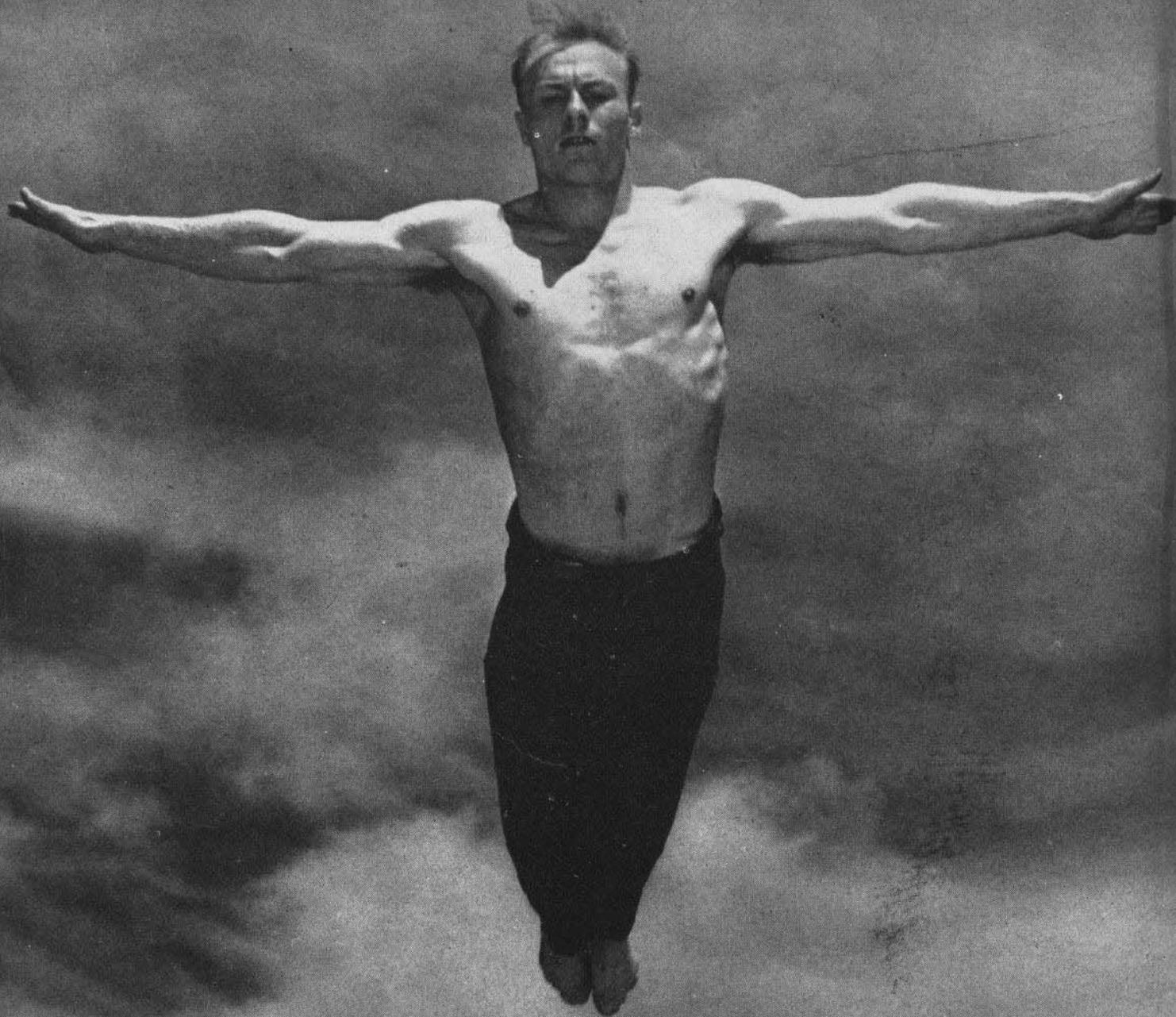
BUAER

# NEWS



Operational Training  
Naval Air Transport  
Technically Speaking

Aug. 15, 1943  
RESTRICTED



Physical perfection is demanded of enlisted men being primed for technical aviation billets at the Naval Air Technical Training Center, Norman



OPERATIONAL

A NAVAL AVIATOR, JUST GRADUATED FROM CADET RANK, PREPARES TO MAKE FIRST CATAPULT IN OS2U AT JACKSONVILLE, NAOTC HEADQUARTERS

# Training For Combat

**Now Wearing Navy Wings, Intermediate Grads Tackle the Technique of Combat in Operational Types**

THE Naval Air Operational Training Command, headed by a rear admiral, is responsible for the operational instruction of naval aviators. Headquarters are in Jacksonville.

Under its jurisdiction are a variety of activities, each embarked on its own program of specialized training—fighter director school at St. Simons Island; naval air gunners' schools at Hollywood Beach, Purcell, and Jacksonville; navigator bomber school at Hollywood Beach; carrier qualification training unit at Glenview; and operational training units at MCAS Cherry Point, and the naval air stations at Vero Beach, Fort Lauderdale,

Melbourne, Daytona Beach, Miami, Sanford, Lake City, Banana River,<sup>1</sup> De Land,<sup>1</sup> and Key West.<sup>1</sup>

Each station has a particular mission to perform, a specific talent to develop.

The program at Jacksonville is somewhat more diverse than the others, training being in twin-engine seaplanes, scout observation and torpedo bomber planes. Fighter units are in training at outlying Lee and Cecil Fields.

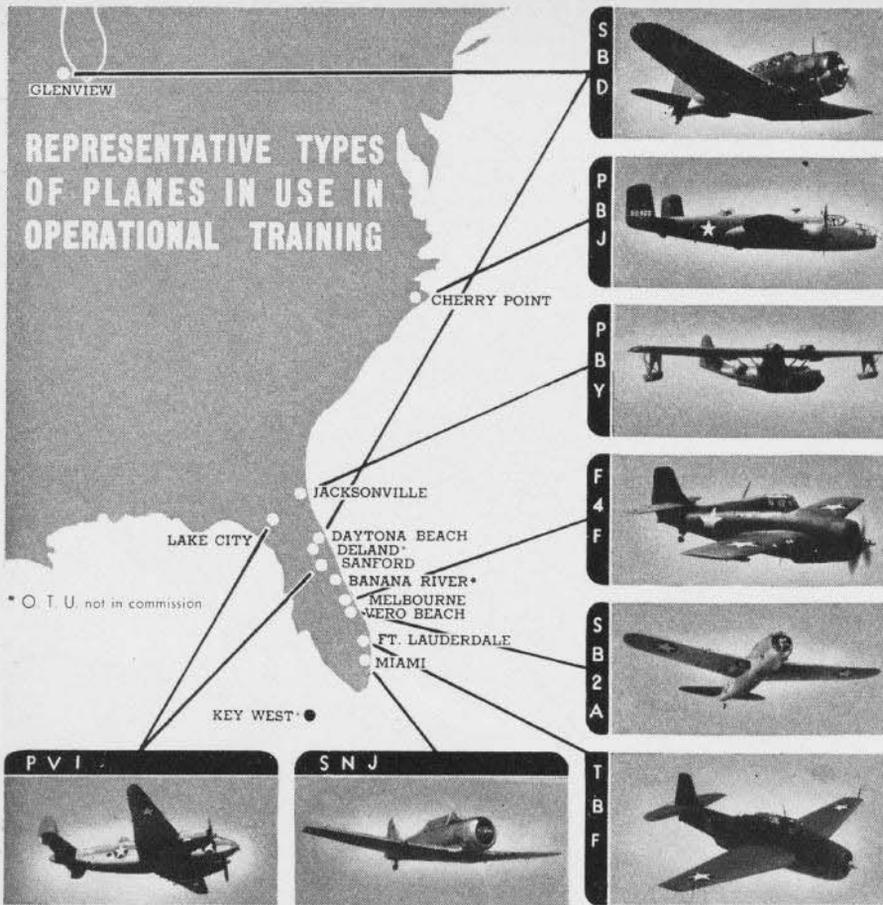
Miami currently is giving a 1-month preoperational course in carrier type planes. Fort Lauderdale has a carrier torpedo bomber unit; Vero Beach and Daytona Beach carrier dive bomber units; Melbourne a fighter unit; Sanford and Lake City, medium bombardment antisubmarine training units; and Cherry Point a medium bombardment unit for training Marine pilots in twin-engine landplanes.

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BUREAU OF AERONAUTICS  
NAVY DEPARTMENT—NO. 199

<sup>1</sup> No operational training units at present.



OPERATIONAL TRAINING AFFORDS NAVAL AVIATORS CHANCE TO FLY MANY TYPES OF FAST PLANES

Completing specialized flight training at intermediate centers, naval aviators go on to operational training units for an 8-week course or about 100 hours in service type planes. There they train to fight in combat weapons under circumstances most nearly duplicating latest operations against the enemy. Air crewmen undergo a 2-month course in the type of operations which they will participate in when they join the fleet.

### Training Embraces Three Phases

Operational training is composed of three overlapping phases: 1. Thorough familiarization with flight characteristics of the service airplane; 2. Improvement of specialized tactics, such as gunnery, cloud flying, navigation, carrier landings, etc.; and 3. Military employment.

Before entering operational, the average student has been trained almost exclusively to perform a single mission on each flight, leading temporarily to a one-track method of thinking. As early as practicable, consistent with progressive training, each flight includes as many of the phases of combat flying as can possibly

be handled by the individual pilot.

Forty-five percent of the operational course is devoted to training in the primary weapon, while the remaining time is spent in fundamentals, such as familiarization, instrument flying, night flying, carrier landing, scouting, navigation, advanced base operations, catapult, and underway recovery. A comprehensive ground school course in tactics, gunnery, recognition, aircraft familiarization, operation, maintenance,

and kindred subjects parallels the flying course.

### War Dangers and VO-VCS Training

In wartime the opportunity for training VO-VCS pilots at sea is more limited than for any other type pilot. Danger of enemy submarines and aircraft and operational loads on cruisers and battleships do not permit cruises or flights for purely training purposes. Therefore operational training of VO-VCS pilots ashore must be thorough and every phase of instruction, air or ground, must simulate as nearly as possible actual conditions and operations the pilot will encounter on joining his ship or unit.

Personnel in training are organized into tactical units of four planes each. A fleet-experienced pilot known as the senior aviator and functioning as a ship-based senior aviator supervises each unit or group of units. Some attempt thus is made to duplicate the atmosphere aboard ship.

Every flight, especially during the latter period of training, is a multi-purpose one and simulates combat conditions. It includes loading, rendezvousing, scouting, navigation, observation and spotting of gunfire, bombing, machine gunnery, communications, recognition of ships, estimation of ships' course and speed, codes and ciphers, reading of signal hoists and blinker, and return to ship. All flying is done in seaplanes.

### CV Training Points to Ship Duty

When graduates of carrier operation training report to their respective squadrons, they may be launched for combat on any of their first few flights. All of their training then proceeds along lines which will enable them to operate more effectively aboard ship.

The fledgling aviator now learns that carrier planes operate in units more than any other type of naval aircraft and that much of their offensive punch is dependent upon coordinated flying between these units. He learns also that his training follows the lines of operations performed at sea.

The maximum amount of flying takes place over water. Training pilots are checked frequently on their estimates of surface wind force and direction. Flights to gunnery areas are utilized for navigational instruction.

Carrier qualifications consist of a minimum of eight take-offs and eight landings. If feasible, pilots

### Training Series

*In its previous two issues, BuAer NEWS described, successively, activities that take place under Primary and Intermediate training commands. This is the third article in the training series—Operational, which rounds out the naval aviator's formal schooling before he takes up duties with combat units.*

*BuAer NEWS will continue its naval aviation training series in the next two issues . . . dealing with the Technical and Airship training commands consecutively.*

watch carrier landings before their own qualifications. Generally, the last three landings are from a formation break-up. Three launchings are by catapult when practicable. When load permits, flights involving short navigational and attack missions supplement qualification landings.

### VPB Training Emphasizes Scouting

VPB training operations follow procedures carried out in fleet squadrons with emphasis placed on each operation in proportion to its importance in combat warfare. Trainees are organized into tactical squadrons with an instructor squadron commander plus such additional instructor personnel as are available and necessary.

Strategical scouting is the primary mission of the VPB airplane. This means that those who man the planes must be cognizant of full military load take-off characteristics, navigation (DR, celestial, RDF bearings), instrument flying, scouting and reconnaissance, recognition, codes and ciphers, radio and radar operation technique.

The secondary mission of this plane is offensive or defensive activity. Pilots and crews thus must be proficient in: 1. Torpedo attacks, antisubmarine bombing and horizontal bombing, and 2. Free machine gunnery.

As experienced aviators know, more technique is demanded to handle a VPB type airplane properly on water than in the air. So, in operational training great emphasis is placed on taxiing, buoy approaches, mooring, anchoring, beach approaches, and getting under way from anchorages and moorings. Instructors drive home the fact that a VPB commander must have a work-

ing knowledge of the duties of each member of his crew so that he can give orders in the most intelligible manner.

### VB Graduates Become First Pilots

VB training is designed to qualify pilots to take places in operating squadrons as first pilots. Few if any pilots completing operational training have

on navigation, search, attack, and identification; loading of bombers and jettisoning weight; communications, landings and take-offs, and horizontal bombing, glide bombing, torpedo attacks, depth bombing, and fixed gunnery for strafing and defense.

Probably no phase of operational training for VB students is stressed more than instrument flying. The reason for this is apparent. Owing to the range of VB type planes, it is almost impossible to complete a mission without encountering some form of weather requiring flight conducted on instruments. A portion of each flight is devoted to instrument flying to attain and maintain the required proficiency.

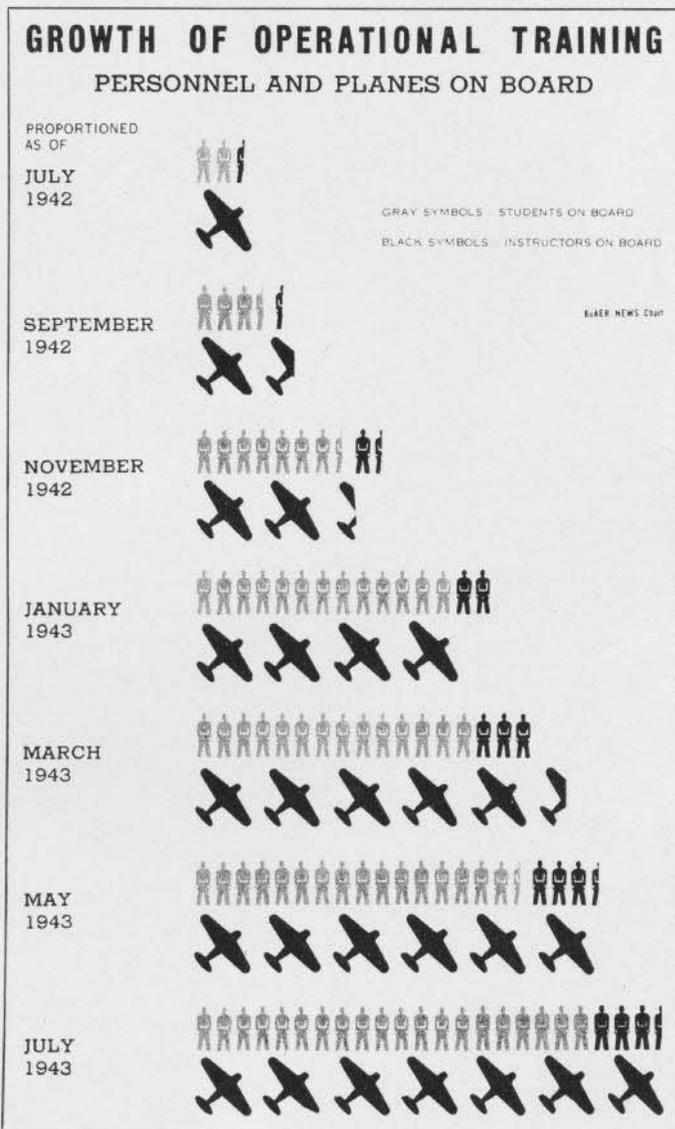
### Train Air Crewmen for Combat

Old hands know that the best pilot in the world cannot attain maximum efficiency if his gunner, navigator, or radioman is not a carefully trained, highly skilled member of the crew.

Training air crewmen for combat is one of the most important functions of NAOTC. The enlisted men's course of instruction is just as thorough, just as intensive, for their particular mission as the operational training of naval aviators. Their training covers a 2-month period also. The courses of instruction for both air crewmen and pilots are woven together as closely as possible

to achieve maximum teamwork. Every effort is made to keep crews that train together intact when they go into combat.

The flight syllabus for air crewmen in operational training units includes familiarization, communication drills, turret manipulation, strafing, radar, and other subjects vital to flight.



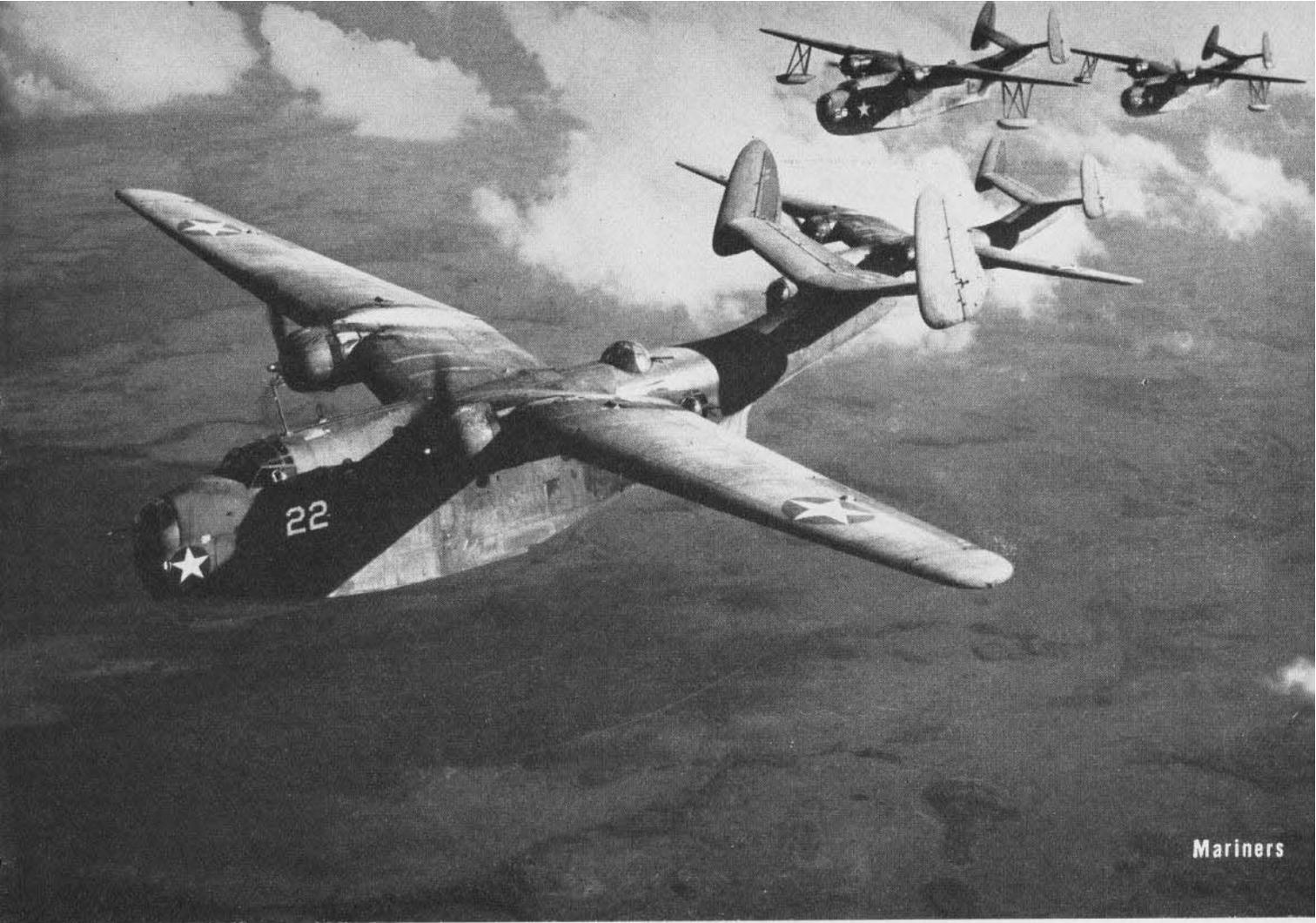
had sufficient flight time to permit them to be designated patrol-plane commanders. VB training must enable graduates to assume the duties and responsibilities of first pilots in accordance with the standards of fleet squadrons.

The VB trainee is drilled in instrument flying, night flying with accent



OPERATIONAL FLYING





Mariners



Catalina



Wartime restrictions limit operational training for VO-VCS pilots more than for any other type. Every phase of instruction must simulate as nearly as possible actual condition and operation which the pilot will encounter when he joins his ship or unit with the Fleet for multi-purpose flights

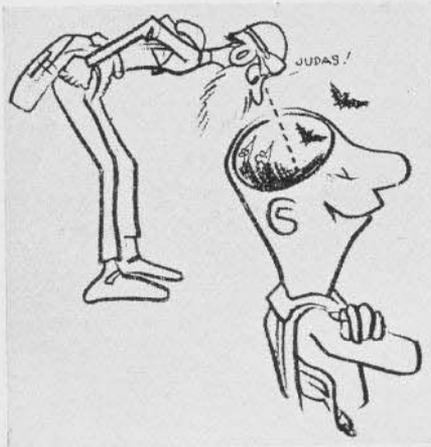


Kingfishers



Avengers

# GRAMPAW PETTIBONE



## How To Spin a PV

While practicing low-level bombing runs on a friendly submarine, a PV-1 was seen to pass over the sub at low altitude and immediately commence a climbing turn to port. The turn steepened, until at 500 feet the aircraft was in an almost vertical bank, at which time it flipped over on its back and dove into the water. Partial control was regained at approximately 200 feet, but the airplane crashed at high speed in a dive estimated at 40°.



*Grampaw Pettibone says:*

It's hard to believe this pilot had 1,150 hours flight time, with 165 recent hours in the PV-1. Familiarity evidently bred contempt in this case, and this is one airplane that demands respect.

The technique used here was perfect for entry into an accidental spin. No doubt, the pilot never got below *normal* stalling speed in this maneuver, but he neglected to take into account that this was not normal flight. His airplane was in a steep, climbing turn, during which two forces were acting to increase the stalling speed: 1. acceleration, and 2. angle of bank.

Acceleration ("g") is developed in turns, as well as in dive pull-outs, and the stalling speed of an airplane increases directly as the square root of acceleration; as explained in Technical Order No. 3-42, and again recently under "Progressive Stalls and Spins" in BuAer NEWS, June 1.

Also, angle of bank affects stalling speed, increasing it directly as the square root of the tangent of the angle of bank. In pilot lingo this simply means that the wings have less lift when banked than

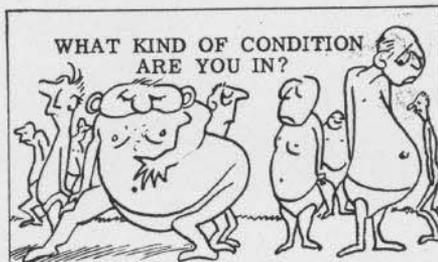
when in level flight and that the airplane will stall at higher speeds as the angle of bank is increased (in this case the angle of bank was almost 90°). There is no way of beating these basic flight laws, so it behooves all pilots to recognize them and fly accordingly.

The PV airplane has an exceptionally high wing loading and stalling speed and, therefore, requires more attention to these matters than the average Navy airplane. This is our first real "hot" two-engine airplane, so treat it with respect and keep plenty of airspeed.

## Can You Swim?

An engine failure in a TBM-1 caused a forced landing to be made in a river, approximately 50 yards from shore. The plane landed with wheels down, turned over on impact and sank. About 8 seconds later it came to the surface, and the plane captain stepped out of the rear compartment hatch perfectly dry and apparently unhurt. A rowboat put out from shore to rescue the flight crew, but before it got there the airplane sank again. The plane captain also sank—*he could not swim!*

Another recent accident involving a nonswimmer occurred as follows: A Marine pilot in an SNC-1 was faced with a forced landing while flying over a river. Knowing that his passenger couldn't swim, the pilot (big-heartedly) elected to land in a wooded area instead of in the river. At about 50 feet altitude a pine tree sheared off the left wing just outboard of the wing tank. The plane continued through the air for 150 yards, struck the ground on its nose and right wing, rebounded, and, traveling sidewise, struck another tree just abaft the rear cockpit! Result—one wrecked airplane, minor cuts and bruises for the passenger, plus an urgent desire to learn to swim.



## Flap Danger

"I was making a touch-and-go landing in a TBF-1. After making contact, my aircraft bounced into the air and I hit the throttle to take off again.



I thought I had enough air speed, so I pulled up my wheels and flaps, but the plane settled and crashed on the mat."—Pilot.

► **BUREAU COMMENT**—This pilot's statement indicates that he was completely unaware of the danger of raising his flaps when near the stalling speed. Technical Note 42-36, which is supposed to be required reading for all pilots, deals generally with the effect of flaps on take-off and landing. It states that, "after take-off, the flaps must not be raised until excess speed has been attained." In this case there were even more specific instructions. The TBF-1 Pilot's Handbook contains the recommendation of the Trial Board to the effect that flaps should not be raised on this airplane after take-off until a speed of 100 knots has been attained.

## Take-Off Emergencies

*Case 1.*—A pilot with 423 hours flight time was taking off in an N2S-3 when his engine cut out at 200 feet. He attempted to turn back into the field which he had just left, but lost flying speed and spun in.

*Case 2.*—An SB2A-4 pilot with approximately 1,500 hours flight time experienced engine failure over the edge of the field immediately after take-off. He attempted to get back into the field and, in so doing, lost control of his airplane, which entered a nose-down spiral and crashed.

*Case 3.*—The engine of an F4U-1 backfired a few times during take-off and then caught again. The pilot, with 470 hours flight experience, went into a left climbing turn until reaching 250 feet, when the engine failed com-

pletely. The pilot then attempted to turn back into the field, but spun in out of the turn.

### Grampaw Pettibone says:

All right class, what pilot error do these three recently reported accidents have in common? \* \* \* Right! Then why in blazes do so many of you try to make it back to the field when this happens? You've all had plenty of instruction in this emergency and know that unless you are in the *proper position* and have *plenty of altitude*, you should land straight ahead.

The three pilots mentioned above were all experienced; a good average group. They had all had plenty of training in this emergency, but they hadn't actually linked it up with the real thing. To them, it was just part of the training program. When their engines did fail, they followed their natural instinct, which was to land on an airfield. And the chances are you'll do the same thing, if you haven't prepared yourself ahead of time.

This type of emergency usually occurs at low altitude; too low to jump and with no time available to figure things out—only a few split seconds to jockey around. The main thing to remember is, *don't lose flying speed!* And this isn't as easy as it sounds because you are usually in a climb, just above stalling speed.

So snap that nose down, just like you were taught in a cut-gun emergency. After that, if you have any time left, you can maneuver into the clearest available landing area. If you can get your wheels on the ground with the airplane still under control, your chances of "walking away from it" are a thousand times better than if you lose control and spin in. Don't try to turn back into the field when you haven't got a snowball's chance of making it.

This is one of the maneuvers you can't learn by correcting your mistakes because you seldom get a second chance. So use your head for something besides keeping your earphones apart; figure this thing out and get it firmly fixed in your mind. Then, to insure that you will react correctly, visualize this emergency on your take-offs until you know force of habit will overcome your natural instinct.

## Attention Maintenance Personnel

The pilot of a TBM-1 started a normal take-off. As he went down the runway his r. p. m. dropped and his engine lost power. A bright orange flame was observed coming from his exhaust at this time. The pilot cut his throttle, but ran off the mat and into a ditch, which pushed the landing gear up through the center section, bent the propeller, and damaged a wing.

Investigation disclosed that this accident occurred as the result of an error by maintenance personnel.

During the previous night the airplane had been given a 60-hour check. As a part of this check the carburetor stabilizer unit was removed for a flow test. When this unit was replaced, the *wrong gasket* was used (a solid gasket, instead of one having the proper cut-outs for vent holes). This caused the carburetor to run rich, which, in turn, caused the engine to load up and lose power.

## Prop Failure Plus Pilot Error

The automatic propeller control of an F4F-4 became inoperative at 11,000 feet, and propeller went into positive high pitch. The pilot stated that he was unable to hold his altitude with 1,600 r. p. m.'s and 35 inches manifold pressure and was forced to land on the beach.



The Trouble Board said: This airplane will more than maintain altitude and speed with 1,600 r. p. m.'s and 35 inches manifold pressure—with wheels up. It is believed the pilot should have been able to fly his airplane back to the base under these conditions.

► BUREAU COMMENT—Also, there was no indication that any attempt was made to bring the propeller out of full high pitch by use of the manual increase r. p. m. circuit.

## Know Your Cockpit!

Following an engine failure at 100 feet immediately after take-off, the pilot of an SBD-4 apparently centered his attention inside the cockpit in an effort to get the engine started. While concentrating on this he failed to note the flight path of his airplane. The airplane slowly nosed over and crashed to destruction.

The Trouble Board was of the opinion that had the pilot concentrated on making a full-stall landing, he would have probably escaped injury.

### Grampaw Pettibone says:

Remember that! If your engine cuts out at low altitude, don't duck your

head in the cockpit. Concentrate on making a good landing. Of course, if you have an idea what is causing the trouble, try to correct it, but don't ever divert your attention from flying your airplane at low altitude.

Here, again, the answer is "Know your cockpit!" A glance at the instrument panel may tell you what is wrong. When you locate it, however, your fingers should be so familiar with the cockpit that you can make the correction without looking.

## Often Ease Forward on Stick

There have been a number of accidents similar to this; several of them at night. They illustrate one of two common dangers which occur when attention is diverted from controlling an airplane. When leaning forward to look at the instrument panel, or when the head is ducked inside the cockpit, the tendency is to ease forward on the stick at the same time. That is why this is particularly dangerous at low altitude. The other danger occurs when flight leaders, or anyone but the last man in a formation, forgets to fly his airplane when he leans back to look around at the rest of the flight. The tendency here is to ease back on the stick unintentionally and pull up into the formation.

Although it is hard to make the test when you are conscious of it, try yourself out on these two points sometime when you are alone. Maybe your reaction is different; maybe you relax all pressure on the stick, in which case the airplane will react to the tab settings. A little experimenting will at least show you how easy it is to get out of level flight and should impress you with the vital necessity for consciously controlling your airplane. If you don't take charge, it will!

## Full Power Test

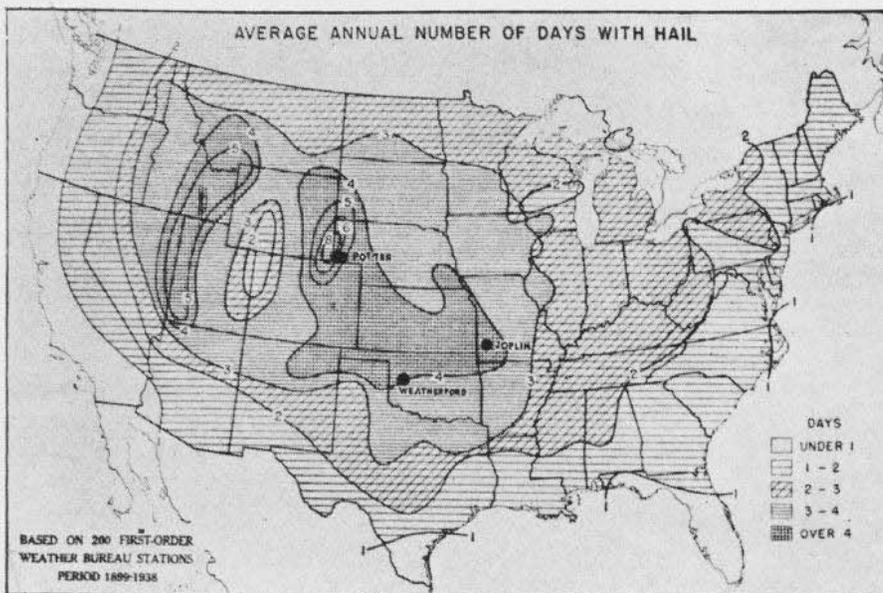
An SBD-4 airplane crashed when the engine cut out on take-off, apparently due to fouled spark plugs. The Trouble Board in this case made the following pertinent remark: "It is just as important to hold your brakes and test for full power on a large field as on a small one."





RAINDROPS CAN BECOME AS DANGEROUS AS BULLETS DURING THUNDERSTORMS GROWING INTO HUGE HAILSTONES. THIS ONE IS 15 IN. AROUND

# HAIL CAN RAISE HELL



HAIL IS PRINCIPALLY A WARM WEATHER PHENOMENA, AND MAY OCCUR IN ALMOST ANY PART OF U. S.

**H**AIL is the precipitation of solid water in the form of balls or irregular lumps of ice. They are either transparent or composed of clear layers of ice alternating with opaque layers of snow. Hailstones may attain great size and have been recorded in weights greater than 2 pounds and about the size of a grapefruit. Hailstones 3 inches in diameter are not rare.

Hail falls almost exclusively in violent and prolonged thunderstorms and is very rare at temperature below  $0^{\circ}$  C. at the earth's surface. Hailstorms are principally a warm weather phenomena, occur rarely in winter.

### Formation an Oddity of Nature

Within the cloud, a raindrop falling earthward is caught by a strong verti-

cal updraft in the chimney of the thunderstorm and lifted into a region of freezing temperature. Here it quickly congeals and also gathers a coating of snow and ice. As the vertical currents are irregular and gusty, the incipient hailstones may reach a weaker current or tumble over the edge of the ascending column back into the region of liquid drops. There it gathers a layer of water, a portion of which is frozen by the low temperature of the hailstone.

It may again be caught in an updraft and carried back to the region of freezing temperatures. From this point the travel becomes cyclic and the process is repeated until the hailstones grow to large proportions. The size of the hailstone, in general, is roughly proportional to the strength of the convective currents in the storm. Formation of hail requires strong convective currents.

Occurrence of hail at the present time is extremely difficult to forecast. Hail being associated with thunderstorms, there is a correlation between frequency of distribution of thunderstorms and hail. From what is known about the formation of hail, it may be anticipated in severe seasonal thunderstorms. Large hail appears to occur more frequently when the base of the thunderstorm-cloud system is be-



**CITIZENS OF TRINIDAD, COLORADO, GOT OUT SHOVELS AFTER TWO-FOOT HAILSTORM IN MID-JUNE**

low 7,000 feet and depth of the moist layer of air in which the thunderstorm occurs at least 15,000 feet.

Hailstones may strike moving aircraft with terrific impact. Hail damage on the ground is relatively frequent; hailstones have severely damaged small houses, pierced automobile tops, killed rabbits, pigs and even large cattle, and destroyed crops. Damage to aircraft on the ground may be extensive.

1. Planes in flight, in order to avoid hail, must avoid portions of the thunderstorm in which hail forms—that is, the level of freezing temperatures. They also should keep clear of the area below the anvil out of which the hail may spill.

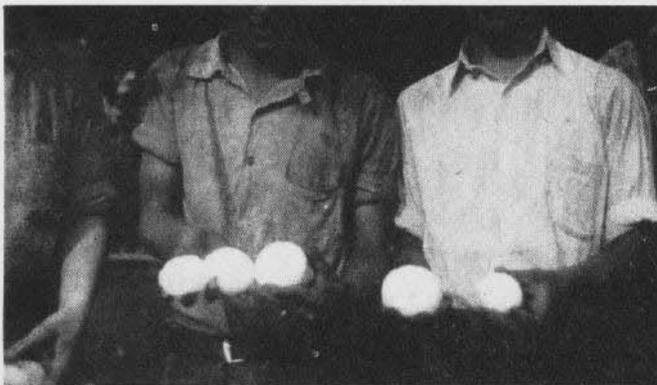
2. At present the only satisfactory

method of protecting planes on the ground is to place as many as possible under cover or to evacuate them to a region outside the area of thunderstorms.

3. Aerological personnel must be on the alert to observe occurrence of hail in the vicinity as reported on weather sequences.

4. Aerological personnel should anticipate hail with severe or violent thunderstorms. Some measure of the thunderstorm's intensity may be obtained from the depth of the tropical air mass, the difference between the level of condensation and the freezing level and the lapse rate of the warm moist air. Observe these indications.

**THIS IS BUAER'S TECHNICAL NOTE NO. 52-43**



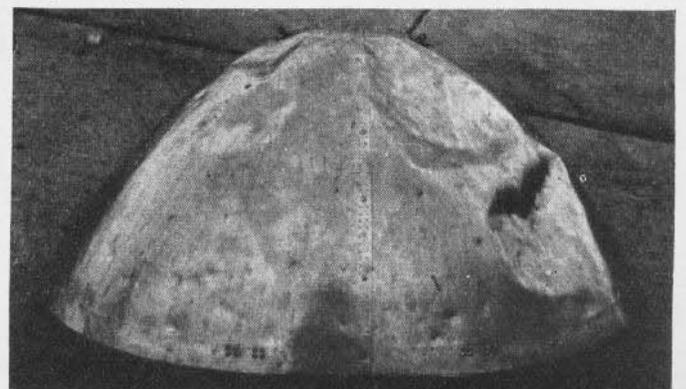
**THUNDERSTORM CLOUDS WITH BASES BELOW 7,000 FEET CAUSE LARGE HAIL**



**HAIL CAUSED THIS DAMAGE TO DC-2 WING IN LESS THAN THREE MINUTES**



**DAMAGED CAR SHOWS HAIL CAN BE DANGEROUS TO GROUNDED PLANES**



**NOSE OF SAME PLANE SHOWS IMPACT OF HAILSTONES DURING FLIGHT**

# Naval Air Transport



FLEETS OF HUGE TRANSPORT PLANES, LIKE THIS R4D FLY FOR NATS, CARRYING MEN AND MATERIALS TO FAR-FLUNG BATTLE ZONES OVER WORLD

## MATERIALS AND MEN QUICKLY REACH VITAL ZONES ON NAVY WINGS

**L**AUNCHED a few days after Pearl Harbor with seven planes, NATS today has more than 100 two- and four-engine airliners. They fly over a 60,000-mile world-wide network, carrying 15,000 passengers and 4,500,000 pounds of cargo and mail a month. Ton-miles of cargo and mail now total 2,900,000 each month, double the amount carried 6 months ago and seven times the total a year ago.

To rush parts for planes, ships and other battle equipments to any part of the globe in a few hours, the Navy now has eight squadrons in NATS. Two more will be commissioned this fall. One flies from Iceland to United States and on to Brazil and Africa. Other air lines reach Alaska, Hawaii, the United Kingdom, the south and southwest Pacific and across the U. S.

Many key men in NATS are former

executives of commercial air lines. Six of the eight transport squadrons which now comprise the service have former air-line operators and pilots as squadron commanders.

### **Uses Land and Seaplanes**

NATS uses both land and seaplanes in roughly equal proportion. Three-fourths of the planes fly over water; the others operate in this country. Sea-



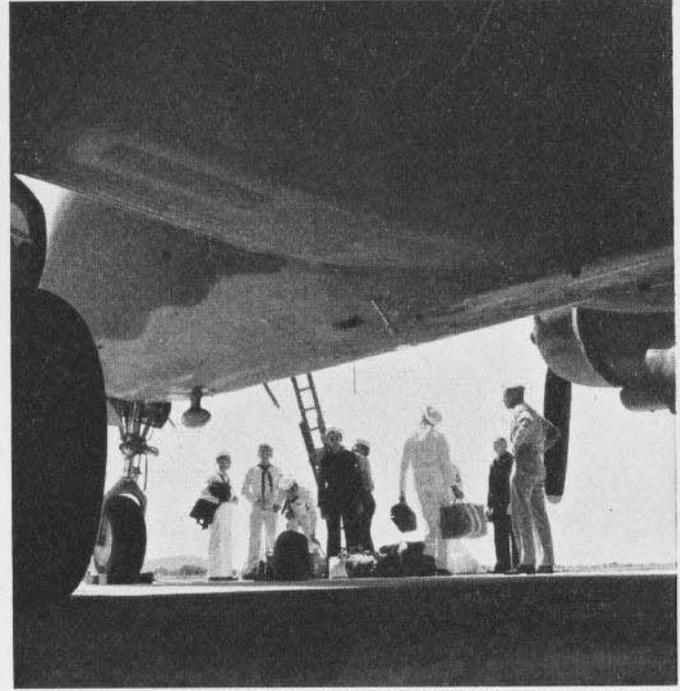
NATS WAREHOUSES CLEAR EVERYTHING FROM ENGINES TO TOOTH PASTE



GROUND ED ALLIED FIGHTER PLANE WILL FLY AGAIN WITH NEW ENGINE



FREIGHT OFTEN TAKES UP MOST OF THE SPACE IN BIG TRANSPORT PLANE



SAILORS WILL REACH FIGHTING FRONTS IN TWO DAYS ON NATS PLANES

planes are necessary for landings at distant patrol fronts where there are no air fields to accommodate large transport landplanes.

Nine out of ten passengers in naval transport planes are in uniform. They sit on plain steel seats, sandwiched among the boxes of cargo. Lashed to the deck, the cargo may be anything urgent, from soldier's mail to blood plasma for a South Pacific isle or a sub part headed for South America.

NATS has flown all varieties of ma-

terials, from operating manuals to complete aircraft engines, and all classes of personnel, including admirals and queens.

#### Changes Plans Quickly

As supplier of the fleet, NATS must be prepared immediately to alter routes and frequency of flights to areas having greatest relative need for air transport and supplies.

An aircraft carrier, damaged in battle, needed replacement of heavy air-

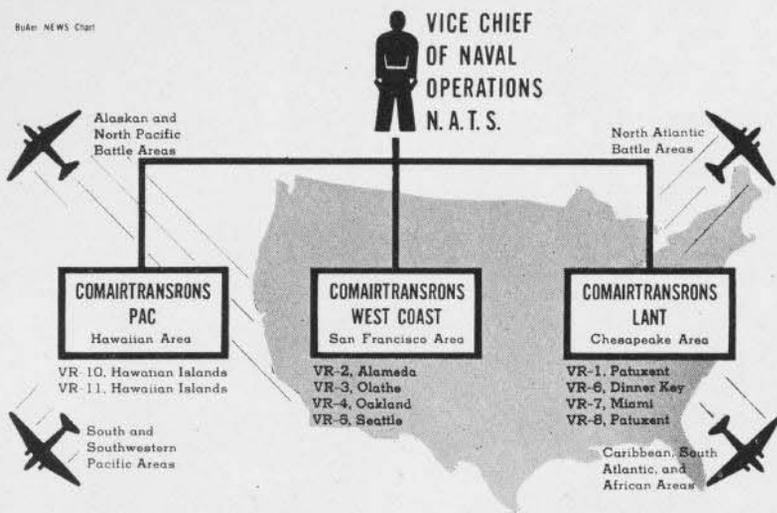
craft elevator plungers and 5-inch ammunition hoists. A plunger intended for another vessel was finish-machined at Norfolk and the ammunition hoists were secured at Camden, N. J. Within 6 days the material was en route to the mid-Pacific.

One afternoon BuShips received an urgent request for engine parts for aircraft rescue boats in the South Pacific. The same afternoon the material was sent by air from a supply depot.

There was an electrical fire aboard

# NAVAL AIR TRANSPORT SERVICE

BuAer NEWS Chart



a submarine and 18,000 pounds of replacement parts were required. Thirty-six hours after the request was received for main drive controls and power cables, parts were in the air headed for a port 10,000 miles away.

Manufacturers cooperate with the Navy in providing urgently needed parts. Transportation companies and the Navy's own air line finish the job of getting equipment over land and sea to its destination.

NATS has done many "rush jobs" in its short history. Detachable fuel tanks from Wildcats were speeded from manufacturers to Guadalcanal to help stop the Jap advance; firefighters were sent to a beached, burning ship off South America. One transport took half a billion dollars in cash to a country that needed financial backing. Depth charges were rushed to a coastal patrol boat and bottles of chlorine to an outpost where the water supply became contaminated by ship sinkings.

A nucleus of personnel to operate NATS was obtained originally from the ranks of naval reservists employed by various commercial air lines. Some were ex-Navy pilots. With this group of experienced pilot and ground personnel, training of other officers and enlisted men has been carried forward to meet the needs of the service.

Subsequently, both pilot and ground personnel were obtained through procurement activities of the Navy and trained in naval training establishments. Assignments are based largely

on qualifications of these personnel.

NATS is operated by the Chief of Naval Operations. Staff of the NATS section of the Aviation Division of the Office of the CNOP in Washington comprises 15 officers. Under the vice chief are the ComAirTransRons—Lant, West Coast and Pac, with headquarters in the Chesapeake, San Francisco, and Hawaiian areas.

NATS is closely related in its activities with all bureaus and offices of the Navy Department. BuSandA functions to a degree as a traffic department, originating practically all cargo carried by the planes. BuAer procures for NATS all of its aircraft, spare parts and other equipment and supplies advice and recommendations in matters of engineering, personnel, and maintenance.

BuPers assigns all personnel and establishes complements for the various squadrons and staffs, and orders personnel to duty in accordance with these established complements. Other bureaus of the Navy department, such as Ships and Ordnance, find NATS always ready to furnish rapid transportation for material urgently required by fleet units or advance bases.

### Uses Existing Fields, Stations

NATS operations are conducted primarily with the existing facilities of naval air stations and other naval activities along its routes. Where operations are conducted along established civil airways, civil communications

and control systems are employed, and in many cases municipal airports are the regular stops for NATS.

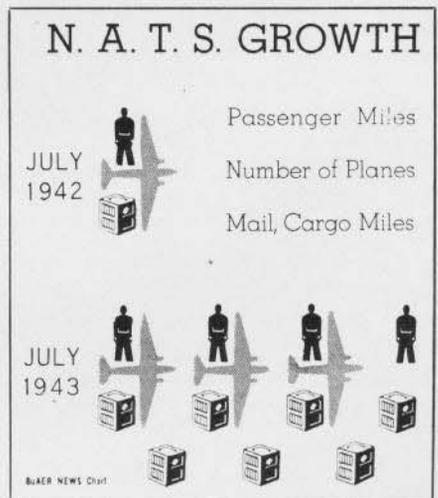
Loading and dispatching of aircraft at various stops are handled by air-transport officers assigned to this particular duty at these stations, together with complements of enlisted specialists V, known as transport airmen. Regular station personnel also aid in some cases.

NATS in June 1943 was operating a number of aircraft equal to about 40 percent of the number of aircraft employed by all commercial air lines operating in United States in 1942. With these aircraft it flew approximately 35 percent of the total ton-miles flown by such commercial airlines. Although these statistics do not appear favorable at first glance, it must be recalled that commercial airlines carry 85 percent of their load as passengers, which are easily loaded, whereas 65 percent of NATS loads comprise cargo and mail.

### NATS Flies Rugged Routes

In addition, commercial air lines have been flying regularly established routes whereas much of the Navy's operations are outside continental limits of the United States, where operating facilities are limited and weather conditions, as in Alaska, have a great influence on utilization of aircraft.

NATS does not confine its activities to flying personnel and equipment to far-flung places. On more than one occasion its pilots have spotted Axis submarines and radioed to coastal patrols. One pilot spotted seven survivors adrift on a raft and circled them for more than an hour until a Navy rescue plane appeared. Two rescued sailors suffering with gangrene





MODERN VERSION OF NOAH'S ARK, THE PB2Y COVERS AIR SEAS FOR NATS. IT HAS USEFUL LOAD OF 27,000 LBS., MAXIMUM RANGE OF 3700 MILES

were delivered to a hospital in Boston after being picked up by a transport plane sent through a snowstorm from Washington to Sydney, Nova Scotia.

NATS has established an enviable record for safety in flying. In a year and a half of operations, not a single fatal accident occurred on its runs between Iceland and Rio de Janeiro, which produce all kinds of weather. Practices responsible for this safety record will be applied with great benefit to future flying.

#### **Sailors Can Tie Knots**

The age-old Navy ability to secure

and carry cargo safely was applied to its operations. Not only were ingenious methods developed to prevent cargo from shifting and being damaged in flight, but packaging was improved and the weight of shipments cut as much as 35 percent.

Wooden and pasteboard boxes often proved too flimsy, so a new waterproof "V" board was developed, providing a strong container thinner and lighter than ordinary wooden boxes.

To develop further improvements in handling and packaging of supplies to go by air across the oceans, BuSandA sponsored a "packaging

school" at University of Wisconsin. Several score naval personnel were trained in the scientific packing and handling of war materials.

NATS is acting as a clearinghouse for information available on airline operations. Manuals are being compiled on landplanes and seaplanes, containing the best of everything that has been written on operations to date, gathered from commercial airline data, Navy material and manufacturers' data books. The landplane manual will be completed shortly, while that on seaplane practices already is being used as a virtual "bible."

## JOBS NATS DOES

**T**HE DAY after Pearl Harbor NATS started life with seven planes and a plan. The plan called for carrying personnel and cargo of a

limited character. But as the smoke of battle spread to other parts of the world—far islands of East Indies, Africa, Iceland, Asia—demand was



**WOUNDED FIGHTERS**—Aboard swift, giant air transports, wounded men of the allied fighting forces are rushed out of battle zones to hospitals behind the lines. Here crewmen load a stretcher into the cavernous interior of plane, preparatory to evacuation from advanced zone



**V-MAIL**—One of the most welcome cargoes NATS planes carry is V-mail from folks back home to men in front lines; film greatly reduces mail's weight



**CAPTURED ENEMY**—Navy transports sometimes carry prisoners from battle areas to distant camps where they work to help allies



**ENEMY SUBMARINES**—NATS pilots occasionally spot enemy submarines, radio to bombers at nearby bases to come and dispose of the wolves of the deep



**KEY MEN**—Specialists in art of making war fly to battle zone where their talents are needed to keep machines in operation

made for an air service that could transport naval supplies and personnel, not just to a few isolated points, but to any designation. Gradually,

yet speedily, NATS broadened out its service. Along with its big job of hauling loads of freight and personnel, more and more it was called upon

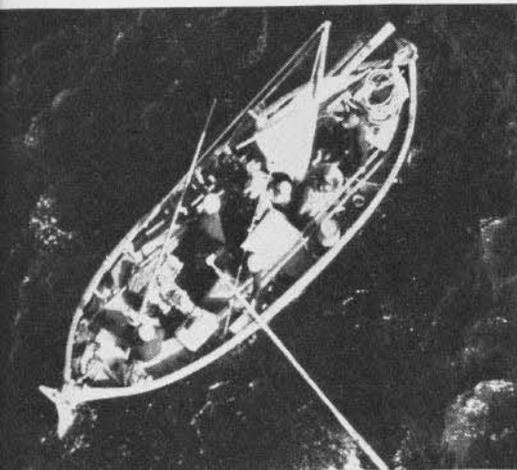
to perform urgent and unusual errands, many of which are shown on these pages. Today, NATS spreads its wings across many waters and lands.



**BLOOD PLASMA**—Red Cross plasma, sent via plane, helps cut down death rate from wounds



**MEDICAL SUPPLIES**—When medicine is needed at the front, NATS planes furnish swift service



**SUB VICTIMS**—Transport pilots radio news of boatloads of survivors, direct rescuers to site



**GLOBAL SERVICE**—From Iceland to Africa, via Brazil; from Seattle to Alaska and Hawaii to South Pacific, NATS' huge airliners answer need for fast action on crucial supplies to war zones



**DEPTH BOMBS**—When bombing planes run short of ammunition, NATS bring new supply quickly



**GAS TANKS**—NATS carried special droppable gas tanks to Navy Wildcats stationed at Guadalcanal

# DID YOU KNOW?

## New Operations Post (Air)

### Marks Naval Aviation's Growth

A change in the organization of the Office of Chief of Naval Operations recently was made to include a Deputy Chief (Air). Rear Admiral John Sidney McCain, chief of the Bureau of Aeronautics since October 1942, was raised to the rank of vice admiral and named first incumbent. His successor as chief of BuAer is Rear Admiral D. C. Ramsey, who has been a task-force commander in the Pacific. Before going to sea Admiral Ramsey was assistant chief of the Bureau. Office of Deputy Chief of Naval Operations (Air) will facilitate handling of expanding naval aviation, with particular regard to policy, plans, personnel, and logistics.

## Note on Training Films

### Specify Silvered Screens

When requesting screens for use with motion-picture and slide-film projectors, training activities should consider whether or not Polaroid Vectographs (three dimensional films) are to be incorporated in their training program, the Bureau says.

The Training Division contemplates use of Polaroid Vectograph films in celestial navigation instruction.

All silvered or aluminum finish screens are suitable for Polaroid Vectographs. Beaded screens are used for ordinary motion-picture projectors but silvered Polaroid screens are not altogether satisfactory for this type of exhibition due to excessive reflection and differences in size.

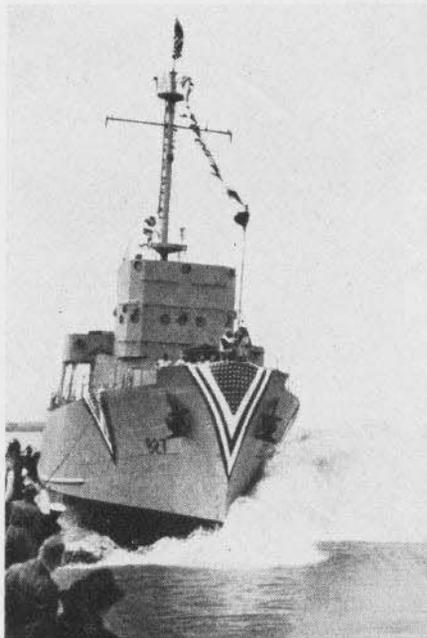
When ordering screens for Vectograph films, activities should specify especially treated silvered screens.



## New Anti-Sub Craft

### Two Types Join Fleet to Track Down U-Boats

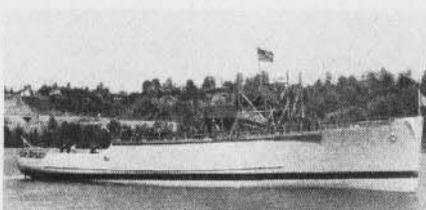
Two new types of anti-submarine craft have been developed by the Navy to join the new Destroyer Escorts [NL



PCE WILL FIGHT SUBS IN NORTHERN WATERS

5/15/43] now guarding United Nations convoys.

The first several PCE's—patrol craft escort—already have been launched. A second newly developed type of patrol craft, the PCS, an adaptation of the 136-foot wooden minesweeper, also is being turned out.



PATROL CRAFT SAIL ON HEAVY CONVOY DUTY

The PCE's have more than doubled the displacement of the popularly known 173-foot PC's, with a much broader beam. Conversely, however, they are several knots slower than the sleek PC's. They will carry the latest type detecting devices and will be

armed with dual purpose and anti-aircraft guns, as well as with many depth charges.

The PCS—patrol craft sweeper—is the same size as the minesweeper, and depth charges and other patrol craft armament and instruments will be substituted for the sweeping gear of the other vessel. A number of yards which have been turning out wooden minesweepers are producing the PCS, the first few having been launched.

## Aviation Supply Depot

### One of Five Supply Points

Brief ceremonies marked the commissioning of the new Naval Aviation Supply Depot recently at Oxford Avenue and Martin's Mill Road in Philadelphia. The new depot has already taken its place in the naval aeronautical organization as one of the five major distribution points for supplies.

## Good Conduct Award

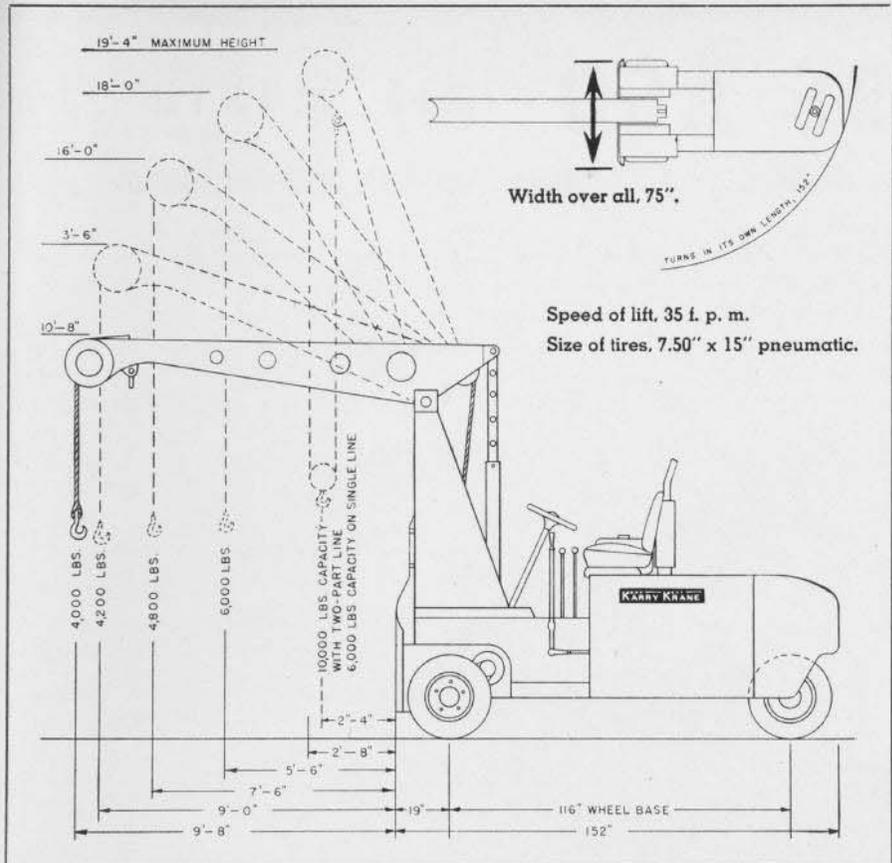
### Now Extended to Reservists

Enlisted men of the U. S. Naval Reserve are now eligible to receive good-conduct awards after 3 years of continuous service during a war or a national emergency (dating from September 1939).



The good-conduct award was previously authorized only for men of the regular Navy or for reservists who had transferred to the regular service. Officers who have won this award in an enlisted status are entitled to wear the good-conduct ribbon.

Naval Reserve men may be recommended for the award after each 3-year period of continuous active service in time of national emergency or war. To earn the award, reservists must meet the requirements prescribed for the regular Navy, such as clear records and an average of 3.5 in efficiency in rating.



KARRY KRANES, USED IN HANDLING OF CRASHED AIRCRAFT, CAN BE CARRIED ON SMALLER CARRIERS

## Tractors, Jeeps for Carriers To Be Provided Without Reqs

Tractors and jeeps have been placed on BuAer allowance list for aircraft carriers and are to be supplied as follows:

	Tractors	Jeeps
CV's	5	3
CVL's	2	1
CVE's	2	1

The above allowances should provide an adequate and well-balanced automotive means for spotting and other operations in which this equipment is essential. Equipment will be provided without requisition to fill the above allowance for all carrier classes.



## Karry Kranes on the Way

To assist in handling of crashed aircraft on CVL's and CVE's, the 10,000-pound capacity Karry Krane will be supplied by BuShips as units become available. CV's are now supplied with one 14,000-pound capacity Le-Tourneau Crane, but the size of this unit precludes its use on smaller carriers.

## BuAer News Reporters To Summarize News Regularly

Believing that the scope of technical training can be broadened by dissemination of its activities in *BuAer NEWS*, the Naval Air Technical Training Command at Chicago has proposed a plan whereby *BuAer NEWS* correspondents are being appointed at its centers and schools to promote a flow of news items at regular intervals.

Secondary tasks of the *BuAer NEWS* correspondents will be, 1. To eliminate kinks in local distribution of the magazine, 2. To advise on a reasonable number of copies that should be sent to each activity.

The measure was worked out with *BuAer NEWS* as part of a general plan being adopted to keep ships and stations up-to-date on aeronautical activities of the Navy.

# BEST ANSWERS

## IV—Essentials of Naval Service

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

1. Among the following U. S. ships, the one which is not matched with a proper characteristic is—

- a heavy cruiser, 10,000 tons
- b submarine, 12 knots submerged speed
- c light cruiser, 5,000-mile cruising range
- d battleship, 100-foot beam
- e destroyer, 36-foot beam

2. The Bureau of Yards and Docks does not have cognizance over the—

- a construction of barracks
- b public utilities at shore stations
- c construction of sewage systems
- d dredges and derricks used in navy yards
- e repairs to naval vessels

3. In the absence of the Secretary of the Navy, the Navy Department is administered by the—

- a chief of naval operations—
- b assistant secretary
- c chief of staff
- d under secretary
- e commander in chief, U. S. Fleet

4. The commanding officer of a battleship—

- a must delegate independent authority to his department heads
- b takes his battle station at central station
- c shares responsibility for the performance of his ship with the executive officer
- d must govern his ship under a system of absolute despotism
- e is president of the wardroom mess

5. The one among the following which is not properly included in the Navy's contributions to aeronautics is the—

- a bi-engined plane
- b dual controls
- c seaplane
- d flying boat
- e amphibian

6. Three significant steps in the advance of naval aviation have been the first flight across the Atlantic, the first participation in maneuvers with the fleet, and the founding of the Bureau of Aeronautics. The proper chronological order of these steps is—

- a BuAer, Atlantic flight, maneuvers
- b Atlantic flight, BuAer, maneuvers
- c maneuvers, Atlantic flight, BuAer
- d BuAer, maneuvers, Atlantic flight
- e maneuvers, BuAer, Atlantic flight

# 25 YEARS AGO THIS MONTH

## Naval Aviation August 1918

*August 1.*—First material for Northern Bombing Group arrived at Pauillac, thanks to the courtesy of Brig. Gen. Charles Lamb, R. A. F. Night bombing squadrons attempted to use 3-engine Capronis (Fiat engines). Day bombers used DH's. Capronis were ferried from Italy, 16 of which crashed en route owing to engine failure—resulting in 9 deaths. Actually only 1 flight over the front lines was made with this type of plane, before it was discarded. Capronis were to be replaced by Handley-Page bombers, but the Armistice interrupted the plan.

Fifty-two DH's were obtained from Great Britain on the basis of exchanging 3 Liberty engines for each DH with engine installed. Thousands of aircraft without engines were available in England.

First mission for night bombing group was antisubmarine operations along the Flanders Coast. Thirty bombing seaplanes were to keep this area clear of enemy submarines. The bombing planes in turn were to be protected by 200 fighter landplanes operating against German pursuit squadrons based near the coast line. This plan was finally modified to use landplanes only to bomb submarine base.

*August 11.*—First Caproni bomber arrived at Pauillac for use in Northern Bombing Group.

*August 13.*—Dunkerque Air Station: Seaplane patrol consisting of 1 DD triplane and 3 scouts bombed large enemy submarine. Submarine opened fire on aircraft, but bombs proved effective and submarine foundered.

*August 14.*—First large consignment of 145 Liberty engines reached France. However, shipment included only 9 starters. Not until a month later did the remainder of the starters arrive.

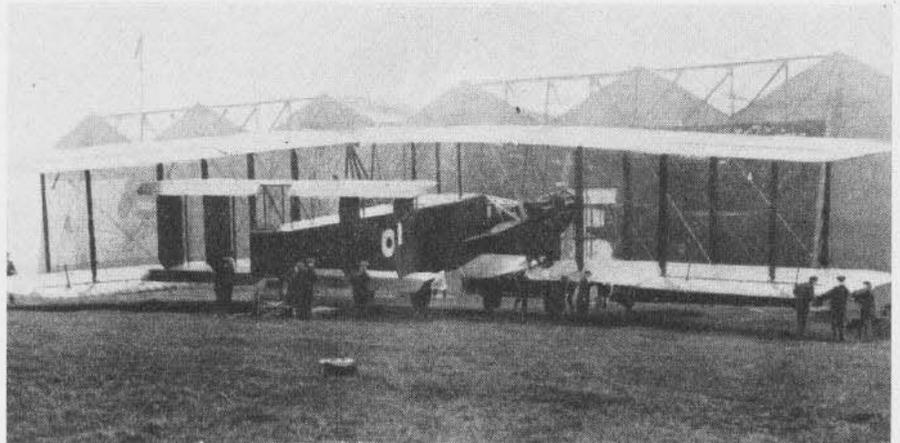
*August 15.*—Naval Air Station taken over from French at Trequier for HTA operations—Lt. A. M. Baldwin, U. S. N. R. F., commanding.

First Northern Bombing Group plane left St. Ingleverte for bombing

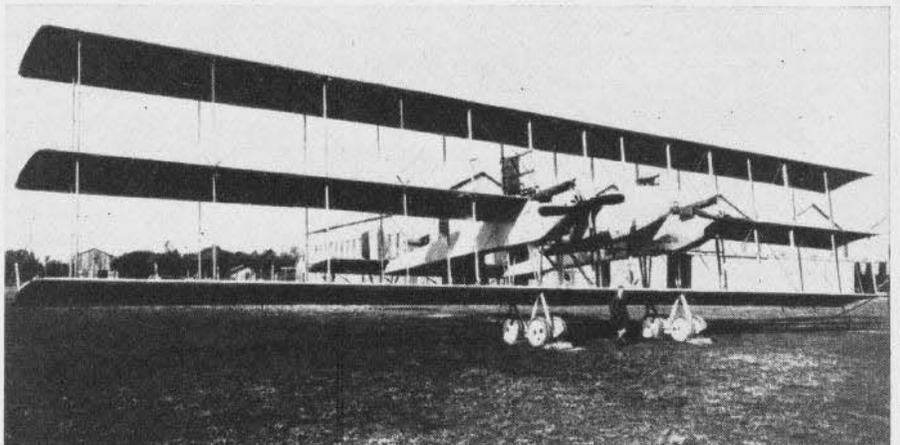
raid at 2100 and dropped explosives on German submarine bases. Between 1,600 and 1,700 pounds of explosives were dropped. This was the Caproni's first and only flight over the front lines, and were then discarded.

*August 20.*—First Navy American-built DH flew in France at Pauillac.

*August 21.*—Porto Corsini, where U. S. Navy pilots were based, received violent bombing raids from the Austrians. The damage was severe.



DARING ALLIED AIRMEN PROPOSED TO RAID BERLIN WITH THIS MONSTROUS HANDLEY-PAGE CREATION



ITALIAN CAPRONI TRIPLANE WAS FITTED WITH THREE FIAT ENGINES OF UNCERTAIN DEPENDABILITY



THREE-PASSENGER LIBERTY-POWERED HS-1 PUSHER BOATS RAN PATROLS OVER THE ENGLISH CHANNEL

THIS is the story of how the boys blew up the Zipper Zu bicycle factory. In getting its story across, the booklet becomes a letter of introduction which might be subtitled, "Meet the Air Combat Information Officer."

The sixth in a series of "Sense" pamphlets issued by BuAer's Training Division, *Air Information Sense* represents the advice of many combat pilots and Air Combat Information officers from all fields of naval air activity. It is a composite of the combined experience of several hundred men, is generously illustrated and written to make reading free and easy.

One of the most important innovations of the war has been the attaching of specially trained officers to all air squadrons and activities in order that pilots and the higher command may more quickly get the latest dope from each other.

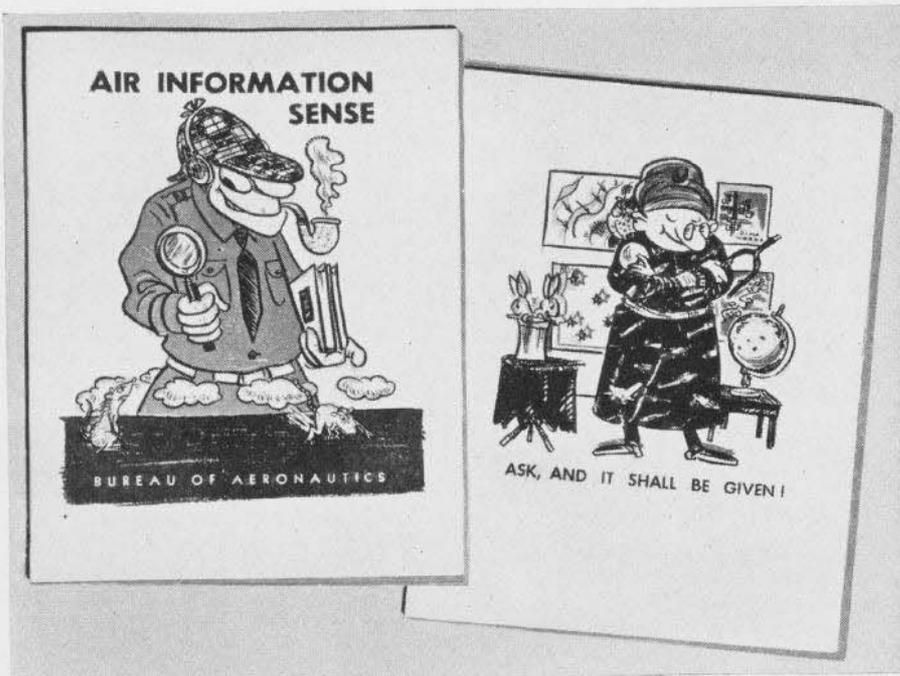
What the ACI officer does, how greatly he helps the combat flyer and what a pilot can look to him for, are all covered. The ACI man is a doctor of information and he's there because veteran pilots asked for this sort of individual to help them.



The story opens in the ready room at 1330 when the skipper comes in and says, "We're going to fly up to Zipper Zu at 1500 today and blow up the bicycle factory." This sets off a lot of activity among the boys, seeing as how they have a short hour and a half to learn all they can about Zipper Zu, navigational problems, weather, cloud coverage, terrain, and many other things. Just when they wish they knew someone with the Word, up walks the ACI officer.

By way of introduction, it is made known that the man with the Word "probably won't be a pilot himself but he'll know something about flying. He'll have studied navigation and tactics, aerology, and communications; but, more important, he'll know what the enemy aircraft and ships look like, about maps and aerial photographs, and how to interpret them. He'll know his geography and what you're going to see unroll beneath you when you make that first hop to

# NEW 'AIR INFORMATION SENSE' BOOKLET READY



COMPOSITE ABILITIES OF ACI OFFICERS HARK BACK TO THE EPISODIC PINKERTON, HOLMES, CHAN

Zipper Zu, or Naples, or Berlin, or Tokyo. He'll try to make you feel at home over enemy country and give you the probable location and kind of welcoming committees that may be waiting for you."

And so the ACI officer gives out with the information about Zipper Zu, but after the mission is completed he will want the pilots to answer some questions for him. He is the medium of exchange, the clearing house

through which the lessons learned are passed on. What the crews see or don't see all adds up to combat information. To crewmen, the pamphlet says: "If you've kept a bright lookout and seen nothing, don't forget to report that you *have* seen nothing."

Pilots are urged to be buddies with the ACI officer. "Don't wait for experience, possibly bitter experience, to teach you. Lend him a hand. Maybe you'll live a lot longer."

## USE THIS FORM TO ORDER "AIR INFORMATION"

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

FROM: \_\_\_\_\_  
(Unit commander)

TO: The Chief of the Bureau of Aeronautics.

SUBJECT: "Air Information Sense" Pamphlet, Request for.

It is requested that \_\_\_\_\_ copies of the subject pamphlet be sent to this activity at the address indicated.

SIGNED: \_\_\_\_\_

Delivery \_\_\_\_\_

address: \_\_\_\_\_

Cut here



# Marine Corps Aviators in Busy Program

**WHILE DEVELOPING FLIGHT  
SKILL, SQUADRONS PERFECT  
EQUIPMENT TO EXACT UT-  
MOST USE IN AIR COMBAT**

**H**HEADQUARTERS Squadron 42 has designed an aerograph mount to be used on SNJ's for proposed aerograph flights. The purpose is to get readings of temperature, pressure, and humidity up to an altitude of approximately 16,000 feet. The department has also designed a detachable rear ring sight for the .30-caliber water-cooled machine gun for training and anti-aircraft use. Except for the material and being mounted on a base that encircles the water jacket, it is similar to the Mark VI rear ring sight and the Mark I post sight.

## **Douglas Transport Salvaged**

**SAN DIEGO.**—Forced down in a wheels-up landing in an open field well off the end of the runway, a Douglas transport plane recently furnished a nice problem in salvage work.

Two Model U-8244-T Autocar crane crash tractors proved their worth in raising the large plane to

a low-body trailer, making it possible to haul it to the A & R shop without additional damage.

## **Step Up Radar Training**

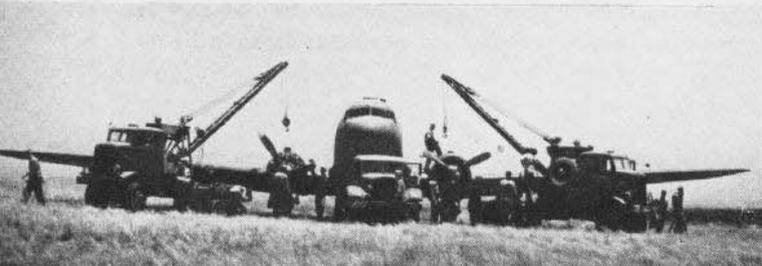
**SANTA BARBARA.**—A Marine base defense aircraft group at this station has supplemented its regular schedule with extensive training in radar operation. The group is cooperating with an Argus unit to acquaint pilots with the fundamentals of radar-controlled interception and give them valuable experience in flying under simulated conditions of fighter-direction. To forestall errors of dead reckoning due to lack of D. F. equipment, it has been found advisable to vector interceptors to a point relative to a definite landmark, where they report "on station," and direct the interception from that position.

## **Pool Transportation Facilities**

**EL TORO.**—Pooling of transportation within the aircraft group has resulted in maintenance costs being cut.



**DOUGLAS TRANSPORT RESTING AFTER FORCED-DOWN-WHEELS-UP LANDING IN CALIFORNIA FLINGS CHALLENGE AT MARINE'S SALVAGE FACILITIES**



**CRANE CRASH TRACTORS LIFT BELLIED PLANE TO LOW-BODY TRAILER**



**ON BORROWED WHEELS CRAFT SAFELY MAKES TRIP TO REPAIR BASE**

The aircraft group has cut maintenance costs in half, decreased gasoline consumption 25 percent, and reduced accidents.

At 500 and 1,000-mile periods, each vehicle received a thorough check-up and complete lubrication. Use of proper lubricants and greases is an all-important factor in keeping maintenance costs down.

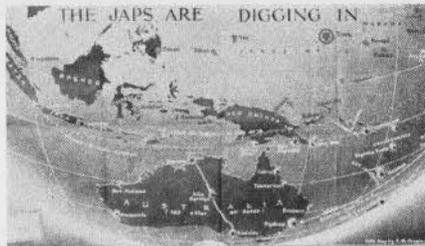
Pooling further benefits a group by allowing greater utilization of manpower, more centralized control and release of individual squadrons from responsibility of furnishing the men necessary for such an activity.

#### Devise Tin Map Containers

MOJAVE.—To take a supply of maps overseas in good condition, group intelligence recently ordered some tin map-containers about 44 inches high and 4¼ inches in diameter. These are satisfactory but hard to get and not quite large enough to be ideal.

A group intelligence officer hit on an idea which has the merit of being workable at any time in the field. Large gallon cans were salvaged from the mess hall and turned over to a metalsmith in service squadron. Seven of these soldered together give a cylinder about 46 inches high and 6 inches in diameter. The top can is crimped, so that half of another can, to which a simple handle has been soldered, may fit over it as a cover.

The container is compact, light, and simple; taped at the cover-joint, it is waterproof. One of the containers has now been filled with water for a month without leaking. For further



**ORIGINAL TIN CONTAINERS KEEP MAPS READABLE** protection, cases may be coated inside and out with zinc chromate primer and any suitable paint finish.

#### A Hobby Is What You Call It

MOJAVE.—Interviewing newly transferred men in an effort to fit them into proper niches in an air group turns up some choice bits of information: One man said that he had no hobbies, but from time to time helped out his brother, who did have the hobby of collecting old match folders; another man maintained that his only hobby was his wife. Most of

the men express a preference to get at the Japs right away—usually as aerial gunner; but one newcomer thought he would be especially qualified for giving guitar lessons.

#### Plasticene Relief Maps Superior

MOJAVE.—Air combat intelligence has been making experiments with plasticene relief maps for demonstration purposes and finds them superior to the flat surface drawings, especially in getting across the ideas of relief and of contours.

#### Paper Chutes Save Silk

CHERRY POINT.—Paper is more plentiful than silk so experiments have been made at this station with paper parachutes to land rations, ammunition, and medical supplies.

The 6-foot parachutes were tested under all kinds of conditions and found to have a multitude of uses as expendable cargo chutes. They are capable of carrying loads up to 25 pounds.

Tests showed they could be dropped from altitudes as low as 25 feet and still function. The value of the paper chutes over water was demonstrated by the fact that the paper, upon hitting the water, disintegrated and did not cause the cargo to drift away from a raft or boat.

#### Radio Jeep Does Many Jobs

SAN DIEGO.—Use of a radio jeep as stand-by equipment to take over control of the field during control-tower failure has proved valuable.

The radio jeep is also used as liaison between the tower and site of emergency work, and also is valuable in training pilots in lost plane procedure.

## Compact Medical Kit

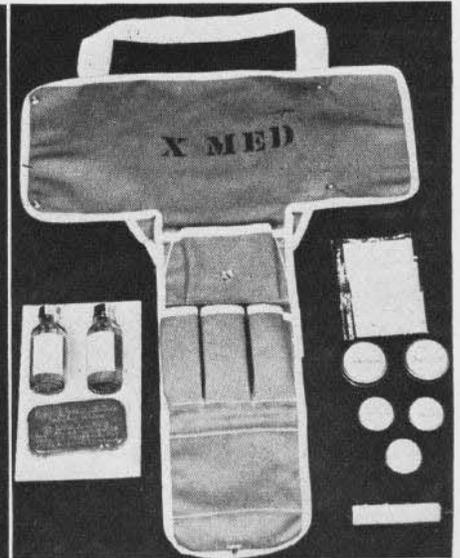
EL TORO.—Pilots of an aircraft group here, while in a war zone, secured a compact kit of medical supplies which could be strapped on like a shoulder holster.

The kit, which has been submitted to the division of aviation medicine for approval, is fitted with several pockets containing standard medical ointment tins and appropriate containers.

Supplies in the kit are 45 atabrine tablets, 20 sulfathiazole tablets, six 10-grain capsules of aspirin and half-grain capsules of codeine, two large cans of 10-percent sulfathiazole ointment, three packets of sulfanilamide powder, one small bottle of dressing, a tube of tincture of iodine and ounce bottles of brandy. All are useful items.



**MEDICAL KIT STRAPS ON AS SHOULDER HOLSTER**



**KEEPS VITAL MEDICAL SUPPLIES AT FINGER TIPS**

# PLANE

## COAST GUARD PRIMES OWN MACHINIST'S MATES TO FILL AVIATION BILLETS

THE Coast Guard's only aviation machinist's mate school is located at San Diego. There it is quietly but efficiently doing a thorough job of training enlisted personnel in aviation mechanics. The school started two years ago with eight green students and one instructor. Today it has 15 instructors, complete modern equipment and 150 alumni.

For two months at San Diego, mechs-to-be jump through the hurdles of basic mechanical training comprised of nomenclature and blueprint. Digesting these, they move into five months of engine assembly, disassembly, operation, cable splicing, fabric, paint and dope, accessories and props. They also study welding, precision machinery, parachute handling, and other fundamental aviation jobs.

### Practical Experience Gets Priority

Like all schools, San Diego's CG classrooms require a fair share of textbook reading, but fifty percent of the students' time is spent under actual conditions experienced in operations and overhaul work. To get the feel of an A & R shop in operation, budding mechs work out on Coast Guard PBV's, Grumman patrol boats, Douglas *Dolphins*, and Hall boats.

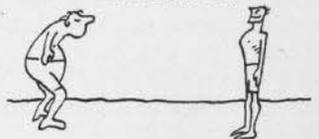
Knotty problems being an inseparable part of technical aviation, San Diego attempts to give the men a real taste of assembly and repair duty so that they can develop resourcefulness in handling maintenance.

Because of the unique position the school occupies, as well as the fact that it is the Coast Guard's only complete aviation overhaul station in the country, other CG activities draw on San Diego for their complements of airplane mechanics.

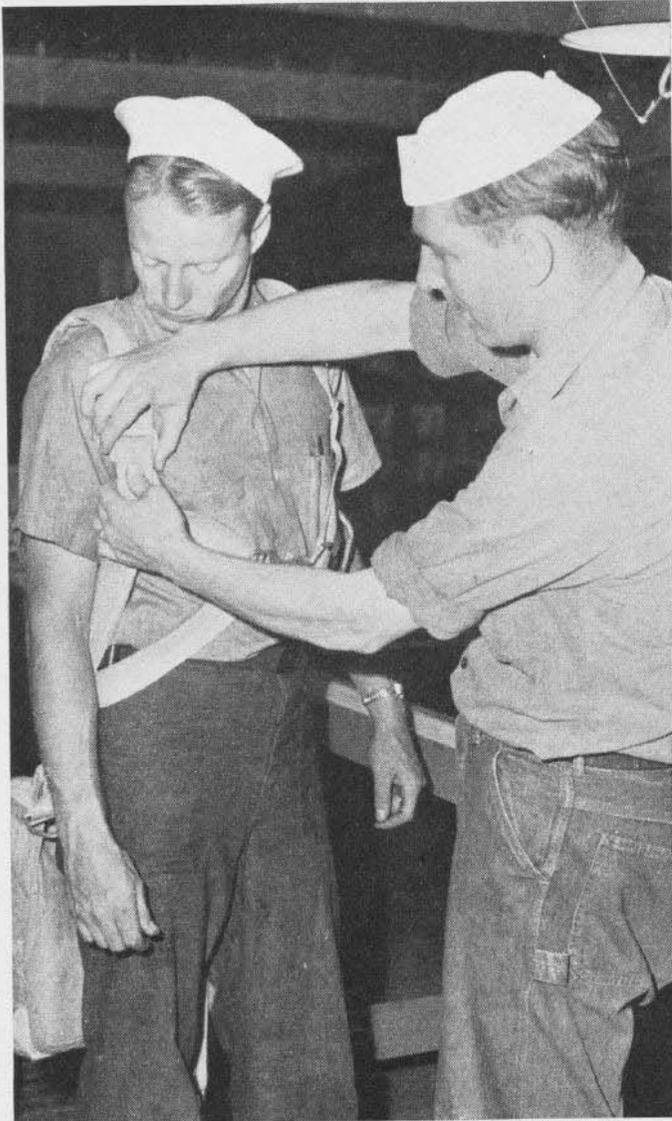


RIBSTITCHING MERCERIZED COTTON COVER TO STABILIZER FRAME DEMANDS PROFESSIONAL KNACK

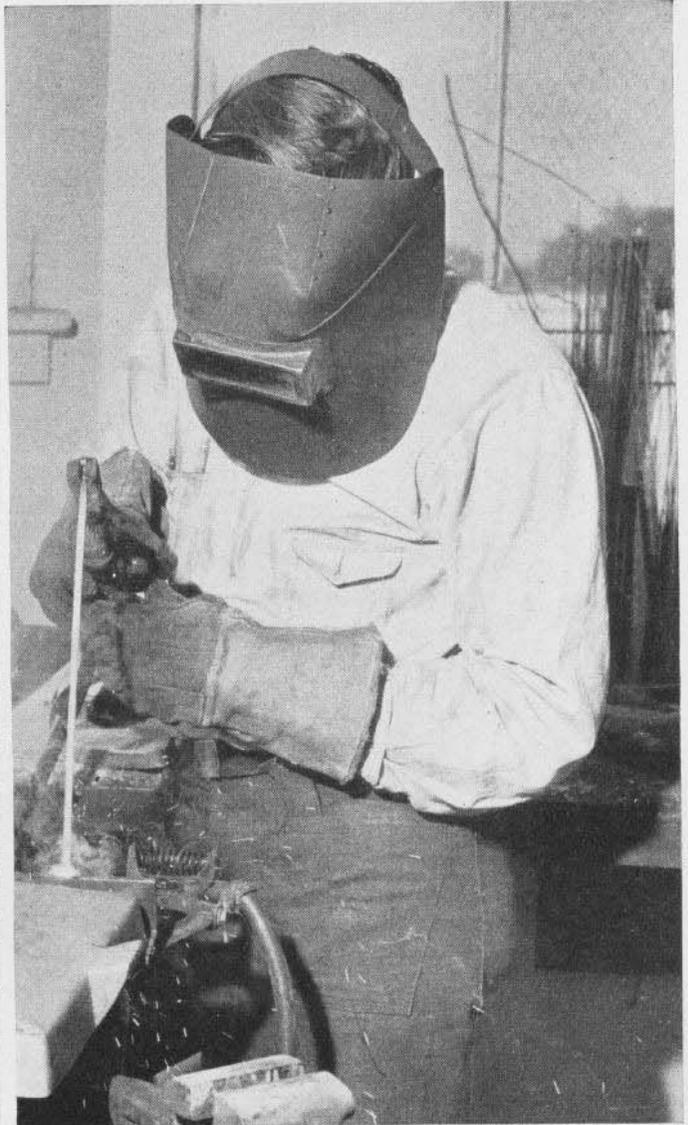
WHAT KIND OF CONDITION  
ARE YOU IN?



# CAPTAINS IN THE MAKING



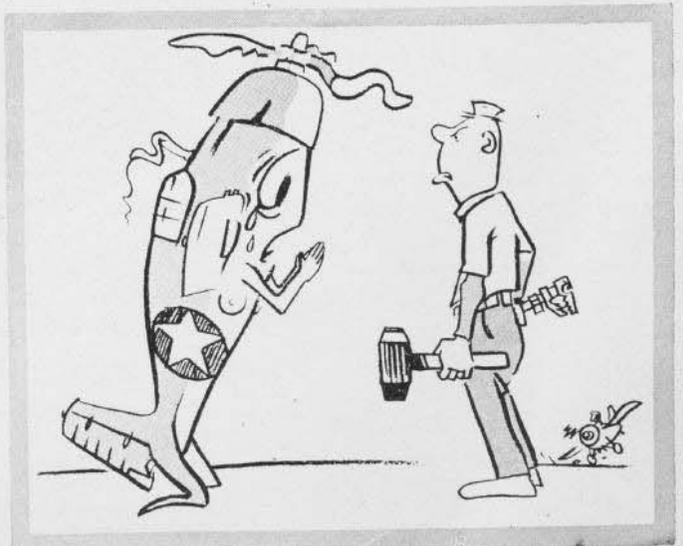
COAST GUARD TRAINS RATINGS TO HANDLE EMERGENCY EQUIPMENT



CRUCIAL MOMENTS CALL FOR EXPERT WELDING ON SHORT NOTICE



FRIEND OR FOE, PLANES MUST BE KNOWN TO COAST GUARD AMM'S



'SPOILER WAS HELL ON PLANES' SAYS CARTOON IN NEW SERIES

# TECHNICALLY SPEAKING

## Replacement Bracket Made Prevents Motion in Elevation

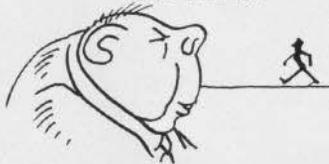
NAS, JACKSONVILLE.—A temporary elevation gear replacement bracket has been designed at this station to replace the elevation gear box in the Emerson-Grumman turret, Mark 1, while repairs are being made to the box.

Without this bracket the .50 caliber turret gun is free to move up and down, thus causing the plane to be grounded. The temporary elevation gear replacement consists of a vertical side of  $\frac{3}{32}$ -inch thick sheet metal, 6 by 6 inches, and a top side of the same material and of approximately the same area as that covered by the elevation gear box. Holes are punched in this member to conform to the hole spacing in the elevation gear box. Five rivets attach a section of gear which was fashioned from a salvaged piece of stationary elevation gear to the vertical side.

This attached gear meshes with the stationary gear while the gear box is removed, thus preventing any motion in elevation. The gear on the vertical side is located  $3\frac{1}{4}$  inches from the top of the horizontal side. The elongated hole in the center of the horizontal side allows entrance of the elevation drive motor to the bracket. The horizontal and vertical sides are held together by a bead "V" weld at an angle of 90 degrees. A plus or minus three degrees in the angle of the weld would be permissible.

With the installation of this attachment, the turret can be operated electrically or manually without affecting elevation gear or elevation motor. This would allow emergency use of turret by aerial gunners, since only the

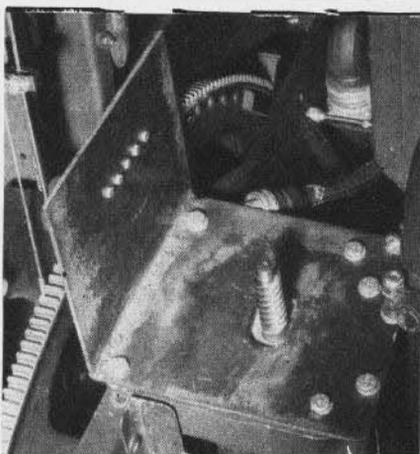
WHAT KIND OF CONDITION  
ARE YOU IN?



## PLEASE DON'T DEPT.

Frequently a good idea reaches *BuAer* News poorly described. Normally, it should be published to other activities waiting for original gems. But what happens? The item cannot be used half-described. Busy *BuAer* News probably has to write back for more information. Or the item kicks around various technical divisions who try to solve the riddle. Finally, everybody is thoroughly discouraged and decides maybe it isn't such a good gadget after all . . . and gives up.

So if you wish to be an active member of the Society for Dissemination of Useful Ideas, be complete and intelligible when you submit yours. Be sure that pictures are captioned adequately and cross-referenced to the text.



BRACKET FROM SCRAP PILE KEEPS 'EM SHOOTING

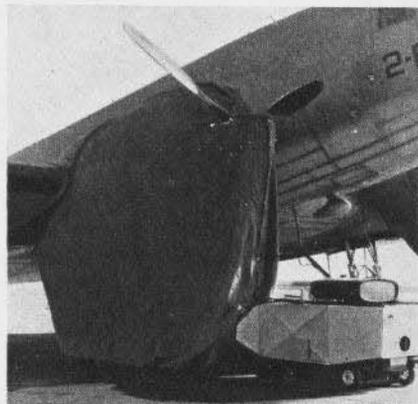
elevation mechanism is decommissioned. The attachment also allows the plane to be kept in commission while more intricate repairs or replacements are being made on gear box.

[DESIGNED BY WALTER A. ROUTHOU, AOM1c; CHARLES M. HORTON, AOM2c AND JOHN A. YANKOVICH, AOM2c.]

► **BUREAU COMMENT**—This is a straightforward and ingenious method of keeping the Avenger turret gun locked in elevation while the elevation gear is removed for repairs or replacement. Parts for fabrication of this bracket should be readily obtainable from local naval air station stock or salvage piles.

## Engine Heaters Modified Expelled Warm Air Reheated

NAS, SEATTLE.—To increase efficiency, Herman Nelson aircraft engine heaters have been modified at



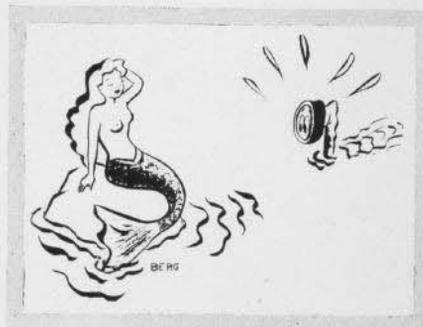
MODIFICATION MAKES ENGINE HEATERS HOTTER

this station to provide a recirculating flow of air.

The original heaters drew outside air through the heating unit and forced it into the engine cover. In the modified unit, the air from inside the engine cover is reheated and driven back into the cover, thus taking advantage of its already warm condition.

Modification of the heater consisted of adding a duct to the unit and combining the two original 11-inch outlets to form one 11-inch outlet with a 45-degree elbow to direct heated air to the nacelle.

When the outside air temperature was 36 degrees, tests showed the inside temperature was 72 degrees in the standard heater and 128 degrees in the modified unit. The oil temperature rise was from zero centigrade to 29 degrees in 1 hour.



## Torpedo Director Device

### Foreshadows BuAer's Trainer

NAS, JACKSONVILLE. — Ground training in operation of the Mk 28 director and torpedo problem practice are being accomplished successfully here through use of a torpedo director device.

The device consists of pilot's cart, target and pelorus, the former being a seat mounted on casters. Airplane steering can be simulated, as forward caster is steerable with rudder linkage. A standard torpedo director is mounted on the mast in front of pilot, and 50-ft. steel tape is attached to reel on mast.

Target is a plywood ship model in silhouette, hung on side of standard bombing motor-driven target. Pelorus is mounted on a standard and used to check target angle. The device is scaled at 1- to 100-ft

### Students Alternate Positions

Students work in three-man teams,

and alternate positions as pilot, target man, and observer. Pilot sits in cart and prepares the director for his run. Observer pushes cart forward at a slow walk (two knots equals 200-knot air-speed). This speed is indicated by a speedometer on the cart. Pilot steers course which will put him in position to begin attack from approximately 150 feet (5,000 yards) off bow of target. Meanwhile, target man has set target in motion and established its course.

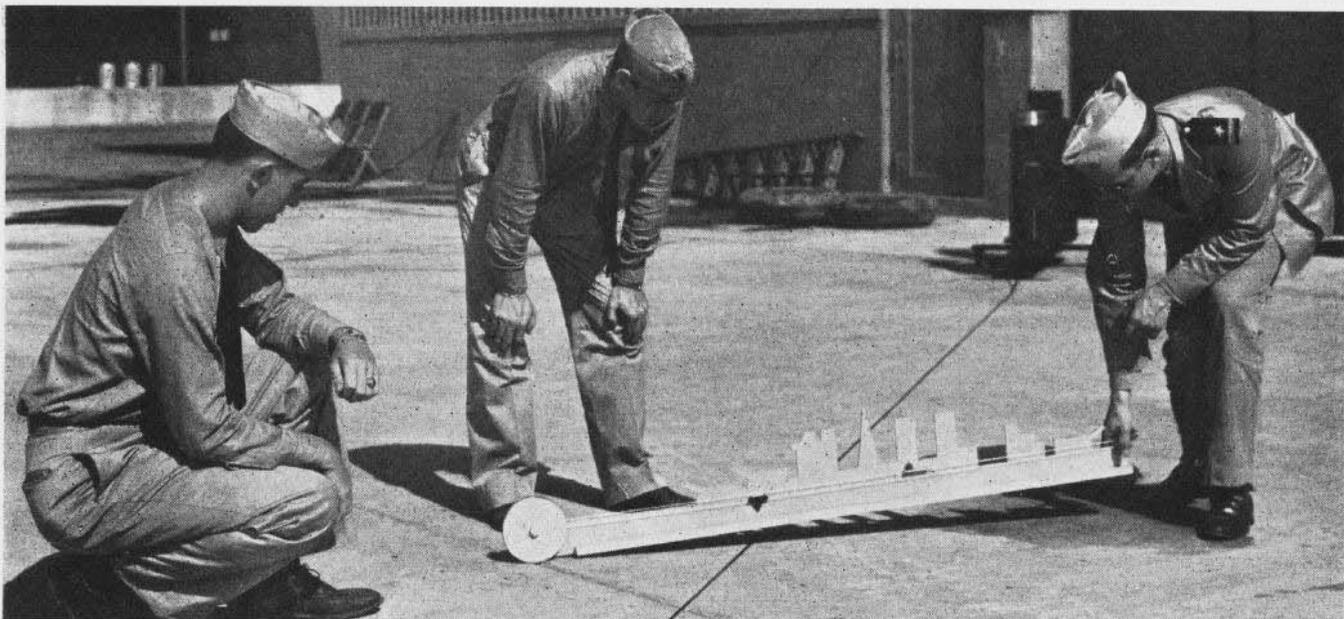
During run on target pilot must set director for target speed and angle, and maneuver his cart so that he will be at desired range and selected target angle when drop is made.

Pilot makes his drop and cart is stopped by a brake. Target man stops target. Pilot leaves cart and runs steel tape forward well beyond point where target course will intercept it. Target is then rolled forward by hand and a special type indicator on target shows if hit has been made.

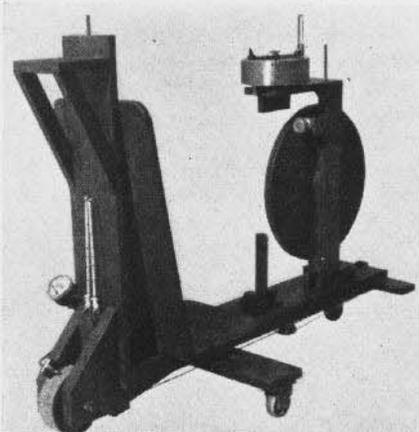
► BUREAU COMMENT—BuAer's Training Division will make available in September a quantity of 25 Mechanical Torpedo Attack Trainers, Device 14-G, for evaluation and test by interested activities.

Device 14-G is similar to the trainer now used at Jacksonville but will possess additional desirable features. It consists of a small motor driven scooter aircraft which will launch a self-propelled torpedo at a maneuvering ship model. The "aircraft" is flown by means of conventional aircraft controls, and contains instruments and switches necessitating proper check-off procedure and pilot's attention to flight altitude and air speed during a "run" in addition to proper use of director.

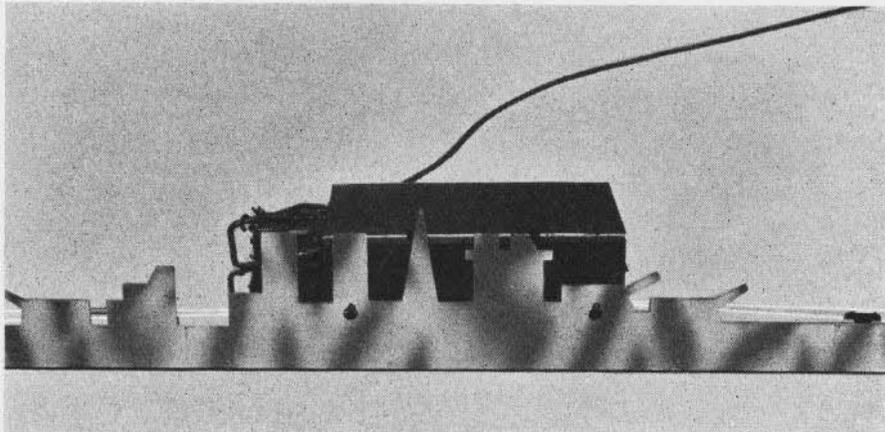
The instructor may introduce these factors individually as desired in order to build up student's ability to coordinate all actions necessary to successful torpedo attack. The device will be equipped with Mk 30 Torpedo Director. A similar device has proved useful in the training program of Army Air Forces.



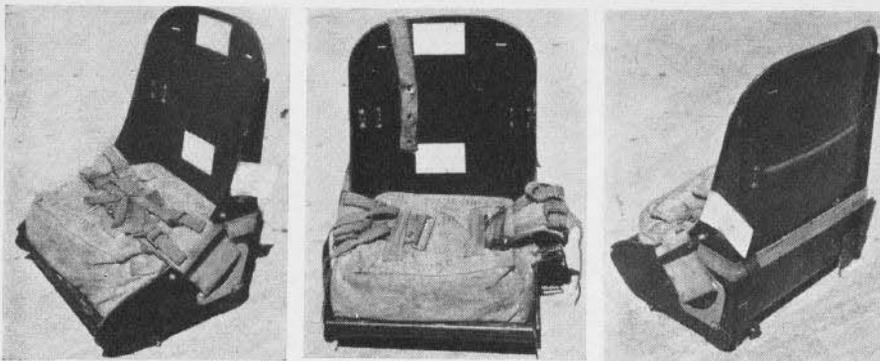
JACKSONVILLE STUDENTS WORK IN THREE-MAN TEAMS, ALTERNATING POSITIONS AS PILOT, TARGET MAN, OBSERVER ON TORPEDO DIRECTOR DEVICE



PILOT SITS IN CART, PREPARES FOR HIS RUN



TARGET IS PLYWOOD MODEL IN SILHOUETTE, SCALED 1:100 FT., ATTACHED TO MOTOR-DRIVEN UNIT



TO AVERT ACCIDENTS, NEWLY CONSTRUCTED ADJUSTABLE BAG IS STRAPPED TO BACK OF SEAT

## Pensacola's Sandbag Steps Taken To Avoid Accidents

NAS, PENSACOLA—Prior to publication of information on sandbags by the Bureau, a fatal accident at this station necessitated redesign of the type of sandbag then used.

Examination of the sandbag after the accident showed that the covering had deformed during a formation break-up, allowing sand to flow over the lip of the seat and jamming control stick in forward position.

To prevent similar accidents, a sandbag, believed comparable in merit and of much simpler construction than that designed by the Bureau, was de-

veloped. This type has been used successfully for the past 18 months.

It is made of 16-oz. canvas, sewed with waxed sail-twine. Its over-all dimensions are 18" x 18" x 7". It is held in rigid shape by plank reinforcement in top of the bag. This reinforcement material consists of six 1" x 6" x 18" wood planks with rounded corners.

The bag is filled with 125 pounds of gravel. Two beackets made of 1 3/4" x 10" web strap are sewed on top of the bag 8" apart, leaving a 6" loop to accommodate the safety belt.

The strap around the back of the seat is made of discarded parachute harness 1 3/4" x 36" sewed on one side

of the bag. It runs around the back of the seat and is fastened into a buckle sewed on the other side of the bag. This strap has three grommets so as to fit any size seat.

► **BUREAU COMMENT**—NAS Pensacola is to be complimented for the ingenuity shown in designing this method of securing sandbags. For further information on methods of sandbag fastening, reference should be made to BuAer Circular Letter Aer-E-2565 HMS, N12-3, NP11, Serial #11359, dated 23 Jan., 1943.

## Exhaust Heating System BuAer Reviews Background

PATROL SQUADRON 42, PACIFIC.—An exhaust heating system has been suggested by personnel of this Squadron, devised for naval aircraft to replace the present gasoline system, which some flight crews consider dangerous and "finicky." Exhaust heaters have been used successfully for a number of years in other types of planes and have proved efficient in operation, light in weight and simple in construction.

► **BUREAU COMMENT**—Exhaust type cabin and cockpit heating systems have been used for a number of years in numerous Navy land planes such as the R50's, JRB's, and recently in the TBF-1 and for windshield defrosting in the F4F-3's and SBD's. The advantages of exhaust type heaters are simplicity and reliability. The disadvantages are the possibility of carbon monoxide contamination, and the fact that they produce no heat except when the main engines are running.

As far as existing airplanes are concerned the installation of exhaust type systems is complicated by the mechanical and structural problems involved in running relatively large hot-air ducts from the engine into the cabin or cockpit and also by the fact that many exhaust collecting systems are not suitable for the installation of the necessary heat exchanger and many engine nacelles are too crowded to accommodate any additional equipment.

One of the main reasons why combustion heaters have been installed in seaplanes is that it was felt necessary to provide some heat for these airplanes while at rest on the water with engines not running. Comments of activities operating seaplanes on the importance of having heat while the main engines are not running will be appreciated by the Bureau.

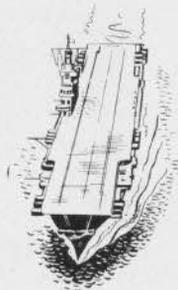
### Only Steam Safe

The Bureau has received many reports concerning all types of heating systems. The only

## SHOW ME THE WAY TO GO HOME

### Geographic Sector Search

On May 20, 1943, you are ordered to depart from the U.S.S. *Ranger* at 0845 to scout a geographic sector from 140° to 160° for a distance of 134 miles and return to the ship. The *Ranger* at 0845 is at lat. 52° - 18' N., long. 36° - 06' W., and is on course 276°, speed 18 k. True airspeed is 122 k. Variation 32° W. Aerology reports the wind at assigned flight altitude as 22 k. from 030°.



#### Required:

	1st leg	2d leg	3d leg
Magnetic heading			
Course			
Ground speed			
Miles on course			
Time to turn			ETI

Direction of relative movement.

Speed of relative movement.

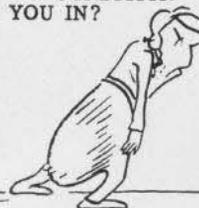
Position of interception:

Lat. \_\_\_\_\_

Long. \_\_\_\_\_

(Answers on page 29)

WHAT KIND OF CONDITION  
ARE YOU IN?





# PARACHUTES

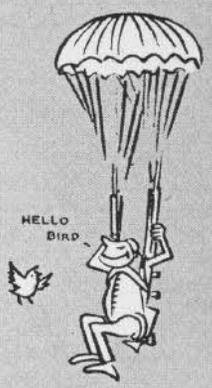
QUICK ATTACHABLE CHEST TYPE



CARRY BY PACK HANDLE

## How to Carry—How to Wear

Even Dilbert knows that the time to learn how to handle a chute is before bailing out—not after! To help standardize procedure in handling parachutes, BuAer NEWS illustrates the proper way of carrying and wearing various types of chute equipment.



SERVICE SEAT TYPE



CARRY BY MAIN SLING

ADJUST HARNESS PROPERLY

SERVICE BACK TYPE



CARRY BY MAIN SLING

ADJUST HARNESS PROPERLY

## New Safety Belt Tester

### BuAer Asks Data on Need

NAS, MINNEAPOLIS.—A new safety belt tester made from the Studebaker hydraulic vise has been devised here. Attaching an oil-pressure gauge showing pounds per square inch to the hydraulic lines between pressure pump on foot pedal and hydraulic vise, an accurate pressure in pounds per square inch registers on the pressure gauge after the dial has been calculated. The safety triangles at each end of the belt are made by bending and welding a one-half inch mild steel rod. Another triangle leading from the jaw of vise is hooked to one of these triangles at one end of the belt. A mild steel rod with single hook in one end and double hook on the other is fastened to the end of the table, the single hook end being fastened to the other triangle on the safety belt.

After the belt has been fastened in place, the correct test pressure can be obtained by pumping pressure pedal on the hydraulic vise, which closes the jaw and registers amount of pressure on the gauge. This design for a safety-belt test can be detached and the hydraulic vise used as a regular vise. To do this a stop cock is inserted between pressure pedal and gauge, which is closed when being used as a vise.

[DESIGNED BY H. C. WAHLSTROM, ACMM]

► **BUREAU COMMENT**—This appears to be a good idea for stations equipped with this type vise. Information is requested from stations as to their possible needs for a safety-belt or parachute-harness testing apparatus.

## BuOrd Sketch Ready

### Helps in Antisub Bombing

A new BuOrd publication should prove of great interest in low-altitude horizontal bombing. The publication is known as Ord Sketch #120485 *Sight Depression Angle and Correction of Low-Altitude Horizontal Bombing*.

This sketch makes it possible to compute the sight depression angle for any combination of ground speed and releases altitude. Corrections for air resistance, vertical and horizontal parallax, and time lag also are included.

This nomogram should be standard equipment for all squadrons concerned with antisubmarine bombing. It is urgently recommended that squadrons procure it from any of the 18 standard ordnance supply points.

## More Information Asked

Following issuance of the original PBM-3 power plant operating instructions, more conservative instructions were issued in bulletin form in an attempt to alleviate power-plant difficulties, including valve burning. The type of difficulty being experi-

enced with R-2600-12 engines is associated with operating methods and techniques. It would facilitate analysis if activities submitting RUDM's were to include information concerning the approximate amount of operating time accumulated at various power settings, mixture control positions used, average gross weights, and average cylinder-head temperatures.

(Succeeds list of June 15, 1943)

### NUMBER AND DATE OF ISSUE OF LAST SERVICE AND OBSOLESCENT AIRPLANE BULLETINS AND CHANGES (CONTRACT CHANGES NOT INCLUDED)

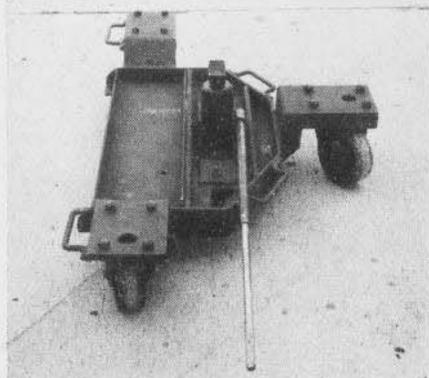
July 15, 1943

Airplane	Bulletin	Date	Change	Date
BD-2	6	5-22-43	18	6-19-43
F4F-3	41	6-17-43	128	5-24-43
F4F-3A	34	6-17-43	105	3-30-43
F4F-4	35	6-17-43	89	5-25-43
F4F-7	9	6-17-43	33	5-24-43
F6F-3	7	7-7-43	23	7-3-43
FM-1	15	6-17-43	34	7-3-43
F4U-1	14	6-10-43	61	6-15-43
GH-1	6	3-3-43	13	6-17-43
J2F-1	40	6-7-43	57	5-4-43
J2F-2	21	6-7-43	38	5-4-43
J2F-2A	14	6-7-43	39	5-4-43
J2F-3	15	6-7-43	28	5-4-43
J2F-4	10	6-7-43	21	5-4-43
J2F-5	11	6-7-43	14	5-4-43
JRF-1	8	7-23-42	9	5-25-43
JRF-1A	8	7-23-42	10	5-25-43
JRF-4	4	7-23-42	7	5-25-43
JRF-5	4	7-23-42	5	5-25-43
OS2N-1	24	6-23-43	27	5-8-43
OS2U-1	44	6-16-43	61	4-1-43
OS2U-2	56	6-16-43	73	4-1-43
OS2U-3	48	6-16-43	60	3-25-43
PV-1	6	6-28-43	34	7-5-43
PBM-3	28	6-30-43	80	7-3-43
PBM-3C	24	6-22-43	36	7-3-43
PBM-3R	20	6-30-43	75	7-3-43
PBM-3S	1	6-22-43	4	7-3-43
PBN-1	2	3-26-43	7	7-5-43
PBO-1	2	7-1-42	10	5-13-43
PBY-5	34	5-10-43	126	6-7-43
PBY-5A	39	5-10-43	121	6-16-43
PBY-5B	2	4-28-43	26	6-16-43
PB2Y-3	6	5-18-43	69	6-24-43
PB2Y-3R	5	7-2-43	57	6-24-43
PB4Y-1	18	6-25-43	31	6-30-43
R4D-1	10	6-23-43	13	3-11-43
R5D-1	1	5-26-43	13	6-24-43
SBD-1	52	6-17-43	100	5-8-43
SBD-1P	37	6-17-43	60	5-8-43
SBD-2	55	6-17-43	109	5-17-43
SBD-2P	41	6-17-43	72	5-17-43
SBD-3	68	6-17-43	127	5-17-43
SBD-3P	55	6-17-43	110	5-28-43
SBD-4	19	6-17-43	32	5-28-43
SBD-5	7	6-17-43	11	6-10-43
SB2A-4	0		49	7-5-43
SNB-1	6	6-10-43	13	5-24-43
SNJ-4	12	5-10-43	15	6-23-43
SNV-1	8	10-24-42	31	6-4-43
SO3C-1	20	6-16-43	44	6-11-43
SO3C-2	12	6-16-43	29	6-7-43
SO3C-2C	2	6-16-43	2	1-20-43
TBF-1	58	7-3-43	126	6-16-43

## Hydraulic Crab Dolly

### NAS Develops Satisfactory Type

The Bureau has received numerous requests from the field for information pertaining to equipment that can be used for spotting airplanes in close quarters and moving airplanes with flat tires or damaged wheels. NAS, Roosevelt Base, has submitted an excellent design of a hydraulic crab



DOLLY CAN SPOT PLANES IN CLOSE QUARTERS



IT CAN BE USED ON SMOOTH RUNWAYS AND DECKS

dolly which it has developed and which has proven successful in use for these purposes. This dolly can easily be manufactured at any air station.

► **BUREAU COMMENT**—The Bureau is experimenting with and testing several types of hydraulic crab dollies for use on carriers, air stations, and advanced bases. This particular design of dolly is suitable for use on smooth runways and hangar deck. The size of casters and stability over rough terrain limit its use and applicability. Further information and photos are requested from the field in connection with any other dollies of this nature that are in use at various naval air activities.

Asked what he'd done with his pay, a NATTC seaman second answered, "Part went for liquor, part for women, and the rest I spent foolishly."

#### BEST ANSWERS

To questions on page 19

1. c 2. e 3. d 4. d 5. a 6. c

# LETTERS

SIRS:

*BuAer News*, July 15, 1943, under "25 Years Ago This Month" states that Lt. Comdr. J. L. Callan, USNR, commanded the U. S. Naval Air Station established at Porto Corsini, Italy, July 23, 1918.

This statement is an error, as this station and the squadron based at the station were commanded during its entire commissioned status by Lt. W. B. Haviland, USNR.

Lt. Comdr. Callan's duties in Italy were those of Aviation Aide on the staff of the Force Commander, with headquarters in Rome.

W. B. HAVILAND, *Comdr. USNR.*  
WHIDBEY ISLAND, WASH.

SIRS:

It is respectfully requested that this office be listed to receive an additional copy of *BuAer News* for distribution to the Greek Ministry of Marine, Alexandria, Egypt.

OFFICE OF THE NAVAL ATTACHE,  
Cairo, Egypt.

SIRS:

It would be appreciated if you would send 13 copies of *BuAer News* to the British Air Commission, Navy Representative's Office, instead of the 4 copies which you are now sending.

It is considered by this office that *BuAer News* contains a large amount of information which would be of use to the British Admiralty, and Ministry of Aircraft Production in U. K., consequently it is our desire to send them current copies.

SENIOR NAVAL REPRESENTATIVE,  
*British Air Commission.*  
WASHINGTON, D. C.

SIRS:

An experiment was conducted by this squadron to determine the weight of the OS2U-3's as we operate them. It was desired to compute the weight from data in the Erection and Maintenance Manual and to compare this figure with the weight found by actual use of scales.

For weighing the aircraft we used five (1,000-lb.) scales. The plane was hoisted by an endless chain fall, then lowered away to the scales placed as follows:

1. Each front wheel was supported by boards laid across the platforms of two scales.
2. The tail wheel was supported by one scale.

(The weight must be evenly distributed between the two scales supporting a front wheel or the 1,000-lb. limit will be exceeded and the weight cannot be read from the balance arm.)

By adding the readings of all five scales and subtracting the dead weight (boards, etc., used to support plane on scales) the weight of the plane was determined.

It is considered that this experiment might be of interest to some squadrons in the field because the maximum weight that can be handled in this manner is limited only by (1) hoisting facilities, (2) number of 1,000-lb. scales obtainable and, (3) satisfactory methods of obtaining weight distribution.

COMMANDER,  
SCOUTING SQUADRON 36.

SIRS:

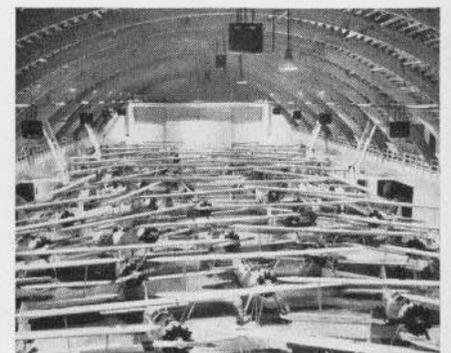
In letter R-1126 on pages 6-7 of the Navy Department *Bulletin* for June 15, 1943, new uniform regulations are established. Information is requested whether this establishes a new uniform whereby blue "service" with full gold stripes is called a "dress" uniform.

COMMANDING OFFICER,  
NAS, SANFORD.

¶Letter R-1126 has been canceled by letter R-1199, pages 5-6, Navy Department *Bulletin* for July 15, 1943. Letter R-1199 makes it optional for officers to wear half lace on sleeves of blue uniforms, service or dress.

SIRS:

The uses of drill halls at flight units of this command are manifold. They are used for drilling and physical training during inclement weather throughout the year, for athletic activities and as auditoriums. Another highly important function for which they are only infrequently used, is emergency housing of planes.



Such a use of the drill hall recently was made at NAS Norman during the imminence of winds of tornado proportions. Fortunately, the winds did not strike this station. Had they done so, however, it is felt that the cost of this building in manpower, materials, and monies would have been justified for this single occasion alone. It is felt that this is not mere speculation, but is borne out by incidents at other stations.

CNAPRIMTRA,  
KANSAS CITY, KANS.



## A NAVY FLYER'S CREED

*I am a United States Navy flyer.*

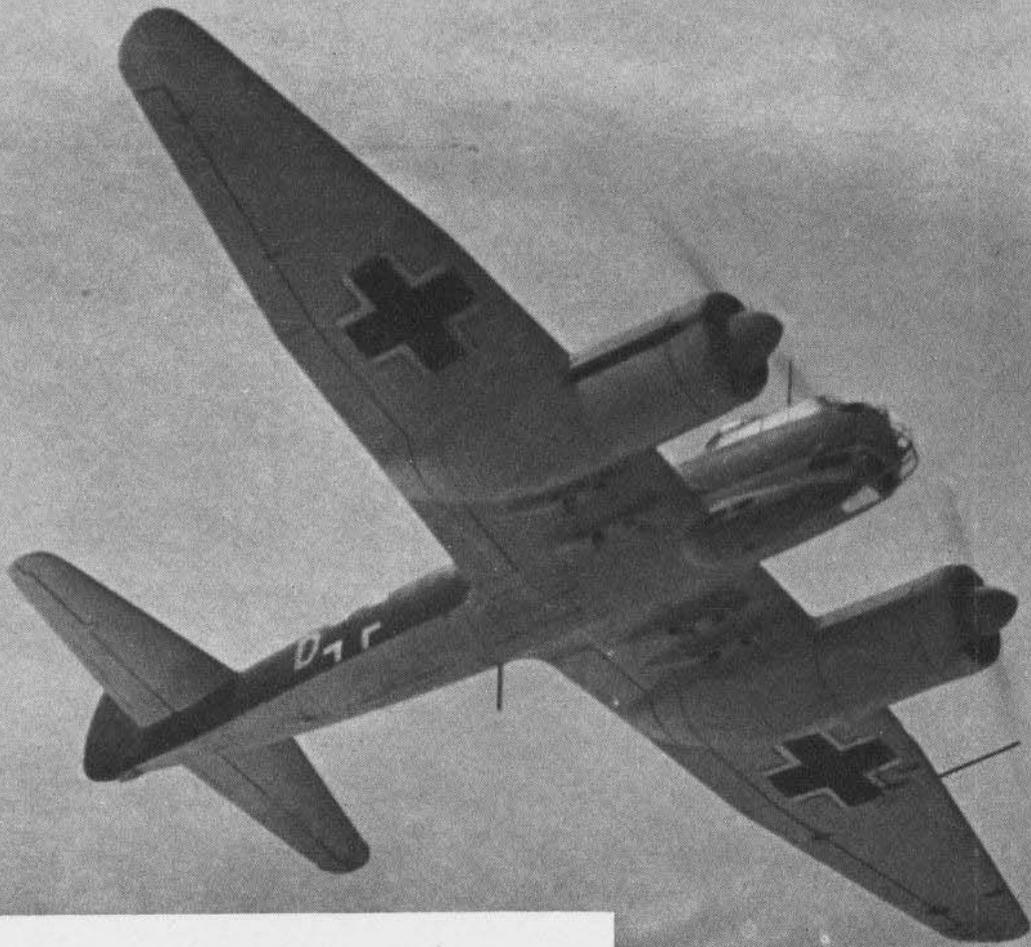
*My countrymen built the best airplane in the world and entrusted it to me. They trained me to fly it. I will use it to the absolute limit of my power.*

*With my fellow pilots, air crews, and deck crews, my plane and I will do anything necessary to carry out our tremendous responsibilities, I will always remember we are part of an unbeatable combat team—the United States Navy.*

*When the going is fast and rough, I will not falter. I will be uncompromising in every blow I strike. I will be humble in victory.*

*I am a United States Navy flyer. I have dedicated myself to my country, with its many millions of all races, colors, and creeds. They and their way of life are worthy of my greatest protective effort.*

*I ask the help of God in making that effort great enough.*



## JUNKERS Ju 88

### GERMAN BOMBER

Span—66 feet.

Length—47 feet.

Service Ceiling—30,000 feet (no load),  
19,000 feet (normal load).

Maximum Speed—287 m. p. h. at  
14,000 feet (no load). 269 m. p. h.  
at 14,000 feet (no load).

**DISTINGUISHING FEATURES**—Twin-engine, low-wing monoplane. Heavy radial type engine nacelles protrude well out from wing. Engines in line with nose. Narrow fuselage with off-center bomber's position under nose. Wings tapered in outer panels with rounded tips. Cockpit well forward. Tapered stabilizer and elevators with blunt tips. The plane has single fin and rudder.

**INTEREST**—The Ju 88 is one of the chief offensive weapons of the Nazis. In service on all fronts, it is used as a day and night fighter and for dive and level bombing of both land and sea targets. Its liquid-cooled engines resemble radials because of the circular radiators. Bomber version can be fitted with jettisonable rocket devices under the wings to assist in take-off.

