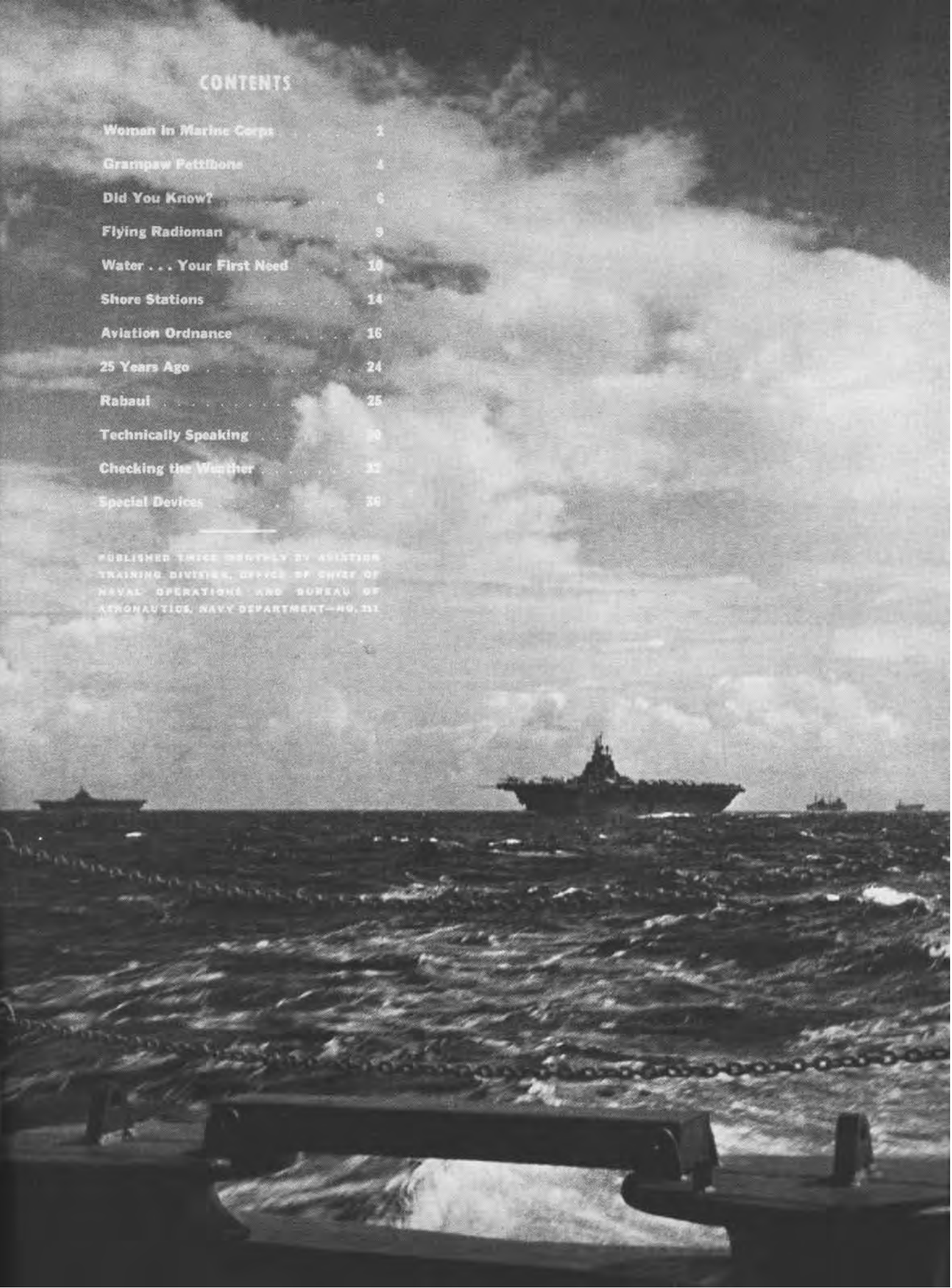
NAVAL AVIATION NEWS

Aviation Ordnance
Women in Marine Corps
Special Devices

Feb. 15, 1944

RESTRICTED



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WOMEN IN MARINE CORPS

THE MARINE CORPS has always been known for thoroughness of recruit training, and the same basic principles are now applied to Women Reserves. Although boot camp is a sharp transition from civilian life, Women Reserves adapt themselves and respond to Marine Corps indoctrination.

Every two weeks more than 500 women from all parts of the country report to the Recruit Depot at Camp Lejeune to be molded into "Women in Uniform." Their training consists of boot camp which continues for six weeks. Women Reserves go to school, fall in and fall out, stand by to stand by, learn to salute smartly, walk rhythmically, hold their heads proudly, and live up to Marine Corps' tradition of smartness.

Every day is a full one, and the WR's are on the double from morn to night. They hit the deck at 0545, police the barracks, chow at 0645, stand inspection, attend classes from 0800 to 1130, then chow again at noon, spend until 1600 in more classes, go in for physical education, squeeze in a half hour liberty, and chow again at 1730. Their evenings are spent boning up for the next day's exams, often totaling as many as five.

Probably the high spot of boot camp is learning to swing along to the tobacco auctioneer chant of the D.I.'s from P.I. (drill instructors from Parris Island). The D.I.'s are firm, but tactful and resourceful. Their most effective method of "getting the best out of a girl on the drill field is to insult her intelligence, and it brings results!" However, one D.I. was slightly abashed when he reprimanded a spirited WR and she fired back with, "Sergeant, I wonder if you ever had a mother!"

When WR's complete boot camp, they may find themselves doing anything from baking pastries to rigging parachutes or attending another school. Over half of the members of the Women's Reserve are placed in aviation units, graduates of some specialists' school.

WOMEN ABLY FILL MARINE CORPS AVIATION BILLETS

WITH THE ADVENT of World War II, Marine Corps Aviation grew with phenomenal speed and women were vitally needed to replace men for combat duty. Half of all the WR's in the Marine Corps are attached to aviation. That's why women aerographers, parachute riggers, control tower operators, machinists and storekeepers are seen at Marine Corps air stations.

At the present time, more than 250 Women Reserve officers and 5,000 enlisted girls are taking over man-sized jobs in aviation. One of the most interesting fields for women is aerial gunnery instruction and gunairstructor. WR instructors are well versed in principles of flying, gunnery, and aircraft recognition. They are able to identify planes at 1/75 of a second's glance at each.

Instructor on Link celestial navigation trainers is the newest of duties. Women officers first started training for this type of work in December, 1943, at the Naval Air Navigation School in Hollywood, Florida. After completing a 17-week course in mathematical theory; use of mathematical tables, equipment, and familiarization flights, WR's proceed to Quonset, Rhode Island, for an additional four-week course in maintenance and operation of the mechanical trainer used in teaching celestial navigation. Enlisted women receive a 10-week course at Cherry Point and Edenton with emphasis placed on operation and maintenance of the trainer rather than on mathematical theory.

The fact that women are becoming adept at skills quite foreign to their peacetime work or hobbies is typified by graduate mechanics. Those WR's are qualified to perform first and second echelon maintenance of airplane power plants; clean, adjust and make minor repairs to lubrication, ignition, carburetion, fuel injection and other power plant features; repair or replace parts of fuselage, wing or tail assemblies, and make required periodic inspections.

THE MORE clerical-minded WR's serve as aviation storekeepers. They supervise and assist in all activities connected with requisition, receipt, transportation, storage and issuance of all supplies and equipment for Marine Corps aviation units. They are responsible for maintenance of stock control records, office files, and quartermaster activities.

In a year's time women have become an integral part of Marine Corps aviation. They have made the transition from civilian frills to grease-stained dungarees without complaint.

BRINGING one in, a woman Marine signals to plane taxiing on runway. Pilots depend on this WR's judgment and efficiency

AS AVIATION machinists, WR's are capable of repairing engines, propellers, fuel systems, brakes, hydraulic system and gears

PACKING parachutes is serious business and one of the vital jobs taken over by conscientious women in Marine Corps aviation

LINK trainer operators, such as one shown here keeping eye on "crab," play a vital part in teaching pilots blind flying

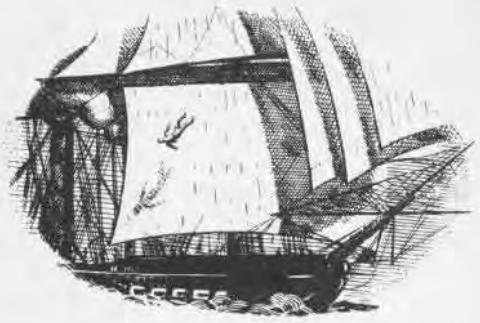
12,000 WOMEN SERVE IN MARINES

WOMEN were taken officially into the Marine Corps during World War I. On August 12, 1918, Secretary of the Navy Josephus Daniels authorized enrollment of women for clerical duties to replace men qualified for active field service. Neat appearance, excellent character and business or office experience were the qualifications of acceptance for the women storming recruiting offices. Orders stipulated ages between 18 and 40, with a provision that applicants "slightly under 18 years of age, who are in every respect very desirable, may be enrolled with the consent of parents." Records show that a total of 305 women were accepted in the Marine Corps.

In 1919, the Commandant issued orders for the immediate discharge of all female reservists and those on active duty were transferred to an inactive status in the reserve. Disenrollment from the Marine Corps Reserve was gradual but final—and when World War II started, there were no women in the regular service or reserve. On February 13, 1943, membership in the Corps was again extended to women on the same basis as men except for prohibition of combat or overseas duty.

The nucleus for the new organization was carefully chosen and a few women were given spot commissions. With their aid, a class of officer candidates started training exactly one month after the initial announcement. Sixty-five civilian women reported to U. S. Naval Reserve Midshipmen's School in South Hadley to learn the art of becoming a feminine Marine officer. A few days later, 706 enlisted women entered the gates of Hunter College, U. S. Naval Training School, Bronx, for their boot training.

AT THE present time, all training for officers and enlisted personnel is conducted at Camp Lejeune, New River. More than 1,000 boots and over 40 officers complete their training every month until now the Marine Corps Women's Reserve numbers approximately 12,000. Aviation ground work is the place where women are filling the greatest need and eventually half of all WR's will fill such billets including metalsmiths, radio operators, light truck, bus, jeep drivers.



Lucy Brewer: 1812

IN 1812 Lucy Brewer was weary of the tribulation involved in being a woman. The self-sufficient, daring young lady consulted a Marine lieutenant and, with "proper precautions," disguised her sex. Then Lucy enlisted in the U. S. Marine Corps.

For three years she served aboard the frigate *Constitution*. After one engagement, Lucy covered herself with glory—but almost ended her career. She accidentally fell from her post in the rigging, and plunged into the sea. Her shipmates quickly fished her out, and attempted to remove her wet clothing. Lucy demurred. She managed, somehow, to escape the kind assistance and kept her disguise.

When she received an honorable discharge, her masquerade was still undetected and her service record "salty" indeed. Until recently, all anyone had to say about egregious Lucy Brewer was . . . "HE was a darn good Marine."

FEMININE MARINE RECRUITS EASILY DIGESTED CENTURY OF TRADITION

DURING WORLD WAR I WOMEN IN MARINES FREED MEN FOR COMBAT DUTY

GRAMPAW PETTIBONE

All for Want of a Safety Wire

A PBM-3 recently broke loose from its mooring and was subsequently so badly damaged that it had to be stricken.

The basic reason for this accident was that the mooring shackle had not been safety wired. The Trouble Board made the following recommendations:

a. Be sure flight personnel are thoroughly familiar with proper methods of securing to all types of standard moorings.

b. Conduct periodic inspection of all buoys. Special care should be taken to make sure all mooring fastenings are secure, all seaweed and barnacles are removed, and that buoy is either at atmospheric pressure (0 pounds) or has no more than 2 pounds' pressure.

c. Check that all shackles of mooring fastenings are safety wired.

Dilbert Runs Riot

Pilots come and go at Marine Base Defense Aircraft Group 42, but Dilbert seemingly isn't moving out to any war zone . . . he's too busy here.

His latest exploit might well be told after recitation of the old axiom: "Don't do as I do; do as I say."

Dilbert was the leader of a flight of 12 TBF's returning to the field after a night glide bombing mission. Everything began to happen—thanks to Dilbert—when the flight was on its last leg.

First, Dilbert noticed that he hadn't let his wheels down. He quickly called the tower to inform them that he was "going 'round again." Then, as an afterthought, he called to all the planes in his flight and suggested that they all be sure to put their wheels down before landing. Eleven planes, with wheels down, landed.

Meanwhile, Dilbert came around again and entered the base leg. Probably he said to himself, "Gee, I'm glad I told the fellows to be sure to put their wheels down; sure saved them a lot of trouble." So he started on in. Frantically, the tower called to him, the

landing officer fired the Very's pistol. But Dilbert, congratulating himself on a job well done, landed with his own wheels still up.

Earlier in the month Dilbert proved, once again, the value of "looking where you're going." Because he was in a hurry he decided to short cut while taxiing at night. He cut inside the plainly marked flare lighted runway and nosed up in a construction gully. Then, while taxiing for take-off, he carefully kept his eye on one wing. Imagine his surprise when the other wing hit a jeep!

Dangerous Cargo

Shortly after take-off in an R4D and upon reaching cruising altitude, strong acid fumes were noticed by the pilot. A quick check of the cargo list revealed that a drum of hydrofluoric acid was on board. After sending one of the crew to investigate, the pilot immediately turned around and headed back for the field. It was discovered that the acid container had cracked, allowing acid to leak out on the deck and corrosive action had already set in. Upon landing, the cargo was unloaded, deck removed and acid neutralized.

▶ *COMMENT*—**This emphasizes two essentials: *1.* Proper packing and marking of dangerous cargo and *2.* Proper handling of such dangerous cargo by all flight crews.**

Each of these points is equally important. Proper packing does little good if the cargo is tossed about by careless cargo-handling crews, or by men who have no way of knowing what the packages contain.

A Stitch in Time

The pilot of an OS2U landplane made a good landing on an extremely windy afternoon. In taxiing back to the line, the pilot had to turn his plane down wind. After turning his plane so that the wind was on his port quarter, the pilot suddenly found himself on his nose with the engine needing repairs.

Grampaw Pettibone says:

According to the Trouble Board, more experienced pilots than this one had had trouble taxiing in the high, gusty winds that afternoon. It seems to me that when this condition was known to exist, common sense should have indicated the need for helping less experienced pilots. Men should have been stationed at the end of the runway to lend a hand as each plane finished its landing run. As a matter of fact, the entire squadron could have walked this plane in with less man-hour expenditure than will be required for engine overhaul.

Calling Mr. Ripley

The following portion of an action report is quoted as of special interest to fatalists:

"It was later learned that the pilot, knowing his plane was hit and on fire,

pulled out of his dive and gave the other men in the plane instructions to bail out. Marine Technical Sergeant W saw the pilot bail out and, upon attempting to follow suit, he found that his parachute was badly burned.

"He tossed his parachute overboard and sat in the pilotless plane while it performed a series of violent maneuvers, diving, pulling up into a loop and falling out, and diving again.

"As the plane approached the water on the third dive it leveled out into a

normal flying attitude and settled down in a perfect water landing. Marine Sergeant W then disembarked with but minor injuries and was picked up by a surface craft afterwards."

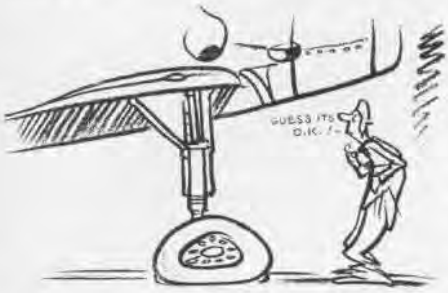
Tire Pressure

The pilot of an FM-1 took off on a cross-country hop, knowing that he had a slow leak in his port tire. Upon landing at his next stop he was unable to cope with the soft tire (down 30 lbs.), swerved, ran off the runway, nosed over.

Grampaw Pettibone says:

And this pilot had the gall to mention a 10-degree cross wind as a contributory cause.

The question of tire pressure is very important. Here is another example: A certain training squadron was having an epidemic of groundloops. Investigation disclosed that tires were seldom checked on the line. Near flats were taken care of, but line personnel claimed they "didn't have any tire gauges" to make systematic tire checks. Tire gauges were provided and, with a little indoctrination, tires were kept



up to pressure. This was all it took to bring the groundloops in this squadron down to par.

If you are having groundloop trouble, look for under-inflated tires. Also, all pilots should get into the habit of making a visual tire check before each flight. Tires should be inflated at all times until the deflection markers just touch the ground. You can soon train yourself to detect tires which are only a few pounds off, just like on autos.

Progressive Stall in F6F

To avoid a collision, an F6F pilot, cruising at 140 knots at 2,000 feet, pulled up into a sharp, climbing turn which resulted in a progressive stall, flipping the airplane over on its back. An immediate attempt to recover resulted in another stall and the aircraft crashed into the water from a vertical dive.

An experienced pilot then took another F6F to safe altitude and simulated the same maneuver. His airplane also stalled and flipped over on its back, just as the crashed airplane had done. He then attempted a premature recovery which resulted in another stall and out of which the airplane entered a vertical dive. Recovery to level flight required approximately 2,200 feet. This test was made four times with identical results.

The recording accelerometer which had been carried throughout these tests showed that the initial stalls had occurred at an acceleration of approximately 4g. By applying the rule regarding the effect of acceleration on stalling speed, which is that normal stalling speed increases directly as the square root of acceleration, we find that in this maneuver the stalling speed (approx. 83 knots with flaps up) would be doubled, or 166 knots. Once this is fully understood, it readily explains why this F6F stalled and spun—it was only cruising at 140 knots when it was pulled up into a 4g climb (which even further reduced the speed).

This characteristic of stalling at increasingly higher speeds as acceleration is increased is not an abnormal characteristic nor one peculiar to the F6F. It is a basic flight law, like Newton's law of the apple, and is equally applicable to every airplane. (A new technical order on *Progressive Stalls and Spins* will be issued shortly.)

The test pilot made one other check that is worthy of mention and that is, where it took him 2,200 feet to recover from an inverted position by pulling out in split **S** fashion, it took only a few hundred feet to half-roll back to normal flight. This point is a good one to remember. If you find yourself on your back at low altitude some day, remember to recover with a half-roll, instead of trying to pull out in a split **S**.

Experience Speaks

After a forced landing in the water, an F6F pilot abandoned ship without his parachute and consequently lost his rubber boat. He noticed the belly tank of his plane floating nearby and held on to it for approximately 15 minutes, until he realized that he was being burned by the gasoline leaking from the tank. He was in the water approximately eight hours before being picked up.

In his report, he made the following recommendation: "That pilots be warned to stay clear of belly tanks unless they are positive they are empty. It makes an excellent life buoy but the burns suffered from raw gasoline, aggravated by immersion in salt water, make it an extremely dangerous one when partially filled."

THE STUDENTS *of these two planes sideslipped into each other a few feet above the ground while shooting the circle.* REASON: *One carelessly misjudged the wind direction and both neglected to check carefully for other airplanes in the area.*

Procedure in Event of Propeller Control Failure

An SNB instructor was returning to the field at 1,000 feet with two cadets after a bounce drill, when the starboard propeller, which had been acting up during the period, went into full low pitch. The engine was functioning normally although the constant speed unit was leaking oil.

The instructor cut this engine immediately because it was not in synchronization. He was now operating on one engine at maximum continuous setting with some three miles to a field. The plane would not fly level at this setting so the pilot cut the other engine and made a wheels-up landing in a plowed field. There were no injuries to personnel, but some $10,000 damage to the airplane.

▶ *COMMENT*—It should have been possible to fly this airplane to the station field (three miles) in the condition described by using the following procedure:

▶ Reduce the throttle on the affected engine until rpm is within safe continuous operating limits. This will give a small positive thrust or at least greatly reduce the large drag induced by a propeller windmilling in low pitch. (If the failure had caused the propeller to shift into high pitch, throttle should be applied as necessary to maintain flight.)

▶ Reduce airspeed immediately to the speed for minimum power required for single-engine flight. The power on the good engine should be increased up to full take-off power if necessary. Directional flight can be maintained by adjusting rudder tab and flying with the good engine wing a little low. The airplane should be kept in a clean condition with wheels and flaps retracted. The airplane may be trimmed to fly "hands off" with either engine inoperative with a normal gross load.

DID YOU KNOW?

Navy to Buy 20 More Mars

Flying Boats Are Successful

The Navy has ordered 20 more *Mars* cargo flying boats of the type which set new records for cargo transportation and over-water flight. The new planes will be substantially the same as the original model, but will incorporate internal changes to provide easier and greater cargo stowage.

Known as the PB2M, the new planes will operate with Naval Air Transport squadrons, which now number 10. The *Mars*, biggest operating plane in the world, has a 200-foot wingspread, is 117 feet long and has the cubic capacity of a 15-room house.

Civilians Get Navy Badges

Plastic Emblems Are Allotted

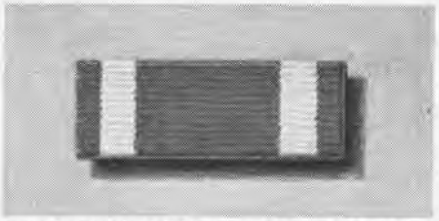
Civilian employees of the Navy are wearing plastic recognition emblems on their lapels to show that they are performing services toward winning the war. The emblem bears the inscription "U. S. Navy—Civilian Service."

It was developed in response to widespread demands by Commandants, commanding officers, and civilian employees of many Navy shore establishments for some sort of recognition. Employees within continental United States and in Hawaii are entitled to wear it if they have been employed a month or more. It was further explained that the emblem is the first step in a broad program which will include recognition awards to civilian employees who perform outstanding service to the Navy.

Authorize Service Ribbon

Recognize Commendation Letter

Authorization for a new ribbon to be known as the Commendation Ribbon, with no medal involved, was established by AlNav 11. It will take precedence next after the air medal and all personnel of Navy, Marine Corps and Coast Guard who have received an individual letter of commendation signed by SecNav, or Commander in Chief of U. S. Fleet, Pacific or Atlantic Fleets, for act of heroism or service performed since December 6, 1941, are authorized



NEW COMMENDATION RIBBON IS MYRTLE GREEN

to wear the new ribbon. All such letters in the future will contain specific authorization if the privilege is extended. Ribbon is myrtle green and white.

Test Cardboard Containers

Fiber Cases Keep Uniforms Neat

Self-locking cardboard clothing containers to meet the needs of naval personnel afloat, as well as emergency use ashore, have been developed and are now being issued for experimental purposes. Made of weatherproof fiber, the cardboard cases are of two-piece die-cut construction, joints being tie-stitched.

Clothing container cases fit snugly into the outside case and keep service uniforms ready to wear at all times. Made in two convenient sizes, the cases can be easily stowed or destroyed if space is not available. Advantages of this type of carrying case include:

1. Case can be disposed of easily
2. Low initial cost
3. Made of non-critical material
4. Conserves other types of luggage

At present, the "4 Seas" cases are not being offered for sale, subject to findings of the experimental tests. Complete assembly and packing information is included with the cases.

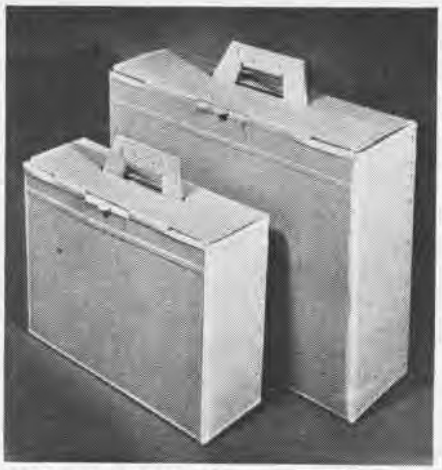
Cut Use of Color Prints

Must Justify Requests to BuAer

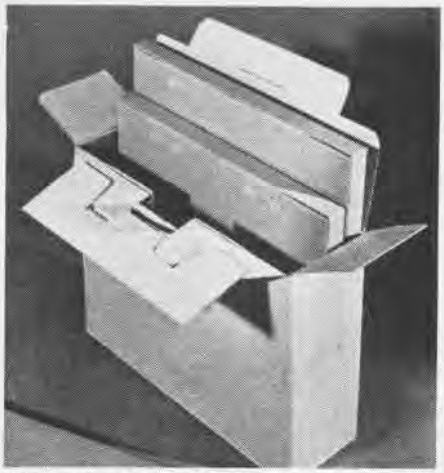
Color photography is becoming of increasing interest to all naval activities, owing in many cases to favorable publicity currently given it as an aid in tactical operations. This is reflected in the volume of official requests forwarded to BuAer for color prints and color enlargements to be made from transparencies. Majority of these requests contain no justification to indicate what official purpose will be served by use of color in preference to black and white.

Cost of making a color print is approximately 100 times that of making the same one in black and white. In view of this, BuAer will require an absolute justification for all color photographs requested, and lacking adequate justification, will direct that black and white prints be supplied in answer to such requests from all naval activities.

PLASTIC EMBLEMS GIVEN CIVILIAN WORKERS



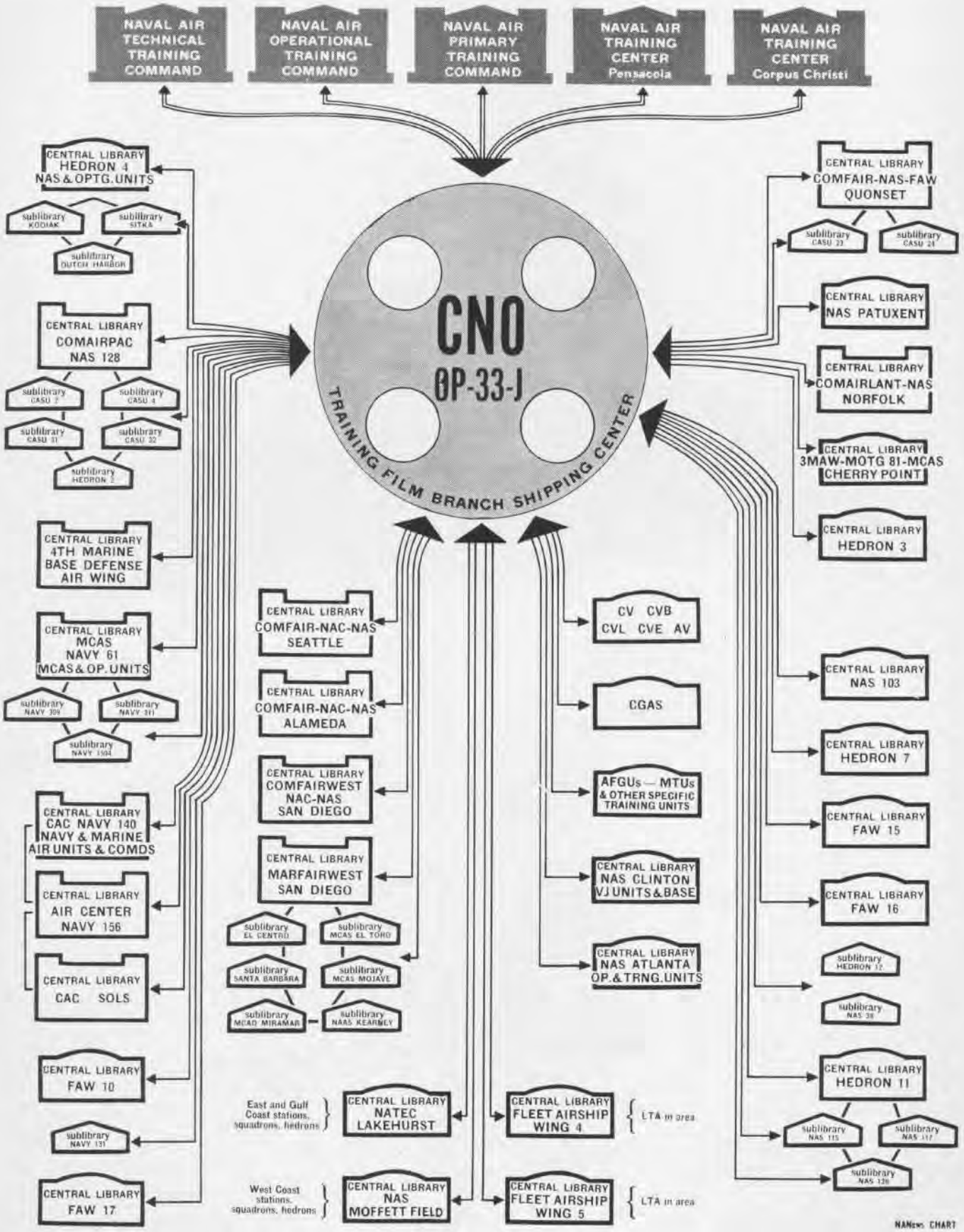
MAKE TEST OF COLLAPSIBLE CARDBOARD CASES



UNIFORMS ARE PACKED IN INNER CONTAINERS

Distribution of TRAINING FILMS

LIMITED STOCK OF TRAINING LITERATURE SECTION PUBLICATIONS IS MAINTAINED IN LIBRARIES (Stocks are maintained to make literature accessible for review and to meet casual requirements of the units)



BEST ANSWERS

XVI—Navy Greats

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

1. **Listed below are four famous sayings by American naval heroes. The one which is *incorrectly* matched with its author is—**
   - ☐ *a*—"Don't give up the ship"—Lawrence
   - ☐ *b*—"We have met the enemy and they are ours."—O. H. Perry
   - ☐ *c*—"I have not yet begun to fight."—Jones
   - ☐ *d*—"Damn the torpedoes! Full speed ahead."—Dewey

2. **The fighting tradition of the U. S. Navy has been embedded in several famous slogans. World War II is adding to this tradition. The one among the following *incorrectly* matched with its author is—**
   - ☐ *a*—"Scratch one flattop."—Dixon
   - ☐ *b*—"Take her down."—Gilmore
   - ☐ *c*—"Pick out the biggest one and fire."—Moran
   - ☐ *d*—"Sighted sub—sank same."—Bulkeley

3. **Lt. Comdr. John Bulkeley became one of the first heroes of this war through his—**
   - ☐ *a*—bombing attack on a Jap battleship
   - ☐ *b*—destruction of Jap cargo ships by submarine attack
   - ☐ *c*—heroic flying against Jap bombers at Pearl Harbor
   - ☐ *d*—gallant and successful use of PT boats during the Philippine campaign

4. **There are many examples of resourcefulness and quick thinking in Navy history. Among the following the action that is matched with the correct officer is—**
   - ☐ *a*—knocking down a gunner who would strike the colors—Farragut
   - ☐ *b*—changing flagships in the middle of a battle—Decatur
   - ☐ *c*—boldly ignoring the dangers of torpedoes—O. H. Perry
   - ☐ *d*—turning an anchored ship about during engagement and winning battle—Macdonough

5. **During her five months of battle service the *Hornet* did all but *one* of the following. She did not—**
   - ☐ *a*—carry General Doolittle's B-25's within 800 miles of Japan
   - ☐ *b*—help shoot down 156 Jap airplanes on her last day afloat
   - ☐ *c*—protect Marine landings at Bougainville Island
   - ☐ *d*—secure bomb and torpedo hits on at least 14 enemy vessels and sink four 10,000-ton Jap transports

NAS Lead in Bond Buying

Percentage Allotment Kept Up

On January 1, 95.4 percent of civilian personnel at seven major air stations were investing 10.2 percent of their pay for War Bonds through the Navy payroll savings plan. This performance is highlighted by the consistency with which these stations have either led the bond parade or hovered near the front rank.

"Mind counting your War Bonds some other place, Buddy? The skipper is expecting a fighter squadron to land in a few minutes."

In nine months of 1943 they achieved the highest standing in the bond program, and for seven months, from April to October, inclusive, they paced the rest of the Navy.

In allotments registered by uniformed personnel, the aeronautic organization likewise stood high. When the program was launched in April, naval aviation immediately took the lead in percentage of allotments registered, maintaining a hot pace for months and continuing interest through December.

Helmets for Combat Crews

Navy Airmen Will Use AAF Gear

Steel helmets of two types are being produced to give added protection to Navy combat crews against low-velocity fragments of flak and other missiles. Use of the helmets is reported to have caused a reduction in head injuries.

FLAK HELMETS CUT NUMBER OF HEAD INJURIES

The M-3 helmet fits over the regular leather flier's helmet and has projecting steel flaps to cover the earphones, the flaps being held in place by a chin strap. A coating of flock, a substance similar to cotton lint, is applied to the metal to prevent the flier's bare hands freezing to it in low temperatures.

The smaller M-4 helmet was developed especially for turret gunners who work in limited space. Made of steel plates enclosed in a canvas cover, it is shaped to fit the contours of the head.

Both helmets were developed by the Army. Navy is procuring a limited number which will be distributed as follows: To ComAirPac—1,000 M-3's and 500 M-4's; to ComAirLant—2,500 M-3's and 1,000 M-4's.

Uses Tail as Fly-Swatter

American Downs German Plane

A "fly-swatter" technique in bringing down enemy aircraft was demonstrated unintentionally by an American pilot on a mission over German territory. The pilot came up on the rear of a *Messerschmitt* 109, opening fire at 200 yards. The Nazi climbed into the sun, and to avoid stalling the American turned sharply. The German appeared right above the *Thunderbolt* fighter.

"I banked even more violently to prevent a crash," the American reported, "but my tail smashed into his propeller and engine. Momentum carried me on, but I saw black smoke pouring from his motor. By standing on my right rudder, I could still maneuver the *Thunderbolt*, so I went back into the fight. The last I saw of the German he was spinning down, 4,000 feet below, smoke still streaming out."

CAA-WTS Schools to End

Closing Is Slated by Summer

A gradual slacking-off in enrollments at Civil Aeronautics Administration-War Training Service schools, with eventual closing by summer, has been announced by the Navy. Aviation training facilities have expanded sufficiently to permit the Navy to train all of its primary students without having to rely on CAA-WTS civilian instructors.

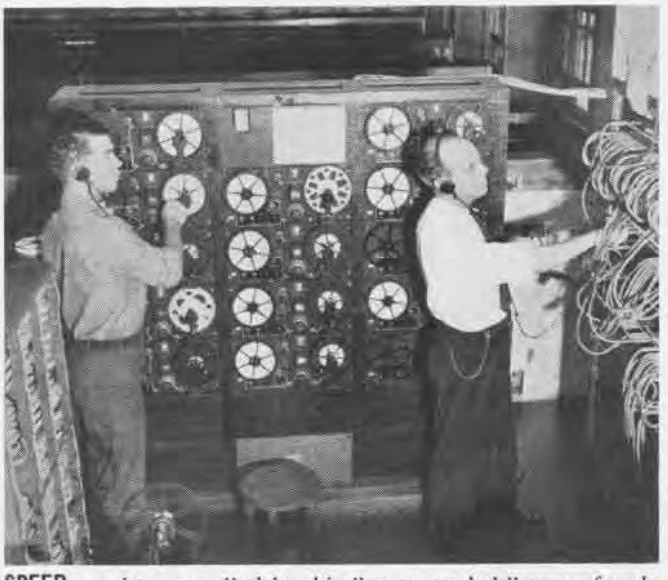
The Navy will reduce the number of students sent to schools month by month until they will be ready for closure by summer. The CAA program was set up earlier in the war when the Navy's facilities for primary training were not great enough to turn out needed fliers.

Send in Material to NANews

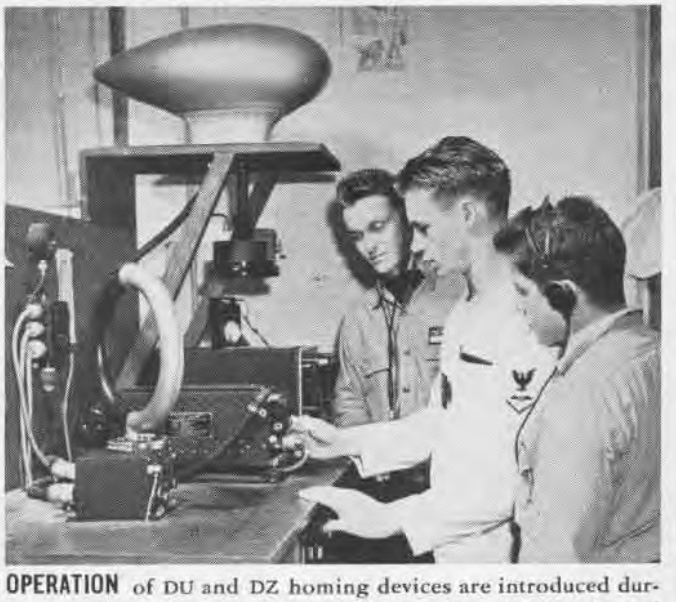
Flying Radioman

AVIATION RADIOMEN, select men who volunteer for flight duty, must pass rigid physical exams before starting training at ARM schools. First on the program is intensive training in code until the trainee is able to receive 16-18 words per minute. Phraseology and form of naval messages are taught in communication procedure with actual experience provided during "watch standing." Operation and simple maintenance are practiced during radio theory classes with stress placed on equipment operation. All phases of training are put to actual use in final stages when ARM must demonstrate his ability by communicating with semaphore, blinker and signal flags, also show his aptitude in recognition. After graduation from ARM school, additional training is provided in aerial gunnery and electronics to produce capable crewmen.

PRACTICE is the secret of code receiving and sending. Would-be radiomen master this phase early in their training course



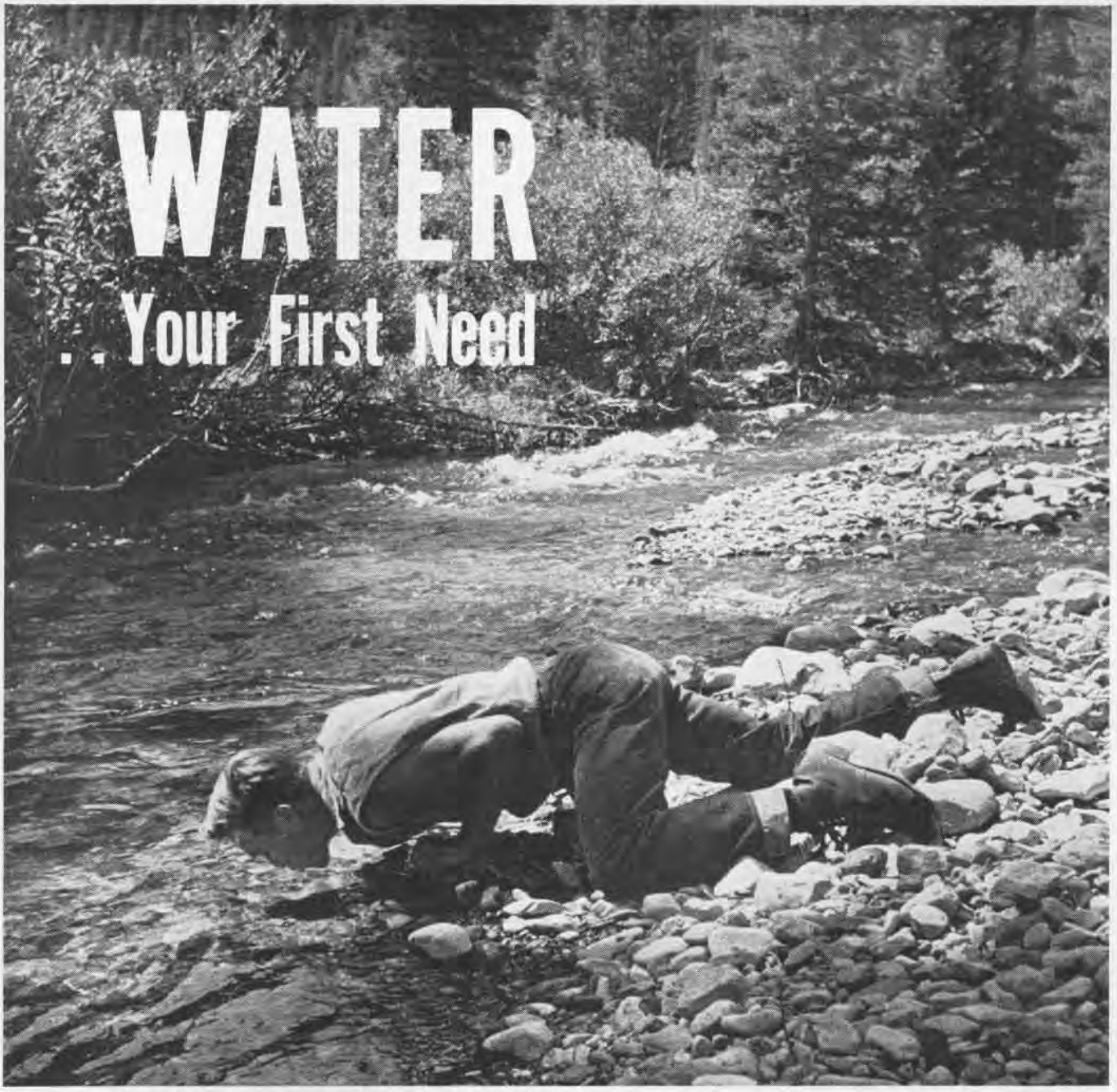
SPEED can be controlled by this "conveyor belt" type of code instructor and is increased with improvement of student ARM



OPERATION of DU and DZ homing devices are introduced during aviation radiomen's training, must be thoroughly mastered

MOCKUPS of airplane installations give practical experience during laboratory periods, acquaint students with operation

DRESS rehearsal in final week of training brings radiomen, ordnancemen and mechanics together to form real combat team



Finding Water and Using It With Care Are Major Problems

WATER is the most important single factor in determining survival. Without it, the presence or absence of food is of little importance. You can survive many days without food if you have water.

Under average conditions an individual needs at least a quart of water a day, but the amount essential under widely varying conditions of weather, climate, and surroundings may be a great deal more or less. A man who knows how to use water intelligently may come through in reasonably good condition with a supply on which another man might die of thirst.

If you are extremely thirsty, sip slowly and don't take an excessive amount of water. Likewise, if you are hot from sun or from exercise, avoid drinking cold water, or an excessive amount of water. If only cold water, snow, or ice is available, warm it in the mouth before swallowing.

If water is scarce, and you are exercising, you will lose less through sweating if you drink a small amount at fairly frequent intervals. When the body is dehydrated there is little difference.

The water table is the surface below which the rocks of the earth are saturated with water. Its level tends to follow the contours of the land surface, rising somewhat beneath hills, and in some places intersecting the surface to form springs and seepage areas or to merge with streams, swamps and lakes.

Water lying below the water table is termed "ground water" and in general is pure. Water lying above the table is "runoff water" and is much more likely to be contaminated or impure.

YOU WOULDN'T DRINK IT AT HOME, BUT STAGNANT WATER CAN BE SAFE

STREAMS, rivers, and lakes usually are supplied by both ground and runoff water. Water from large lakes is generally safe if taken some distance from human habitation.

A stagnant hole in the wilderness far from human habitation may be safe for drinking, and a running stream near a native village extremely dangerous. Water in swamps, bogs, and in pockets on the forest floor may be acid and dark from decaying vegetation, but it is not impure unless there is some outside source of pollution. Of course it should always be purified if it is near any human habitation.

A spring issuing from a rock usually is safe. Rain water is pure. When looking for water remember that the water table is usually close to the surface and can be reached with little digging in low forested areas along the seashore, and in flood plains of rivers.

Rain water absorbed by the ground gradually seeps seaward, meeting the salt water at the shore. Drinking water usually can be obtained along the seashore by scooping out holes in the beach at low tide, or by digging a shallow well some distance from the shore.

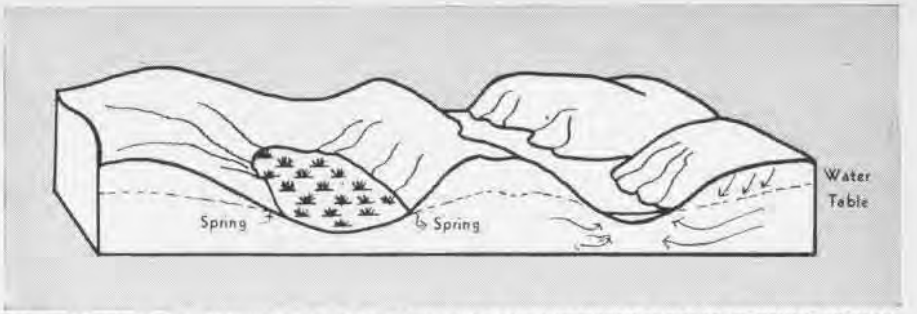
Fresh water will be found first when you dig since it is lighter than salt water. Water from any hole dug near the sea is apt to be brackish, but is safe to drink as it is found. Water too brackish to drink frequently can be made palatable by running it through a sand filter several times. Brackish water, although salty in taste, doesn't have a high enough salt concentration to be harmful.

In all arid parts of the world there are numerous indicators of the presence of water. These include converging game trails, presence and direction of flight of some birds, and presence of certain plants. Pigeons or parrots are always within reach of water.

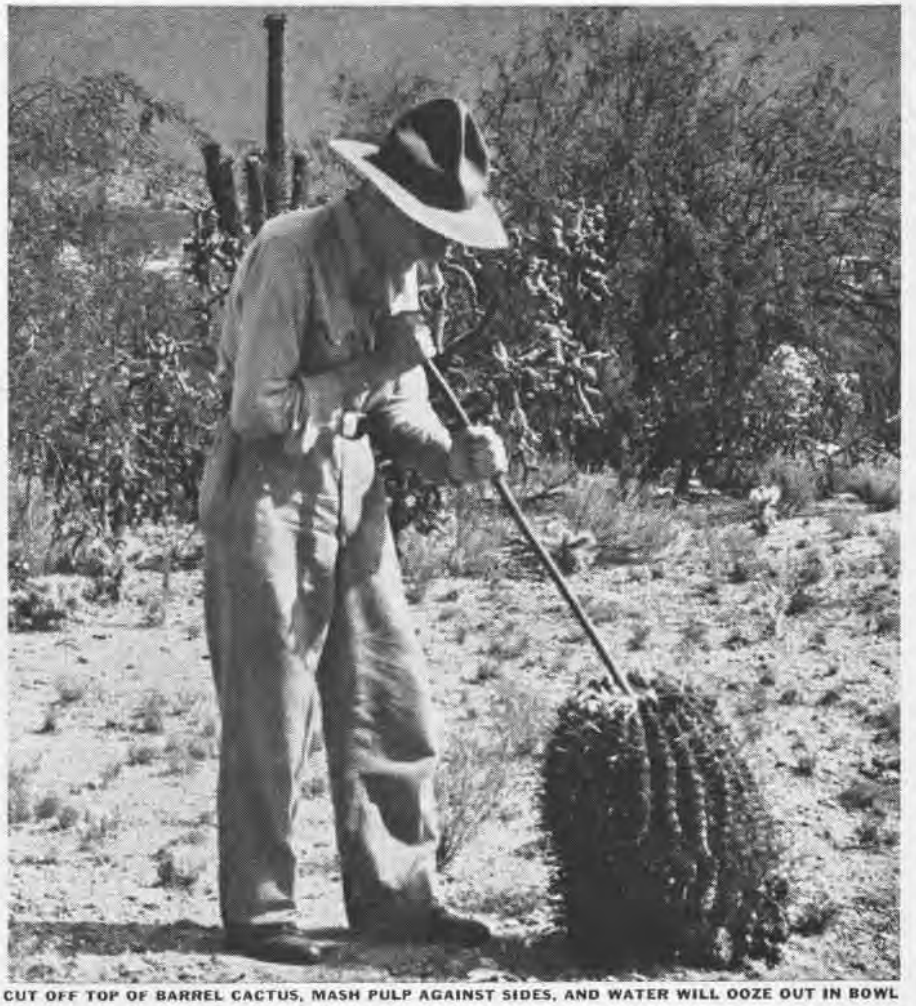
On a clear day, mountain snow can be melted by placing a shallow container on a sunny exposure out of the wind. Apparently dry mountain stream beds often will contain water beneath the gravel bottom. Put your ear to the ground and listen for the trickle.

SURVIVAL HINTS—NO. 3

This is the third in a series of articles condensed from How to Survive on Land and Sea, *new U. S. Naval Institute textbook issued by Aviation Training Division of CNO. Individual copies may be purchased from the U. S. Naval Institute, Annapolis, Md.—Ed.*



LEVEL OF WATER TABLE TENDS TO RISE BENEATH HILLS AND INTERSECT SURFACE, FORMING SPRINGS



CUT OFF TOP OF BARREL CACTUS, MASH PULP AGAINST SIDES, AND WATER WILL OOZE OUT IN BOWL

CACTUS (OPUNTIA)

BROMELIA

PAUSE THAT REFRESHES MAY FOLLOW TAPPING VINE, DRAINING COCONUT, OR PEELING ROOT

SAP IS CHIEFLY water and from many plants it is both fit to drink and readily available. In an emergency, a water-yielding plant may save your life, or save valuable time by eliminating the necessity of purifying water from questionable sources. Some tropical lianas and palms have a steady flow of water in their stems. The fruits, growing tips, leaves, stems, and buds of many plants contain quantities of water.

Many desert and other plants store water in their fleshy leaves or stems. In an emergency, such sources should be tried. The fruits and roasted pads or stems of very young prickly pears taste somewhat like asparagus and will help quench thirst.

Water may be obtained from some desert plants that have their roots near the surface. The "water trees" of arid Australia are a part of the mallee scrub, one of the largest and most distinctive plant formations of Southern Australia. Roots of these "water trees" run out 40 to 80 feet at a depth of two to nine inches under the surface.

To get water from them, locate the root four or five feet from the tree trunk, pry out of the ground, cut it into two- or three-foot lengths, and peel off the bark. Drain each section into a container, or suck out the water. One large mallee root usually will supply the water needs of two or three thirsty men.

Trees growing in hollows between ridges will have the most water, and roots one to two inches thick are ideal in size. Water can be carried in these roots by plugging one end with clay.

Water from the roots of all water-producing plants is obtained in a manner similar to that described above. These plants include the Australian needle bush, desert oak, bottle tree, bloodwood, and several varieties of acacia. The "water tree" or vine of Africa and South America is utilized in the same way.

A drinkable sugary sap can be obtained in quantities from the buri, nipa, coconut, sugar, and other palms. To start coconut sap flowing, bend the flower stalk downward and cut off the tip. Every 12 to 24 hours cut off a thin slice to renew the flow, which may reach a quart or more daily. The flow of sap can also be started by first bruising a lower frond and then pulling it down so the tree will "bleed" at the injury. The sap will run down the trough-like frond and can be easily collected.

On any one coconut palm, the nuts will be in varying stages of maturity. Contrary to your usual experience, the green nuts are the best. They are more easily opened with a knife or machete, have more fluid, and the fluid can be taken in quantity without harmful effects. The delicious juice of the ripened coconut will act as a violent physic if taken in quantities of more than three or four cups daily. Water also can be obtained from the stems of some bamboos. (Shake them to see if water is inside.)

It is often necessary to use muddy, stagnant, or polluted water. Water polluted by mud or animals is unpleasant but harmless if it is boiled. Muddy water can be partially cleared by allowing it to stand overnight. It can be cleared more quickly, however, by passing it through a filter such as a sand-filled cloth, a length of bamboo filled with sand and clogged with grass or clothing to keep the sand in, or by using a grass or reed cone.

Water that has merely had the sediment cleared out of it is not purified. To be safe it must be boiled at least three minutes. Halazone tablets or three or four drops of iodine to a quart of water will help to purify unboiled water. Let it stand for a half hour before drinking.

Don't try to short cut on water purification. Water-borne diseases are one of the worst known hazards of populated tropical and sub-tropical countries.

IN THE FOLLOWING ISSUE: WILD PLANT FOOD

MUDDY WATER CAN BE CLEARED BY PASSING IT THROUGH A SAND AND CLOTH-FILLED BAMBOO FILTER

GRASS OR REED CONE SERVES AS HANDY FILTER

TAPPING VINES for pure watery sap has proved successful in the search for water. To tap a vine, reach as high as you can and cut a deep notch or cut it off, keeping the severed end elevated. Then cut the vine close to the ground; this should give you a water tube six to seven feet long. When water stops dripping from the lower end, cut another section off the top and more water will drain out. If the bottom of the vine is cut first, part or all of the water will be lost, as the water will ascend. Since not all vines will yield water, and the fluid from some is more palatable than others, it will be desirable for you to experiment with various species. Any grapevine is worth a try. Many species of rattan vines or palms produce good drinking water, and the slightly astringent water from the trunk of young banana trees is suitable for drinking. Water is also obtainable from bamboo stems.

SHORE STATIONS

▶NAS, LAKEHURST—Lakehurst's pigeon section, including the main breeding and training lofts in the Navy, is rapidly growing into a colony of its own.

Recently added were two large lofts, one of which is three stories high, consisting of four fine lofts for the pigeons and a classroom for the men and 20 WAVE pigeoneers assigned to the school for six months of instruction in the fundamentals of training and breeding homing pigeons.

Every blimp and free balloon leaving Lakehurst on missions is supplied with a crate of homing pigeons which carry back important messages when radio silence is vital. At the start of the war, Lakehurst was the only naval station at which homing pigeons were bred and trained. Now a pigeon loft is installed at each new lighter-than-air base throughout the country.

Homing pigeons are bred as carefully as race horses and prize dogs. The pedigrees of all the pure bred homing pigeons of the Navy are kept on file at the Lakehurst lofts. Average speed of the birds depends upon weather and wind conditions. Lakehurst pigeons have been known to travel from 40 to 60 mph on flights of from 400 to 600 miles. One bird averaged better than 60 mph on a 500-mile flight.

▶NPFS, ST. MARY'S COLLEGE—The necessity of cadets sending their athletic gear individually to be cleaned and then being forced to wait as long as five weeks for it has been eliminated with the opening of the athletic clothing issue room.

Now, when a cadet's gear is soiled he returns it to the clothing issue room and gets clean togs in exchange. At present clothes are exchanged every two weeks but soon a once-a-week trade-in is planned.

The equipment room takes care of cleaning, and by sending out trunks, socks, supporters, sweat clothing, etc., in quantity, is able to get five-day service, thus saving cadets considerable inconvenience and a bit of expense.

▶NAS, CORPUS CHRISTI—Cadets in advanced VPB squadrons at this station soon will be receiving a more complete syllabus of training than heretofore. Basing revisions on recommendations of graduates who have gone to operating squadrons, as well as of returning fleet pilots, cadets, and officers from other stations, instructors have formulated a new syllabus placing as much emphasis on ground training as on flight training.

The new course includes lectures in organization and operation, engineering and maintenance, aerology, gunnery and bombing, synthetic training devices, navigation, communications, self-preservation, and talks by pilots who have seen action on various fronts.

▶NAS, MEMPHIS—One of the newest activities of the visual aids officer is the establishment of a station war museum and library, located on the second deck of the recreation hall. This exhibit will cover every type of visual matériel that can help better acquaint the enlisted personnel, cadets, and officers with the various phases of the war.

Such matériel as captured Japanese weapons has already been displayed. At present a display of scale model American and German tanks is being featured. Planes and aircraft of all kinds will be shown at future dates. Maps of every type, supplemented by newspaper and magazine clippings, are profusely placed in this room. In addition photographs, when available, are also used to illustrate combat developments. Arrangements are being made to obtain original Navy combat photographs. These are to be put up as soon as they are released and changed regularly as new ones are made available. It is also planned to have scale plaster models of relief maps to illustrate important battle actions.

▶MCAS, EL CENTRO—Pilots of a Marine fighting squadron have been supplied with small waterproofed cards bearing essential survival data. These cards were provided by the intelligence officer who compiled the data and photographs showing edible plants, water sources, and other survival information.

▶MCAD, MIRAMAR—"Sgt. Doc," dubbed the "air travelingest" dog in the Marine Corps, has washed out after duty across the far reaches of the Pacific which netted 200 hours in the air.

"Doc" served as mascot of the famed Hellhawk fighter squadron, recently returned to this depot from overseas, that saw destruction of 104 Jap planes. She has flown in many types of planes, from Grumman fighters to B-24 *Liberator* bombers, and is one of the few dogs to take off from an aircraft carrier in a plane. Her duty was cut short, however, after she suffered permanent injury in the right foreleg when run over by a jeep.

Upon arriving in the U. S., "Doc" was first taken into custody by an agent of the Humane Society to determine whether or not she should be allowed freedom of the camp. Then came a medical discharge for injuries of permanent nature.

Her faith in humanity was restored, squadron officers reported, when she was feted at a banquet of eight hamburgers and a quart of milk.

▶NAS, PENSACOLA—A solution to a tough problem was achieved at NATC, Pensacola, by invention of a "crab dolly" for PBY's which allows the airplane to be moved in any direction on a reasonably smooth paved surface without twisting beaching gear.

Platform on which the beaching gear rests is less than two inches above the deck. Hinged ramps, which also serve as chocks, make it practicable to get the airplane on the dollies by hand without gear of any other type. Drawings are available at the Plant Section, A&R Dept.

▶NAS, MIAMI—Commanding officer of this station was conducting a personnel inspection of VSB-5 at Master Field recently when he saw one sailor wearing an extremely dirty and slightly damaged pair of shoes.

"Are those the best shoes you have?" inquired the captain. "No, sir," was the prompt reply. "Well, where is your good pair?" the captain queried. "Oh, I'm saving those for liberty," came the ultra-frank answer.

▶NAS, NORMAN—Cadet Mess, the off-station clubhouse and headquarters for aviation students on liberty, has been paying big dividends in morale since its founding five months ago. Supervised by an officer from cadet regiment and with a "house mother" as an on-the-scene hostess, Cadet Mess is largely conducted by the cadets themselves. Each incoming draft is honored at a "housewarming" party the first Friday night after its arrival, attended by 100 invited co-eds from the University of Oklahoma. Between this welcoming and the draft's farewell dinner-dance, there are Sunday tea dances, other parties, reading, and just plain lounging. Fifty cents rents a sleeping room in the former fraternity house, and breakfast and dinner are served at correspondingly low prices. Membership for the cadet's training period is $3.

▶NAS, BUNKER HILL—A&R has set up a system of quick-acting trouble-shooting two-man crews for immediate repairs on the flight line. A jeep is assigned to each pair of crews to carry necessary tools and equipment to make minor repairs. On the first three days of operations under the

plan, some 19 jobs were quickly done and put back into service, time of moving equipment to A&R was saved and A&R space wasn't cluttered up with minor jobs.

▶NAS, BRUNSWICK—Civilian skiing organizations have been contacted with a view to having properly equipped, expertly led ski clubs ready at an instant's notice, to go to the aid of pilots of fallen planes in desolate, snow-choked areas. Only skiing clubs that can meet recognized standards of experience in the woods as well as having undergone thorough training in proper ski techniques are being considered.

Mountain troop outfits have been ordered to equip two rescue ski parties, port and starboard, made up of station naval personnel, but use of well-qualified ski clubs throughout the area covered by this station and its auxiliary facilities may save precious time by being closer to the scene of crash, and could therefore be rendering aid to pilot pending arrival of the Navy rescue squad.

▶NAS, DALLAS—Dilbert and his brothers will be interested to learn they have some relatives at this station. Of course the Dallas Dilberts are not too numerous, for the station each month turns out a large number of very competent graduates, but there was the student who did a beautifully executed ground loop on the home mat. Observers noted that he corrected for drift by lowering the down wind wing. Asked why he did this, he replied, "Sir, that is the same wing my instructor lowered yesterday when he corrected for drift."

Then, too, there was the student who made a forced landing. He put his training to good use, set the plane down nicely in a good field about 100 yards from a highway and 300 yards from a nice, modern farm house with telephone facilities. Then he realized he was faced with a difficult problem. He had been told never to leave his aircraft unguarded. Should he leave it and summon aid? No sir, he decided, and he sat right there by his plane for five and a half hours. Finally an inquisitive civilian stopped his car, came over and finally spread the word.

▶NAS, OTTUMWA—The recognition unit of ground school has built a diorama, displaying models of the U. S. Fleet. The diorama is 24' x 8' x 8'. Ships are in formation and include destroyers, light and heavy cruisers, battleships and a carrier. Plaster of Paris, cloth and wood are used in building the sea scene.

▶NAS, GROSSE ILE—The photographic laboratory, as an aid to the A&R Department, has just completed an N2S-3 manual illustrating the engine mount assembly. The photographs consist of exploded views of sub-assemblies with arrows showing part replacement numbers. In addition, each sub-assembly is illustrated with three-dimension vectographs. Use of three-dimension photographs gives valuable assistance to the aviation mechanic in locating proper position of each part in the assembly.

TOKYO TALKS

—To JAPAN

Tokyo features an interview by Lt. Gen. Yoshitsugu Tatekawa who declares that "the use of poison gas against Japan in the present war, as proposed by the New York *Daily News* in an editorial, is not a new American idea. This vicious method of warfare was planned by the U. S. Army more than 20 years ago." Tatekawa gave a warning that "the possibility of use of poison gas by the U. S. should not be disregarded since there is good reason to believe that America's war leaders still cherish this idea."

—To THE U. S.

Domei highlights a statement made by Maj. Gen. Wolfgang von Gronau, Air Attaché of the German Embassy in Tokyo, that "the air forces of Japan and Germany will carry out joint cooperation in the same war theater against the common enemy, the Anglo-Americans, in the near future."

—To RUSSIA

A Tokyo commentary suggests that the problem facing England and the U. S. is how to reduce German fighting strength with the least sacrifice of their own forces, but at a maximum sacrifice to Soviet Russia.

—To EAST ASIA

"A deterioration of enemy air strength is clearly indicated" in the South Pacific sector by the "increase of unbalanced groups of enemy aircraft" now attacking Rabaul.

SHOW ME THE WAY TO GO HOME

Celestial Fix Problem

At ZT 1800, January 3, 1943, at NAS, Key West, Lat. 24°–33' N, Long. 81°–48' W, the star Deneb Kaitos is approximately on the meridian. What principal navigation stars will transit the meridian at the following times the same night? (Consult star chart in Air Almanac.)

1. ZT 1900 .....
2. ZT 2200 .....
3. ZT 2300 .....
4. ZT 2400 .....

(Answers on page 35)

—To NORTH AMERICA

"The Pacific war is facing a crucial stage this year. The growing strength of Japan internally, coupled with rapid preparations of enemy forces, makes it pretty plain as to where the next blow will come from, an offensive that will decide the issue of the war. As in Europe, so in the Pacific, this is bound to be the year which will bring the final showdown in which absolute superiority of Axis military power is to be reasserted to the world."

—To LATIN AMERICA

Recent developments in Latin America "are a brutal testimony of the fact the so-called Good Neighbor Policy of the U. S. is a mere sham. The U. S. policy is nothing more than camouflage for the American primary ambition to grasp world hegemony."

—To JAPANESE AREAS

Premier Hideki Tojo has urged Japanese officials to "understand the aims of the central government and if there is any actuality which obstructs a speedy increase in production of aircraft, to deal with it. Emphasis in munitions production at present lies in effecting progressive expansion of aerial fighting strength."

Earlier, a Japanese correspondent told his listeners that the defense of Rabaul was being seriously hampered by the lack of sufficient aircraft.

—To JAPAN

A retired commander in chief of the combined Japanese fleet assures his countrymen that Japan is safe from invasion. Although the U. S. is manufacturing "new arms and special types of vessels and other devices, she will be restricted in the war situation geographically and forced to use them gradually, thus giving the Japanese time to devise counter measures."

Another commentator says it has been the strategy of the Japanese Navy to "entice the main naval forces of the Allies to most convenient points in order to destroy them, and it has been fulfilling its traditional duty admirably."

—To NORTH AMERICA

Domei refutes a talk given by former Ambassador to Japan Joseph C. Grew, saying that "when he tries to make a distinction between what he calls the 'military clique' and the rest of the nation he is utterly wrong, since there is complete, insoluble unity of the entire Japanese nation under the binding leadership of His Imperial Majesty."

—To NORTH AMERICA

"The third year of the war will see Japan launching an all-out offensive to drive the last vestige of Anglo-American influence from Greater East Asia. Japan devoted the first year of the war to winning limitless resources and the second to winning political solidification." (A wireless dispatch from the Nazi Transocean agency, directed to the Far East, carried a different interpretation of Japan's recent feats. Said Transocean: "From the military standpoint, Japan during this year in general has adhered to defensive tactics.")

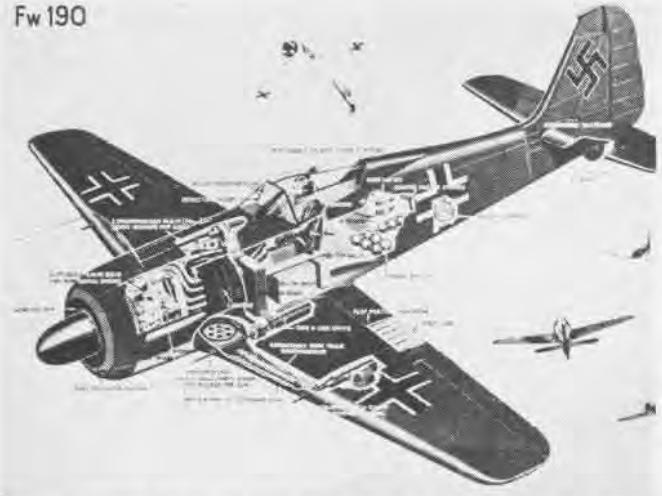
NAVAL AIRCRAFT MATCH blow for blow with German and Jap bombers and fighters because cooperation of the Bureaus of Aeronautics and Ordnance equips them with firepower and speed to do the job. Without speed, plus structural strength, the guns on the aircraft would be of little value. Without adequate armament, the fastest airplanes in the world would be outranged and shot down by enemy planes with heavier guns, unable to retaliate. So the task at hand for naval aviation is to get there first with the best armament. Pacific battle reports show *Hellcats, Corsairs* and other aircraft maintain a four-to-one superiority over *Zeros.*

AVIATION ORDNANCE

BuAer and BuOrd unite efforts to arm fighting naval planes for combat

AIRPLANE ENGINEERS dream of planes sleek and streamlined, without gun blisters, racks and bombs to slow them down. But in the eyes of an ordnance expert, an airplane is a platform on which as many guns as possible are loaded and flown into battle.

Somewhere between the two extremes come Navy planes, designed to go as fast and far as they can with the biggest possible armament for the job to be done. Two bureaus of the Navy Department—Aeronautics and Ordnance—cooperate in seeing that these aircraft have what it takes to fight the enemy on all the world fronts.



GERMAN FOCKE-WULF 190 HAS FOUR 20 MM. CANNON IN ITS WINGS

On the teamwork of those two depend the lives of thousands of aviation cadets and flight crew members being turned out by training schools to fly the planes Aeronautics builds to carry the guns Ordnance furnishes.

BuOrd and BuAer split between them cognizance over various types of fighting equipment installed on planes, with regulations specifying which bureau has control over the multitude of parts it takes to make a plane into a fighting weapon. BuOrd furnishes such items as guns, bombs, torpedoes, ammunition, bombsights, gunsights, bomb racks, down to such miscellany as bomb-carrying trucks, engine starter cartridges, gun cameras, smoke screen equipment, and pyrotechnics. These latter include such things as parachute flares, drift signals, and smoke grenades.

Turrets come under control of BuAer, as do armor, control cables, bomb displacing gear, impulse generators, gun firing solenoids and switches, fixed ammunition boxes, link and case chutes, and torpedo training cameras. BuAer also is charged with installation of all ordnance equipment in naval aircraft and has cognizance over all the parts, furnished by airplane contractors, required for such installations.

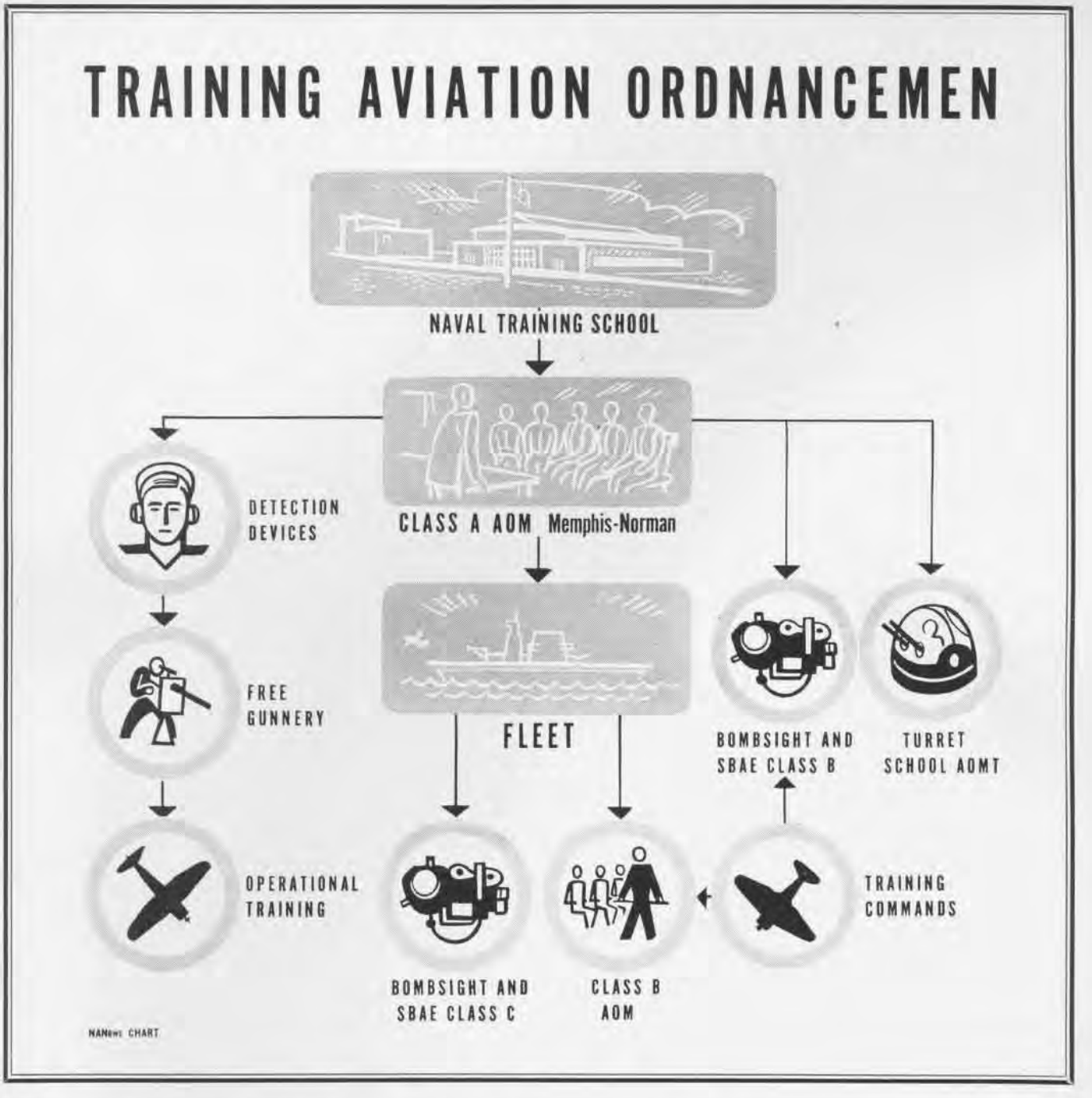
When need for a particular type of equipment arises in the Fleet, BuAer (if the item does not come under its cognizance) asks BuOrd Research Division to go to work on the task of designing and procuring the gear. After original plans are drawn, an experimental model is produced through some manufacturer and tested at Dahlgren Proving Ground, at NAS, Patuxent, or by the maker's own facilities.

If the model meets requirements of both bureaus, it is ordered in quantity through BuOrd and sent out through distribution system depots, annexes and pools to any naval activity requiring such equipment. Items that go into aircraft directly are sent through pools to the aircraft makers to meet their production needs. Spare parts allowed for maintenance are kept in depots and supply annexes scattered all over the world. Bureau of Aeronautics Representatives (formerly called Inspectors of Naval Aircraft) in aircraft manufacturing plants have trained ordnance officers on their staffs to help with ordnance installation matters.

Procurement of ammunition is handled in cooperation with the Army. Since Navy and Army have standardized the types of guns and ammunition they use, the task is simplified greatly. Navy has cognizance over marine target ammunition and Army over land types. This matériel is distributed through 17 naval ammunition depots which issue it to activities, ships, and bases. These in turn distribute to smaller units like squadrons. These depots are separate from the 18 supply depots and annexes which handle guns and other equipment.

Ammunition needs in the field filter through joint Army-Navy working boards in battle areas. They control amounts various service activities can get so that no units get more than they need while others are short-changed. The task is important to keep U. S. fighting units equipped with sufficient ammunition and ordnance gear to do the jobs allotted them by the high commands. Good distribution is important.

ORDNANCEMEN IN HOLD OF CARRIER ADJUST TORPEDO'S MECHANISM



TRAINING ORDNANCEMEN ASSURES STEADY FLOW OF CREWS TO FLEET

THE JOB of training thousands of men who keep guns firing and other ordnance gear on planes operating falls on various schools under Naval Air Technical Training Command. Without these trained enlisted men and ordnance officers, the job of keeping Navy planes fighting would be next to impossible.

"Boots" from six major training schools are sent to aviation ordnancemen's schools operated at NAS, Memphis and Norman. Several thousand of the men go through a 14-week course there, receiving basic indoctrination in weapons and their maintenance, knowledge that will be vital in later days.

Following their graduation, ordnancemen may be assigned to the fleet for active duty or sent on for further training. One sizable group goes to school—if the men pass stiff qualification tests—to learn detection devices, free gunnery and to receive operational training.

Others may be sent on to Class B bombsight or turret schools. Some students at bombsight schools come directly from operational and intermediate commands for this advanced training, or are sent back from fleet units to get this work. There also is bombsight training offered at Class C schools, where only men from the fleet are admitted.

Much of the advanced ordnance training is offered at NATTCEN, Jacksonville. Also located at this station is the Aviation Gunnery Officers' School where officers are prepared for the job of supervising AOM work on carriers and ground units. Some enlisted men and officers get training at the Fleet Torpedo School which is located at San Diego.

ENEMY PILOTS WAVED IN MIDAIR BEFORE ERA OF AVIATION ORDNANCE

THE FIRST two enemy aviators who met in the air merely waved to each other, but it wasn't long before bricks, then pistols and rifles came into play. Pilots tried to bomb and even to ram each other. These tactics prepared the way for the mounting of light machine guns on planes.

On single-seater fighters, guns were mounted on swivel posts in rear observation cockpits, sometimes high enough to fire ahead of the upper wing outside of the propeller circle. The pilot had to stand up to fire his gun. In 1914, both fixed and free aircraft guns were installed on planes; on some planes they were mounted at an angle to the line of flight, so that fire would clear the propeller arc. The pilot had to maneuver his plane in one direction, and fire in another. Mounting of free guns was a great problem in 1914. W. O. Scarff, R.N.A.S., developed a ring type of mounting that was standard during the war. A modified form of Scarff mounting is still in use.

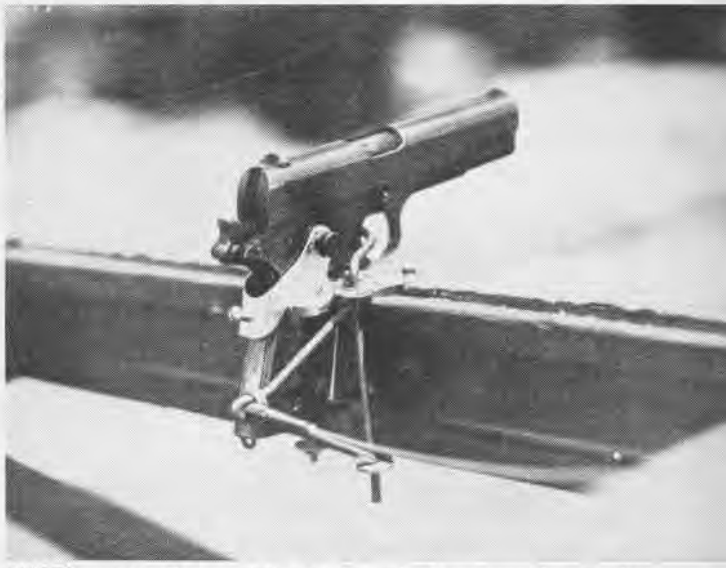
The French were the first to fire through the propeller. Small pointed metal blocks were fastened to the propeller to deflect the bullets. In 1915 Vickers began experimenting with interrupter mechanism, but the German mechanism, developed by Fokker in 1915, was far superior. It locked the firing mechanism of the gun as the propeller blade approached the line of fire. The most important advancement in air weapons was synchronizing gear. Modern versions are similar, except for improvements in apparatus. A pneumatic system has functioned well, although a hydraulic method has also proved efficient.

THE FIRST AERIAL BOMBS were built in cylindrical metal containers, and even in glass bottles, which were thrown over the side of the plane. Among early bombing material were steel darts to be loosed in showers. Grenades and incendiaries were used in November, 1914, in the Battle of Mons. Real bombs were dropped by the Italians in the campaign of Tripoli in 1912. The first bombs made in the U. S. during the last war were based on French design —the Gros Andreau bombs brought here in 1917. Three types of demolition bombs were manufactured—the 25-lb., 50-lb., and 100-lb.—all of streamlined design. First fragmentation bombs were made from rejected 3-inch artillery shells. Later they were based on the streamlined British Cooper bomb of 25 lbs. Actually streamlining did nothing to improve their flight, so cylindrical form was adopted, simplifying manufacture. The first bombs were as dangerous to the plane and to the crew carrying them as to the enemy. They often exploded prematurely, "duds" were common.

Large bore shell firing guns were experimentally used, but later discontinued, for mountings were poor and firing rate very slow. Unless a direct hit was made with the first shot, the enemy would bank around and riddle the cannon-equipped plane. Machine gun bullets were effective in the last war, because pilots lacked armor protection and often took along stove lids or other kinds of metal plate.

From an embryonic stage at the beginning of the war, airplane armament advanced so quickly that at the end of the war, all weapons in use today had passed through early stages of experimentation. The war's end saw a standstill in armament development. In the early twenties, the Italian General Douhet predicted that wars would be fought and won in the air, with large masses of aircraft operating in formation. Many theories were advanced—but had little chance of being tested until the war in 1939.

DAVIS gun, intended for attack on submarines, charged through both ends of long barrel instead of having recoil mechanism



PILOTS originally carried pistols only for ground use, then for air combat. Colt automatic is attached to wing of plane

PILOT had to stand up to operate Lewis machine gun on seaplane; today cockpit armor offers great protection to plane occupants

REARMING ABOARD SHIP IS SPLIT-SECOND TASK

IMPORTANT as the original task of installing armament equipment in an airplane is that of rearming it with bombs, torpedoes, or ammunition and repairing its guns when it returns from a mission. Battle experience on carriers and land bases has indicated the value of being able to do the job in a few minutes so planes are ready for battle again as soon as the gas crew has refilled the tanks. Those few minutes may mean the difference between a carrier's being caught with its planes on the flight deck or in the air ready to meet oncoming enemy bombers or torpedo planes.

The type of rearming done depends on the kind of a mission the plane is to be sent on next, whether it will need 1,000-pound bombs, torpedoes, small bombs, or full ammunition boxes only. The job of the aircraft carrier's ordnance officer is to get rearming done in fewest possible minutes. This may mean storing bombs and bullets in places nearer topside of the ship than the magazines, as close to the returning planes as is feasible from a safety standpoint.

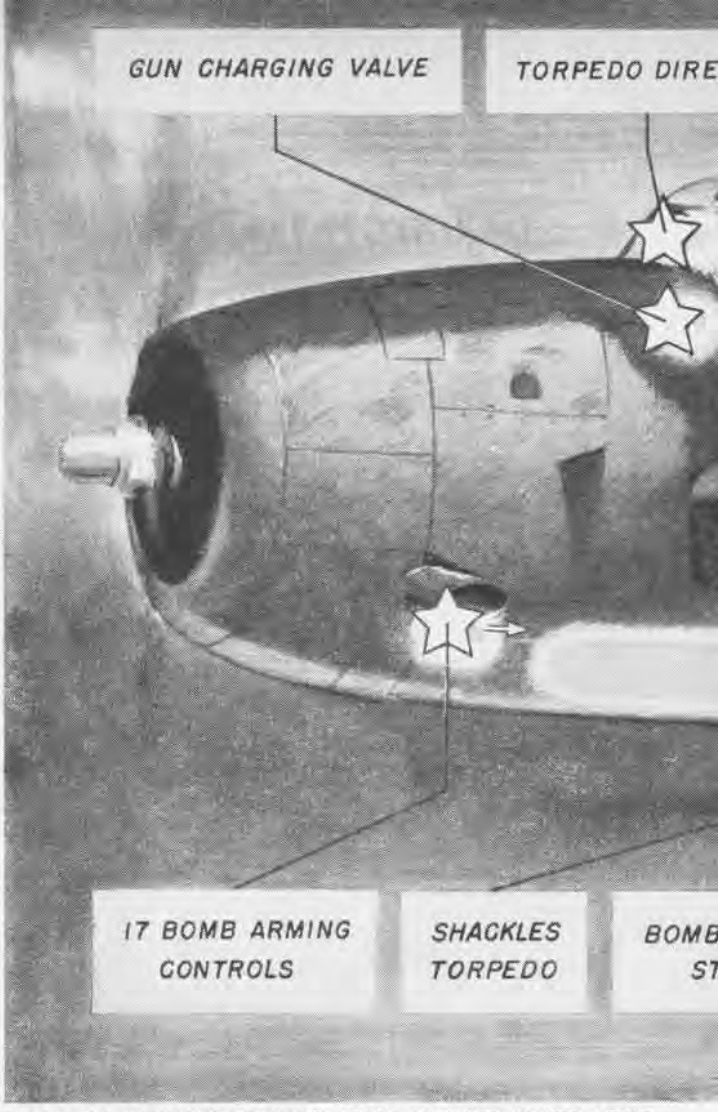
Having plenty of ammunition in the magazines deep in the carrier will be of no help if the ship has a slow system of getting it to the carrier deck when a sudden, urgent need arises. Block and tackle must be ready to take over if the electric elevator system is out. The rearming system must be able to work at top speed day or night. To keep it working properly takes plenty of advance planning on the part of the ordnance officer and others on the ship.

After the plane has been refueled, its guns checked and reloaded and any bomb load taken aboard, the leading ordnanceman inspects to see that it is in fighting trim and the airplane set for take-off. Bombs without properly installed fuses are dead-weight liabilities.

Bomb, torpedo, and mine loads also are receiving considerable emphasis. The varied nature of targets to be attacked and the various types of attacks which may be employed dictate the use of missiles of differing characteristics. Fuses also must be specialized and provide for no delay, short delay and long delay action as well as hydrostatic action. The type of bomb and fuse to be employed is given careful consideration before a striking force is dispatched to carry out a specific type of mission.

The bomb release system of today bears little resemblance to the old system of pulling a toggle handle. Train release of bombs from aircraft in which bombs are stowed in vertical tiers necessitates use of intervalometers and special distribution and selection systems. Moreover, if a bomb carries several types of fuses, the bomber or pilot must be able to select the fuse desired just prior to release.

A carrier's ordnance officer sometimes has to double as photographic officer, loading and unloading gun cameras and boresighting them. Some install mapping cameras on fighters and TBF's and put in torpedo-training cameras to check results of torpedo attacks.



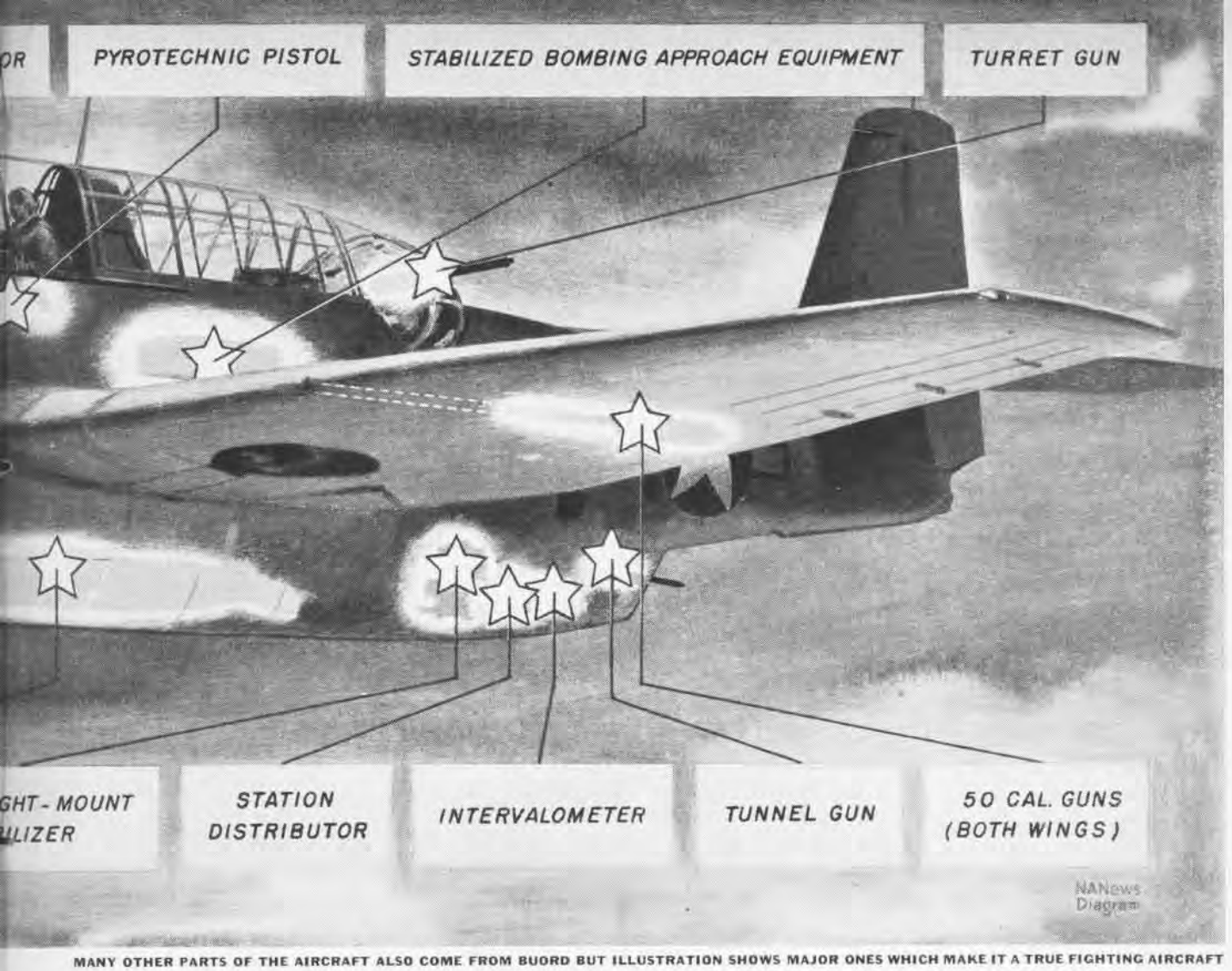
BUREAU OF ORDNANCE FURNISHES ITEMS PICTURED IN TBF ABOVE

BOTH German and Japanese planes carry somewhat the same size guns as Americans, according to reports from battlefronts. Probably the heaviest gun reported on a German aircraft was the 37 mm. mounted in the bellies of JU-87 *Stuka* dive bombers for anti-tank use in Russia.

Focke-Wulf 190's and other late German fighters are carrying 30 mm. cannon for ground-strafing work and for more punch against bombing planes. Four sizes of guns seem to be standard on most *Luftwaffe* aircraft—7.9 mm., which corresponds approximately to a .30 caliber American gun, 13 mm., 15 mm., and 20 mm. cannon. Some *Focke-Wulf* 187's have had four .50 caliber guns on them or six .303's, although the trend is toward heavier armament.

Exact data have not been released on the rocket guns German planes have been using with some success against

BUAER BUILDS THE PLANES AND BUORD FURNISHES MUCH OF THE LARGER FIGHTING EQUIPMENT, AS WELL AS MANY SMALL BUT VITAL ARTICLES



MANY OTHER PARTS OF THE AIRCRAFT ALSO COME FROM BUORD BUT ILLUSTRATION SHOWS MAJOR ONES WHICH MAKE IT A TRUE FIGHTING AIRCRAFT

Allied bomber formations, but they are believed to be fired out of "sleeves" on the plane wings which have a bore of six to eight inches in diameter. While the rocket guns can be fired only once, the projectiles have great fragmentation and penetrating power and have proved a strong supplementary armament for interceptor planes.

One of the disadvantages of a rocket gun is the inability to aim it at a target and expect a hit on the same spot, due to flight characteristics of the rocket itself. Its main advantage over heavy machine guns, from a structural viewpoint, is lightness of the rocket installation and absence of heavy recoil.

Japanese planes use fewer types of guns than German. The new Jap plane, *Tony*, first in-line engine fighter aircraft used by the Rising Sun, carries two 12.7 mm. machine guns and two 7.7 mm. in the wings. Some Jap planes carry 20 mm. cannon while a few earlier models had 7.9 mm. guns, patterned after the German machine gun of that size.

Although mathematical analysis indicated that a gun having a bore of about .6 of an inch—.60 caliber—was the optimum for aircraft fixed gun installations when all factors involved, including space and weight, are considered, the most popular American gun has been the .50 caliber.

While the 20 mm. is a popular anti-aircraft cannon on carriers, it has not been used so much on U. S. planes. One aircraft, the *Airacobra*, has a 37 mm. cannon firing out of the propeller hub. The Army is using 75 mm. cannon fixed in the nose of the B-25 Mitchell bombers in the South Pacific with good effect. New type recoil mechanism made it possible to install this gun in aircraft. The 75 mm. is the largest regular-type gun used on an airplane.

To counteract the power of enemy aircraft guns, aeronautics engineers have installed, increased and improved armor plate protection for crew and vital parts of the airplane. Armor strong enough to stop .30 caliber machine guns was easy to achieve, so heavier guns had to be added which in turn brought still heavier armor plating on planes.

ORDNANCE ON NAVY AIRCRAFT CONSTANTLY BEING CHANGED TO KEEP UP WITH NEEDS OF WARFARE; FRONT LINE REPORTS RECEIVE CLOSE STUDY

GUNSIGHTS | BOMB RACKS | BOMB SKIDS | SMOKE SCREEN TANKS | BOMB SERVICE TRUCKS | BOMBS

Speedy Rearming of Aircraft Is Vital to Protect Carrier From Enemy Attack

ORDNANCE OFFICERS and enlisted men under them are important cogs in the smooth-functioning fighting machine a Navy aircraft carrier must become to fight the enemy the most efficiently. The best pilots and gunners are helpless to do much damage unless their bombs are loaded and fused properly or their guns and belt ammunition in proper working order when they reach their targets.

Some of the scenes on this page, taken on one of the United States' veteran aircraft carriers, show aviation ordnancemen doing various tasks which are theirs when the ship prepares for action. Airplanes and ships are important mainly to carry guns and bombs to the enemy. It is the job of the ordnance crew to see that they work when they get there.

Training aviation ordnance officers is done at Jacksonville, after which the officers may be assigned to duty with such activities as headquarters squadrons of Fleet Air Wings, CASU's, aviation supply annexes, ordnance assistants to Bureau of Aeronautics Representatives, experimental ordnance units, staffs of fleet air commands, advance bases, BuOrd or BuAer, naval air stations, training task force commands, mobile bomb fuse instruction units, training commands and carriers.

Those sent to carriers see to it that the rearming system aboard ship is functioning as fast and smoothly as possible. Planes returning from combat must be refueled and provided with more ammunition and bombs as fast as possible so that an enemy attack will not catch them unprepared. That ship stands the best chance of staying afloat whose aircraft can get back into the fight fastest after landing for rearming.

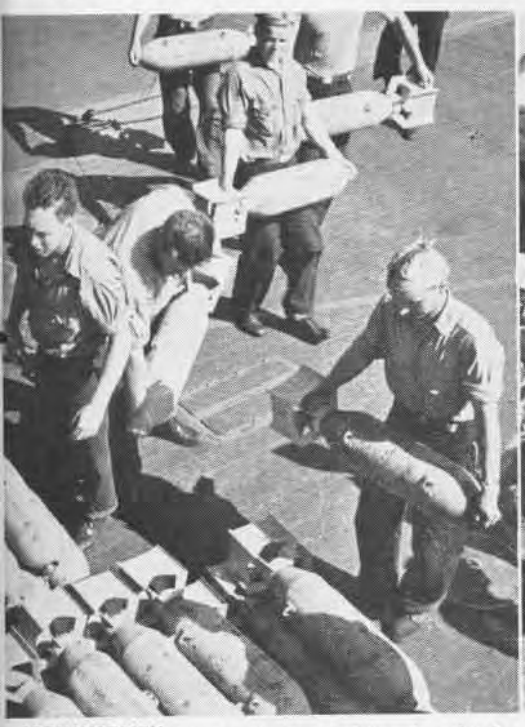
POWERFUL .50 cal. machine guns, such as one installed in this Navy patrol bomber, give U. S. planes heavy firepower

ORDNANCE Bureau furnishes both depth bomb and bomb skid which ordnanceman is trundling on carrier deck past *Hellcat*

BOMB STOWAGE aboard an aircraft carrier; piled here in neat rows, these "eggs" soon will be spreading steel among Japs

S NAVY PLANES FIGHTING PUNCH

TIN FISH, released from torpedo bomber's bay, heads toward its target; Bureaus of Aeronautics and Ordnance cooperate in equipping these he hitting TBF's with the armament which is winning them the title as the world's best torpedo aircraft; torpedoes are taking heavy toll of Jap sh



ORDNANCEMEN on a carrier stacking hundred-pound bombs to load in TBF's, dive bombers

BELTED .50 cal. ammunition being put into boxes of plane preparing to go into action

TORPEDOES in long rows below decks of aircraft carrier being readied for pla

25 YEARS AGO THIS MONTH

Naval Aviation in February, 1919

Feb.—Marine Corps aviators landed in Santo Domingo. Withdrawn in 1924.

Feb. 14—Five H-16 flying boats reported to Captain George W. Steele, Jr., first commander of air squadrons, U. S. Atlantic Fleet at Guantanamo. U.S.S. *Shawmut* was the tender and flagship of aviation detachment.

COMDR. J. H. TOWERS

Comdr. John H. Towers ordered to special duty in connection with proposed transatlantic flight of NC boats.

Feb. 19—Navy non-rigid C-3 claimed world's endurance record for that type with flight of 33 hours. The Bureau of Steam Engineering was assembling an airplane radio set weighing 40 lbs. which was expected to have a range of 60 miles.

Development of a turn indicator had been under way for some time. Several types had been tested and discarded, but the gyroscopic indicator as developed by the Sperry Co. was being installed on the NC-1 at Rockaway—and appeared to have possibilities. This work was carried on by Mr. de Florez of the Bureau of Construction and Repair (now Captain de Florez, Director of Special Devices Division of BuAer).

Planning Section (aviation) was deeply involved in plans for landing a plane aboard ship. It was proposed to construct revolving landing platforms on shore with a view of developing necessary arresting gear which would be finally placed aboard ship. The platform, 100′ x 40′, was to be movable so it could be trained into the wind. General idea of this development was based on experiences of the British Admiralty.

Following work was being done for the Navy by the Curtiss Engineering Corporation, Garden City, L. I.: No. 3 Dunkirk fighter mounting a Liberty engine. Plans were being made to fit this triplane with new wings of larger area in an effort to establish an altitude record. (Roland Rolfe later went to 34,000 ft. in this machine.) Another Dunkirk fighter was being modified into a biplane for use in establishing a high speed record. It was anticipated that a speed of 180 mph could be attained. The HS-3 (modification of HS-2) was also being assembled. In addition a Curtiss Racer RC-1 was being completed.

Bureau of Ordnance was experimenting with an automatic flying machine to be used in carrying large explosive charges. This work was a continuation of that previously done by the Sperry Gyroscope Co. and was being handled by Captain McCormick, USN. The bureau was also experimenting with a .50 caliber machine gun.

The following work was being conducted on naval aircraft at Philadelphia: Testing the Curtiss M-F training flying boat, construction of two monoplanes equipped with Lawrence 50 hp air-cooled engine for the purpose of carrying out preliminary experiments for landing planes aboard ship.

The wind tunnel at the Navy Yard, Washington, was carrying out tests regarding feasibility of lowering the trailing edge of airfoils to reduce landing speed of airplane—being built at Philadelphia for the purpose of landing aboard ship. (Breguet successfully used this in 1916 on his day bombers.)

Ensign Jova, pilot, and Ensign Harder as passenger climbed to 6,000 ft. in 16½ minutes in an N-9 seaplane No. 2590 with Hispano-Suiza engine. This established a climb record.

Feb.—Demobilization of Northern Bombing Group completed. After Armistice, squadrons were moved back from airdromes in Belgium to original airdromes in Northern France, and from there evacuated to the U. S. The group dropped a total of 155,998 pounds of bombs on objectives in Belgium during its World War existence.

C-TYPE AIRSHIPS WERE DESIGNED IN 1918 TO CARRY DEPTH CHARGES FOR ANTI-SUB ACTIVITIES

DE FLOREZ TESTED INDICATOR AT ANACOSTIA

RABAUL

RABAUL is the main Japanese outpost in the Southwest Pacific. From this point flow arms and supplies for her military, naval and air force operations. It is 700 miles from the stronghold Truk in the Carolines.

From 1884 to 1914 Rabaul and surrounding territory existed as part of the German Empire. In World War I a small band of Australians took possession of Rabaul and used it as a seat for military administration until 1921. Then, by a League of Nations mandate, the Bismarck Archipelago, including Rabaul, was handed over to Australia for administration.

Rabaul lies at the northeastern tip of New Britain, which is verdant, mountainous and subject to volcanic eruptions. Climate and rainfall range from a comparatively dry season from May to November, when the southeast trade winds are prevalent, to torrential downpours between November and March.

The waters of Simpson's Harbor afford Jap vessels excellent anchorage, accounting for the enemy's development of Rabaul as a naval and supply base. Airfields and military installations have been created to form a network of defense. The Japs' prompt efforts to recoup Rabaul losses show her concern for this vital outpost.

THE ALLIES' bid for Rabaul, characterized by relentless bombing to dam the flow of Japanese shipping, shatter military installations, wreck defensive facilities and generally soften the area, has moved into the critical stage, highlighting the strategic importance of this township on north edge of navigable Simpson's Harbor.

FIFTH AIR FORCE STRIKES

AMONG the blows that have set the Japs reeling on their heels at Rabaul during the past three months were those well planned, coordinated attacks by Army and Navy air forces on November 2 and 5 respectively, depicted on these pages. November 2 was a scintillating Fifth Air Force show on which the curtains opened and closed almost before the Japs were aware of what was going on.

Units of the Jap fleet then steamed down from the great base at Truk to reinforce Rabaul, only to become the brunt three days later of an attack by carrier-based Navy planes supported by AAF aircraft that was even greater in its damage to enemy vessels.

On November 2 it took squadrons of the Fifth Air Force only twelve minutes to sweep across and encircle Rabaul and Simpson's Harbor, taking a big toll in planes, installations and shipping. Phosphorous bombs dropped before the onrush of B-25 *Mitchells* frustrated many Jap attempts to defend themselves with antiaircraft guns, and fragmentation bombs floating down to earth with delayed fuse action dispersed personnel, then destroyed or damaged planes, airdromes, runways, storage buildings. *Mitchells* coming in on top of these preliminary operations dropped heavy bomb tonnage on Lakunai and Vunakanau airdromes, storage dumps and ships in the harbor. Attacks on shipping were made at masthead level, with many direct hits on warships, auxiliary naval vessels and many freighters and cargo ships.

SURPRISE and diversion, as well as coordination beween fighter and bomber elements, were so effective on the part of Fifth Air Force that the Jap air force was unable to get into stride to offer real resistance. Just an hour before the attack the enemy had reinforced his New Britain stronghold with 125 operational craft.

Antiaircraft batteries were active, but a large percentage of this defense force had been silenced by AAF's neutralizing bomber tactics, with the result that Jap AA effectiveness was seriously impaired. Fifth Air Force lost ten bombers and nine fighters in this action. Jap plane losses were 69 in combat and 16 caught napping on the ground.

METAL strips for runways, shown in this picture, have been developed by the Japs for quick setting up on island outposts

PHOSPHOROUS bombs dropped from fast flying planes proved an effective tactic, preventing Jap operation of antiaircraft guns

DAMAGE, if not total destruction, resulted from delayed bursts of parafrags. Absence of personnel shows success of surprise

PARAFRAGS, fragmentation bombs lowered on parachutes, wreck planes, trucks, work and supply huts, also causing confusion

MITCHELL FLYING AT MASTHEAD LEVEL MAKES A DIRECT HIT ON JAP VESSEL IN SIMPSON'S HARBOR. BURNING SHIP APPEARS IN THE BACKGROUND

PRESENT EVENTS SHAPE FUTURE

A PRACTICAL perspective on developments in any war theater is reached by piecing together day-to-day events and noting from them a trend that may end in decisive action. Some have observed in the Nation's press a tendency to overplay the significance of individual engagements, with the overall effect of lessening in the public mind the bigness of the job ahead. Allied air forces have done, and are doing, a magnificent job in the Pacific. Strikes of Fifth and Navy air forces displayed on these pages is proof of that. But nobody knows better than commanders and fighting forces of the Pacific how big is the job ahead, how all-out the effort, before the enemy finally is brought to his knees. That is because *they* have won the victories and know what it takes. They are not lulled into overconfidence in executing campaigns of an overall offensive strategy.

DIRECT hit on stern litters air above ship with flying debris. *Mitchells* scored their hits flying over harbor at low levels

FIRES from bombs rage around shore supplies on harbor's edge. Pictures on these pages are from Army Air Forces' collection

NAVY PLANES' CRUSHING BLOW AT JAP NAVAL-MERCHANT SHIPPING OCCURRED IN SIMPSON'S HARBOR. AT TOP LIES RABAUL, NOW HOT SPOT

NAVAL AIR FORCE STRIKES

ALTHOUGH the Japs were taken by surprise on November 2, they lost no time sending naval reinforcements of cruisers and destroyers from their base at Truk. Battleship and carrier units were conspicuous by their absence.

No sooner had the naval force been reformed than it was assaulted on November 5 by carrier-based Navy planes that made Simpson's Harbor an inferno of bombs, torpedoes and antiaircraft fire. During this attack, five Jap heavy cruisers were plastered with bombs and torpedoes. One of them blew up. A sixth heavy cruiser was torpedoed. One light cruiser was hit by bombs and torpedoes, a second by bombs alone. Two destroyers were torpedoed, many others heavily strafed.

Of approximately 100 Japanese planes in the air, 24 were shot down, 22 probably shot down and 8 damaged by naval air gunners. Eight Navy planes were lost. The Navy's attack was echoed an hour later by fighter-escorted *Liberators* from General MacArthur's command, and by Australian *Beauforts* which attacked Vunakanau airfield.

The Navy's crucial noon-hour attack provided the setting for many heroic episodes. Stories came back of wounded

DISORDERLY SCRAMBLE OF VESSELS REFLECTS WILD FRIGHT OF JAPS SEEKING ESCAPE FROM TERRIFIC NOV. 5 POUNDING BY U. S. NAVY PLANES

pilots and crews who flew their bullet-ridden craft through mazes of fighter interception, again and again scoring decisive hits on targets in Simpson's Harbor. Some of these air battles stretched out to twenty-five minutes. There were cases of Jap fighter packs ganging up to pounce on one or two lone naval planes, and of being shot down, crippled or driven away by deadly naval air fire. Several Navy planes shot almost to bits in the fracas hobbled back and made safe landings aboard the decks of waiting carriers.

Following this action, Jap squadrons set out in pursuit of the Navy carriers, making four successive stabs, all of which the accurate firing of the carriers' AA's made vain and costly.

OTHER attacks on Rabaul by AAF bombers and RAAF *Beaufort*s followed on November 7 and 9. On November 11 one of the heaviest and most sustained air attacks ever launched in the Southwest Pacific was visited upon Rabaul by Navy, Army and Australian air forces, costing the Japs a light cruiser and 2 destroyers lost, and a light cruiser and 11 destroyers damaged. From then until the present, Allied air power has consistently repeated its punishment of Rabaul, as the tempo of air activity has quickened throughout the Bismarck Archipelago area. But the devastating raids of November seem to have impressed the Japs with the fact that rugged, harbored Rabaul is ticklishly vulnerable.

IN RABAUL WATERS NAVY PLANE HITS JAP HEAVY CRUISER AMIDSHIPS AS AIR ATTACK MADE ITS IMPACT FELT ON THE ENEMY'S STRONGHOLD

TECHNICALLY SPEAKING

Save Space Storing Frames

Cherry Point Uses Hanging Idea

MCAS, CHERRY POINT—Supply Department has developed excellent utilization of storehouse cubic content for purpose of storing air frames. By use of overhead hanging, sidewall supporting, and floor storage, maximum use is made of storage area. The light nature of material permits storage without overloading supporting structures.

Pictured is full view of floor storage of large surfaces plus overhead hangings utilizing strap supports.

CONVENIENT STORAGE FOR AIRPLANE PARTS

Speeds Push Rod Assembly

Jig Prevents Damaging of Parts

NAS, PENSACOLA—A useful vise mounting jig employing the jack principle for removal and installation of push rod ball ends has been developed at this station. The jig has been used successfully in engine overhaul, chief advantage being in rapid assembly and disassembly of push rod parts without damage to any part.

The drift and hammer commonly used for disassembly causes damage to both push rod and push rod ball ends. The new jig assembles and disassembles push rods by pressure evenly distributed, thus eliminating damage caused by concentrated blows.

An estimated five minutes of time is gained on each unit, making possible total estimated dollar savings per month of $31.25.

[DEVELOPED BY JAMES C. ROTH]

▶*BuAER COMMENT*—**This suggestion appears to be a new idea and is a much better method than formerly used.**

JIG ELIMINATES DAMAGE TO ROD BALL ENDS

Speeds Propeller Removal

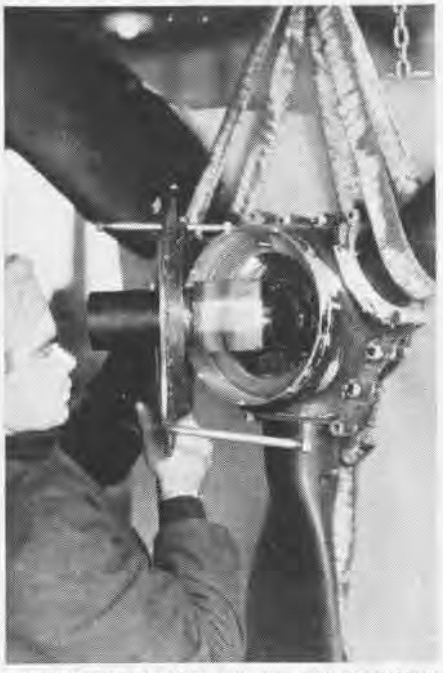
New Wrench Fits Retaining Nut

MCAS, MOJAVE—A PB4Y squadron has encountered considerable difficulty in removing propeller retaining nuts which have become frozen or excessively tightened in use. Inadequacy of the wrench supplied with the service kit made it necessary at times to use a chisel and hammer to loosen the nut when other methods failed.

To remedy the situation, a newly designed and built wrench with guide eliminates difficulties. This wrench was made by cutting 1¼ in. off the present wrench and welding the socket to a 6 in. length of 3 in. pipe which is drilled at the other end to hold a torquebar. As a guide, a plate was devised, large enough to cover open hub with a collar to hold it in place and two bolts to secure it to hub by existing bolt holes in the casing. A central hole 3¼ in. in diameter provides guide bearing for wrench. It will be found that the cut-off socket forms a shoulder which further prevents slipping since it bears on the inner side of plate when in place for use.

[DESIGNED BY CORP. BOB CALL, USMCR]

▶*BuAER COMMENT*—**This appears to be an excellent modification of this tool and it is recommended that it be publicized so as to acquaint other activities with its use.**



NEW WRENCH PROVES USEFUL AND EFFECTIVE

Mails to Ban Many Plants

Quarantine Rulings Violated

Naval aviators and ground personnel on foreign shores are running up against plant quarantine regulations when they try to send certain kinds of plant life and insects home as souvenirs.

Unacceptable for mailing to continental United States by persons overseas are: cottonseed, seed cotton, unhulled rice and rice straw and hulls, leaves and parts of plants used as packing materials, bamboo seeds or plants, sugar cane, citrus plants or cuttings, banana plants, fresh fruits and vegetables, including potatoes, sweet potatoes and yams; live insects, including living larvae, pupae and eggs. Rice straw and rice hulls are not acceptable as packing materials. Dried, cured or processed fruits and vegetables are acceptable under the Department of Agriculture's regulations.

MOUNT AERIAL CAMERA ON FOUR "A" BRACKETS

MOUNT INSTALLS IN PLACE OF ESCAPE HATCH

LOCKING DEVICE "B" SECURES MOUNT TO SNB

Devise Mount for Camera

Make Adapter for SNB-1 Plane

NAS, JACKSONVILLE—An adapter has been designed at this station for installing aerial camera mount NR-1 in the nose of an SNB-1 without changes or alterations in aircraft structure. By use of this adapter, mapping is made possible from the nose of this type of aircraft.

Entire assembly fits in the escape hatch, which is removed to install camera mount. It is locked into position with wing nuts, making removal possible to give access to hatch in cases of emergency.

[DEVELOPED BY HOMER D. FORD, PHOTOGRAPHER, USN]

▶ *BuAER COMMENT*—**This appears to provide a satisfactory installation for this airplane and shows considerable practical ingenuity in its development.**

Marine Invents New Crane

Constructs Airstrips in Hurry

A Marine first lieutenant in the South Pacific has invented a crane on a caterpillar tractor designed to do the work of 12 men in laying airstrip matting and to do general tasks about an airfield.

The invention was evolved after Guadalcanal experience demonstrated the necessity to set up or repair airstrips in a hurry. His crane has a jib that drops within four feet of the ground or raises to 18 feet. Its most powerful shift hoists 8,000 lbs., while others handle 4,000 and 6,000 lbs. Counterbalance on the stocky little crane is 3,000 lbs. To build the lift, parts were accumulated from all available sources.

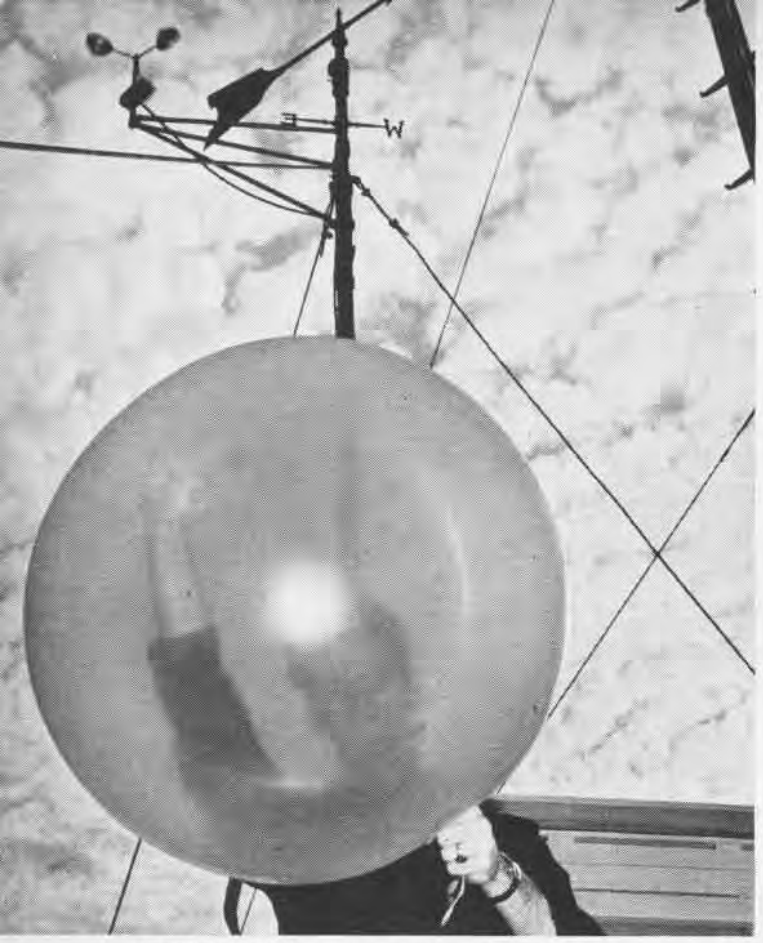
(Succeeds list of December 15, 1943)

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

January 20, 1944

Airplane	Bulletin	Date	Change	Date
F4F–4	40	11–6–43	99	12–10–43
F6F–3	24	12–24–43	45	1–9–44
FM–1	21	11–6–43	45	12–29–43
F4U–1 F3A–FG	27	12–24–43	84	12–6–43
GH–1	7	11–15–43	16	10–7–43
N2S–1	22	12–22–43	32	8–9–43
N2S–2	16	12–22–43	14	8–9–43
N2S–3	19	12–22–43	25	9–14–43
N2S–4	11	12–8–43	6	9–14–43
N2S–5	3	12–8–43	3	9–14–43
NH–1	0	.....	6	11–1–43
PV–1	25	1–2–44	96	1–4–44
PV–3	4	1–28–44	11	12–20–43
PBM–3	33	11–2–43	107	1–4–44
PBM–3C	30	12–18–43	62	12–18–43
PBM–3R	25	11–2–43	102	1–4–44
PBM–3S	7	11–2–43	31	12–28–43
PBN–1	2	3–26–43	25	1–4–44
PBY–5	40	12–24–43	145	1–1–44
PBY–5A	47	1–1–44	133	1–1–44
PBY–5B	8	1–1–44	31	12–21–43
PB2Y–3	18	12–22–43	120	1–1–44
PB2Y–3R	18	12–22–43	105	1–1–44
PB4Y–1	31	11–30–43	64	12–16–43
R4D–1	16	11–8–43	20	12–14–43
R4D–5	8	11–8–43	5	12–14–43
R5D–1	9	12–11–43	55	1–2–44
R5C–1	6	12–17–43	19	12–12–43
R5O–6	3	11–26–43	1	11–16–43
SBD–1	57	1–5–44	104	12–28–43
SBD–2	60	1–5–44	113	12–24–43
SBD–3	78	1–5–44	144	12–23–43
SBD–4	33	1–5–44	55	12–23–43
SBD–5	31	1–5–44	40	12–23–43
SBD–6	3	1–5–44	2	12–23–43
SB2A–4	11	1–7–44	91	12–7–43
SB2C–1	26	1–7–44	21	1–7–44
SNJ–2	11	4–8–43	18	1–5–44
SNJ–3	25	12–31–43	24	1–5–44
SNJ–4	19	12–31–43	23	1–5–44
SNJ–5	2	12–31–43	6	1–5–44
SNV–1	15	1–6–44	45	1–5–44
TBF–TBM	78	11–25–43	163	1–1–44

CHECKING THE WEATHER



1 AEROGRAPHER'S mate studies cloud formations, checks weather conditions at surface & aloft to aid aerial navigation

IF MARK TWAIN were alive today he would have to take back what he said about the weather. For something *is* being done about it. Aerologists measure weather elements hourly both afloat and ashore for definite uses and purposes. As these pictures indicate, NAS, Lambert Field, gathers weather information for naval aviators and cadets to determine flight plans and other procedures. Surface weather observations are made hourly and upper air observations at least once a day, and more often when particular information is required.

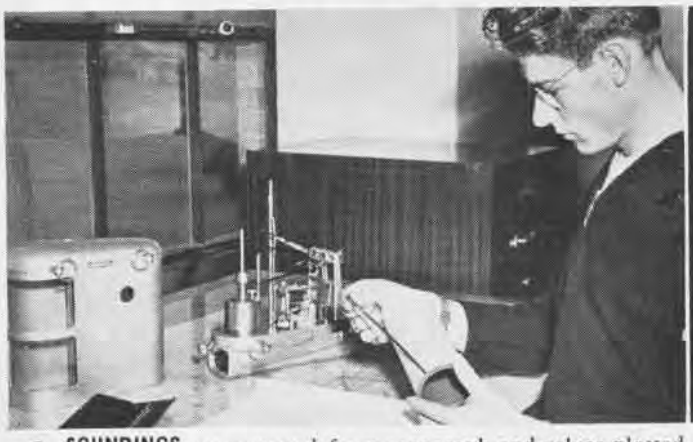
The station prepares weather maps every six hours on the basis of reports received by teletype and radio from several hundred stations in the United States, Canada, Alaska, Pacific Islands, Mexico, Central and South America, and the West Indies. Most naval air stations are located on—or have connecting lines to—teletype circuits over which are transmitted hourly weather reports along commercial airways. This enables aerological personnel to keep close watch on changing weather conditions and allows them to issue warnings on any sudden variations that may be dangerous to aircraft that are either aloft or on the field.

2 THERMOGRAPH records temperature weekly. To left is humidity-recording hydrograph. Maximum & minimum thermometers are on wall. Psychrometer, used to obtain wet & dry bulb temperatures, is on rotor at right

3 LAMBERT FIELD aerology officer carefully checks barograph which gives continuous weekly record of barometric pressure

4 AEROGRAPH records pressure, temperature, and humidity to height of about 3 miles when carried aloft by service aircraft

5 PILOT balloon is released to check winds aloft. Then theodolite measures elevation and azimuth angle of balloon in air



6 SOUNDINGS are removed from aerograph and values plotted onadiabatic chart which aerology officer uses in forecasting

7 TELETYPE system brings information to NAS, Lambert, from weather observation stations throughout U. S., possessions

8 OBSERVATIONS from other stations are entered on weather charts that are analyzed and made easily accessible to pilots

9 AEROLOGY helps naval aviators determine flight plans and other procedures. Norfolk picture; others are from Lambert

Gapper Sets Speed Record

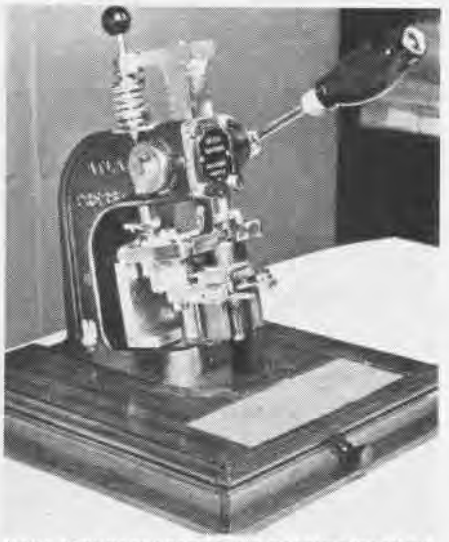
BuAer to Supply Efficient Tool

NAS, NORFOLK—A spark plug gapping machine which won a $250 cash award for its designer has been submitted to BuAer for further consideration. The machine has been used in the spark plug shop at NAS, Norfolk, for six months, during which it has resulted in savings estimated at from four to five thousand dollars by speeding work.

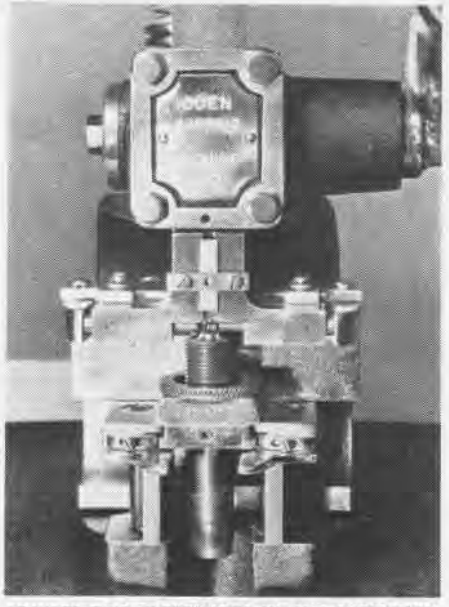
With present equipment, each of four electrodes on aircraft spark plugs are set individually by a more or less trial-and-error method. Gap is set and checked and process repeated until .012" clearance is attained. On standard existing equipment operators set anywhere from 100 to 400 spark plugs per working day.

With the new Oden machine it is possible to set accurately 400 plugs per hour. This machine is so constructed that by full floating action and equalized application of pressure, two electrodes are accurately set in one operation. This is accomplished by having two .011" thickness leaves come down between center and shell electrodes on either side while at the same time an especially shaped set of gapping rams, conforming to the contour of particular type of plug being gapped, applies sufficient equal pressure to set each shell electrode firmly against thickness leaves which are up against center electrode.

All of this action occurs merely by



MAKE ACCURATE SPARK PLUG GAPPING MACHINE



ADJUSTS TWO ELECTRODES IN ONE OPERATION

(Succeeds list of November 15, 1943)

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

January 13, 1944

Engine	Bulletin	Date
Pratt & Whitney		
R-985	174	Being issued
R-985	175	7-14-43
R-985	176	Supplement No. 1 dated 11-8-43
R-985	178	11-1-43
R-1340	194	Supplement No. 1 dated 11-8-43
R-1340	196	11-1-43
R-1535	216	Being issued
R-1535	217	Supplement No. 1 dated 11-8-43
R-1535	218	Being issued
R-1690	201	Supplement No. 1 dated 11-8-43
R-1690	203	10-25-43
R-1830	336	Being issued
R-1830	340	Revision No. 1 dated 12-16-43
R-1830	342	11-22-43
R-1830	343	11-24-43
R-1830	344	11-20-43 and Supplement dated 12-11-43
R-1830	345	11-9-43
R-1830	346	11-13-43
R-1830	347	11-27-43
R-2000	46	Being issued
R-2000	51	11-22-43
R-2000	52	11-8-43
R-2000	53	11-9-43
R-2000	54	Supplement No. 1 dated 11-8-43
R-2000	55	11-13-43
R-2000	56	11-27-43
R-2000	57	12-7-43
R-2800	74	Revision dated 10-25-43
R-2800	93	Being issued
R-2800	95	Being issued
R-2800	98	Being issued
R-2800	100	Revision No. 1 dated 8-30-43
R-2800	103	11-22-43
R-2800	104	11-22-43
R-2800	105	11-19-43
R-2800	106	12-7-43
R-2800	107	11-24-43
R-2800	108	12-1-43
R-2800	109	11-30-43
R-2800	110	12-7-43
R-2800	111	Being issued
R-2800	112	12-22-43
Continental		
R-670	13	11-5-43
Jacobs		
R-755	1	8-14-43

General Engine Bulletin	Date
11	Being issued
14	Revision No. 1 dated 11-8-43
16	Being issued
20	Being issued
23	11-6-43

Auxiliary Power Plant Bulletin	Date
2	Being issued
9	11-17-43

Propeller Bulletin	Date
Hamilton Standard	
5	Being issued
7	Being issued
8	8-23-43
9	Being issued
10	11-22-43
Curtiss	
3	Being issued
8	11-1-43
9	11-20-43
10	11-17-43
11	12-4-43
12	12-4-43

General Propeller Bulletin	Date
2	Being issued

lowering the gapping lever with enough pressure to cause shell electrodes to set firmly against center electrode. When lever is released, spring back of electrodes leaves them a near perfect .012". Then by turning plug one-half turn and lowering lever once more, gapping operation is completed.

[Designed by Lewis M. Oden, Sr.]

▶ *BuAER COMMENT*—**This machine will eliminate the one bottleneck in spark plug overhaul. It is estimated that one operator with an Oden gapping machine will be able to gap all plugs at any NAS, thereby relieving four or five persons normally engaged in gapping plugs at the larger stations.**

BuAer has a simple production model under contract, incorporating all possible manufacturing short-cuts without altering basic design. Upon final approval of sample, sufficient machines will be procured to supply a machine for each activity overhauling spark plugs. Every effort will be made to complete shipment to all activities within 90 days after production sample is approved.

Checks on Trainer Radio

Squadron Perfects New Method

NATC, Pensacola—A squadron at NAAS, Saufley Field, has devised a simple method of maintaining exact transmitting frequencies on its 200 SNV trainers, reducing the time required for radio checks.

The squadron had experienced some difficulty in transmission because of large drifts in frequency resulting from plane vibration, temperature change and because of the proximity of another squadron operating only 45 kilocycles away.

To assure that each plane's frequency is always kept exact, a constant listening watch is kept on base radio during flight periods by the duty radioman, using receiver in combination with frequency meter. When a plane, identifying itself by call, is noted to be off in its frequency, the number of plane is recorded. The moment it returns to line, frequency is checked and corrected.

Frequency check is then eliminated from radio check, saving considerable time for check crew. It was found necessary to shorten receiver antenna length to permit monitoring by receiver and freq-meter in combination. Otherwise, freq-meter signal would not be able to buck receiver signal strength.

ANSWERS TO CELESTIAL FIX PROBLEM

1. Achernar
2. Aldebaran
3. Betelgeux
4. Sirius

(See page 15)

Build Projection Screen

Make Daylight Movies Possible

Daylight moving picture projection screens consist of a small curtain with a deep hood, which makes out-of-doors movies possible. The training film staff at NATC, Corpus Christi, had to design and build their own, because of shortage of such equipment on the market.

The Corpus screen is a simple, practical, daylight theater that can be used when heat makes light-tight projection rooms unlivable, or when an instructor wishes to show a film beside the plane it involves.

SIMPLICITY IS OUTSTANDING SCREEN FEATURE

The isometric projection presented here shows the simplicity of design. Screen is 3'8" x 4'10" rectangle of airplane cloth, stretched on 2' x 2' wooden frame and backed with plywood. Cloth is doped and sprayed with aluminum paint. Four panels of plywood make the hood. Sides, which flare out to provide wide visibility, are 3'8" x 6' panels. Top and bottom panels are 4'10" at screen end and 8' at open front. Strengthening the front opening are 8" sideboards. Stand is a triangle of 2" x 4" into which are mitred three legs of the same lumber, each 3'8" high.

Corpus Christi training film officers are enthusiastic about the efficiency of the simple screen, quickly built of material available at all naval air stations.

An instructive booklet—*Hand Tools*—has been prepared by the Training Service Section, General Motors Corp., to help the thousands of men in the services now being trained as mechanics. Copies of the booklet are available from CNO's Aviation Training Division. Activities interested in receiving *Hand Tools* should indicate requirements on the form below.

The subject is presented in a different manner than would be done in the conventional textbook. Cartoons and drawings illustrate the story. Some cartoons show how tools should not be used.

All important hand tools—from files to vise jaws and from file cards to screw extractors—are pictured and explained in detail.

The sergeant who talks in the pages of this booklet is typical of those hundreds of instructors assigned to the important task of teaching mechanics. Many men coming from civilian life are totally unfamiliar with tools. It is for them that this booklet was written, with the hope that it may make their task easier.

USE THIS ORDER FORM

FROM: _____
(Unit Commander)

TO: **Chief of Naval Operations.**

SUBJECT: **Booklets—Request for.**

It is requested that _____ copies of *Hand Tools* be sent to this activity.

SIGNED: _____

Delivery _____

Address: _____

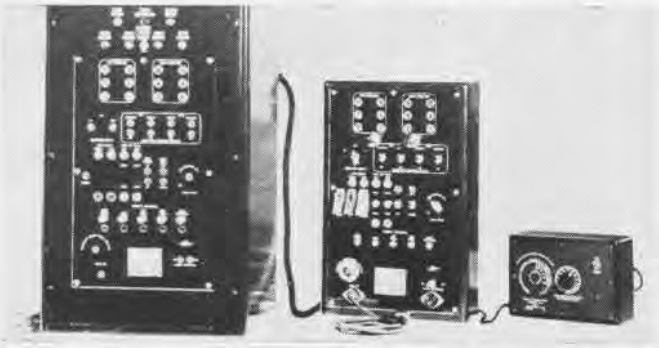
Cut here _____

SPECIAL DEVICES

Training Aids Announced Recently by BuAer Division Cover Wide Range of Activities in Naval Aviation

BOMBING

Panels Representing PBM-3, PB4Y-1, and PBJ-1 Are Available for Use as Familiarization Devices by Student Bombers



BOMBING PANELS are intended primarily as a familiarization and procedure training device for student bombers. Panels representing the PBM-3, PB4Y-1 (2), and the PBJ-1 are now available. All switches and indicators relating to selection and release of bombs are built into panels, including quadrant selector and selecting switch. Panels come in sets of two, one for student, one for instructor. Instructor's panel contains switches for simulating various bomb loadings, as well as indicator lights that give continuous information as to actions of student. Student's panel is constructed so he must go through all steps leading up to release of bombs, as well as procedure of dropping them in sequence. (DEVICE 7-E)

GUNNERY

Portable Range Estimation Trainer, Pilot's Reflector Sight Mod 2, and Free Gunnery Training Sight Mod 2 Are Developed

FREE GUNNERY TRAINING SIGHT MOD 2 (*left*) has been designed for use on all free gunnery training devices in place of the more expensive MK IX combat reflector sight. As in combat sight, radius of inner ring is 35 mils. Radius of the outer ring is 70 mils. Sights are issued with most synthetic trainers which require this type of sight. (DEVICE 3-A-5-(e))

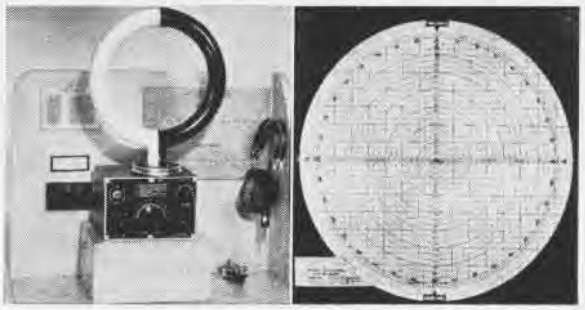
PILOT'S REFLECTOR SIGHT MOD 2 (*right*) is used on the fixed gunnery deflection trainer or the gunairstructor. It is also recommended for use on range estimation trainers. It simulates the MK III combat reflector sight and may be used in any ground training work connected with fixed gunnery. The sight is for ground training only. (DEVICE 3-A-5(d))

PORTABLE RANGE ESTIMATION TRAINER operates on same principle as the mirror range estimation trainer. It consists of a collapsible frame 90″ x 16″ x 14″. End panels are not collapsible. Student operates trainer by looking into a 3-A-5-e free gunnery sight mod 2 attached to front panel of trainer. He focuses sight on a model airplane, scale 1/432, mounted on a vertical rod set in a horizontal arm which slides in grooves from one end of trainer to the other. Student moves airplane to position desired by means of a sprocket and chain arrangement which is controlled by a removable crank on right side of trainer near front panel. A ⅜″ white fabric tape is calibrated to trainer near front panel. (DEVICE 5-TT)

NAVIGATION

Cone D/F Trainer and Blackboard Model of Plotting Board MK III Are Among New Navigation Instruction Aids

CONE D/F TRAINER is designed to teach radio D/F procedure and to provide facilities for practice of D/F problems on the ground. Trainer is constructed on a table and is completely self-contained. Student sits to right of instructor at one end of table facing a synthetic model of the DU-1 bendix direction finding equipment. Bilateral and unilateral signals are received. (DEVICE 1-G-1)

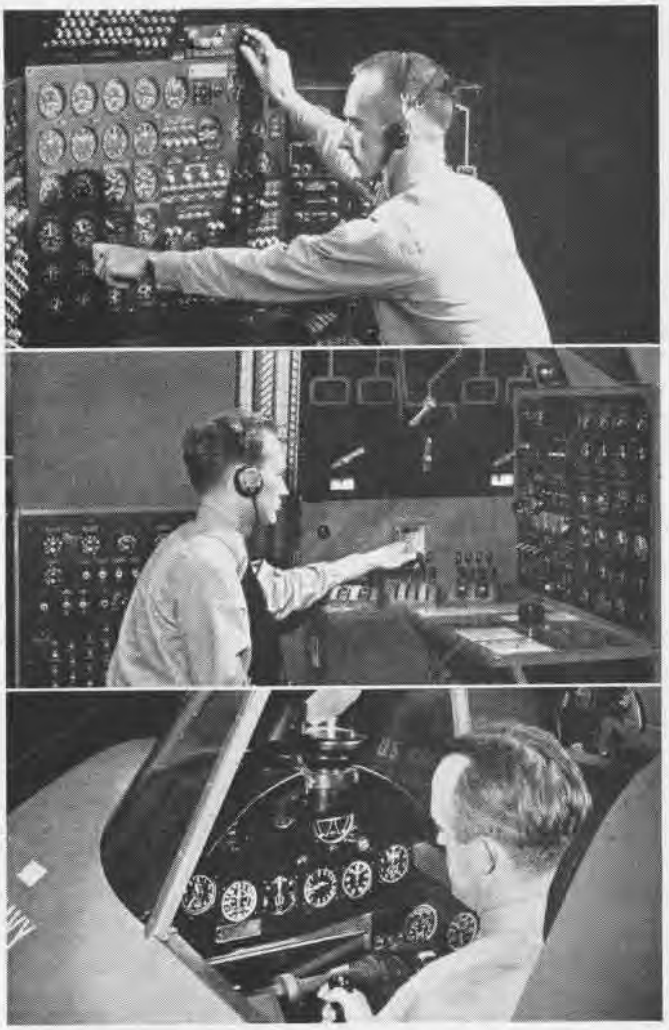


BLACKBOARD MODEL OF PLOTTING BOARD MK III is designed as a teaching aid in navigation classes. Made of clear plastic with a matte surface on which calculations may be made and diagrams drawn in soft pencil, chalk, etc., PLOTTING BOARD has black numerals and calibrations. Markings of masonite plate beneath are green. Use soft eraser to preserve plastic surface. (DEVICE 1-GG-3)

AIRCRAFT SIMULATION — Flight Engineer's Panels Improve Student's Ability to Maintain Maximum Engine Efficiency

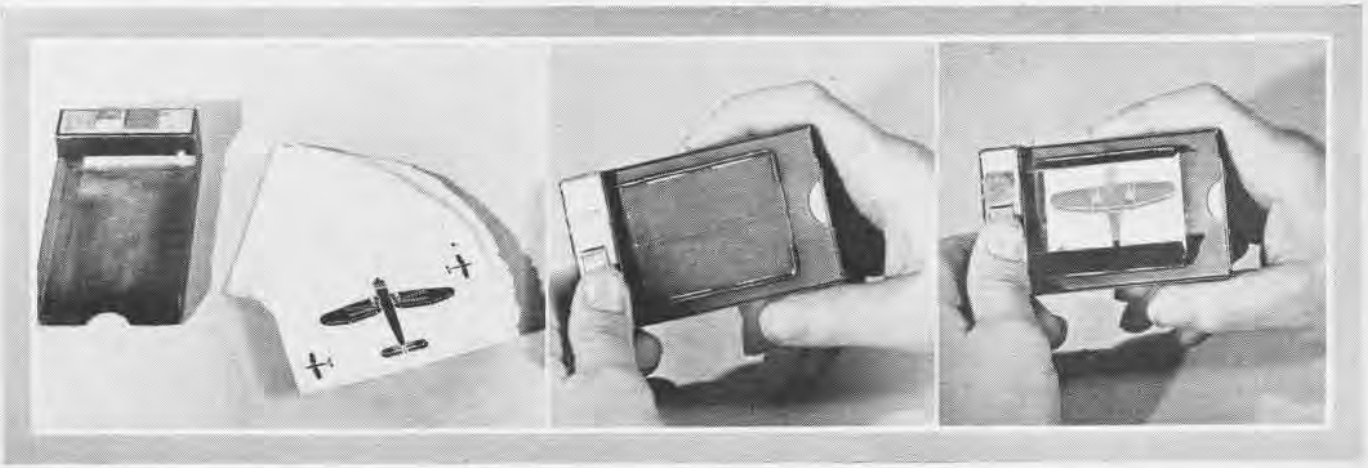
FLIGHT ENGINEER'S PANELS were developed to familiarize the student with flight procedure and to test and improve his ability to maintain maximum engine efficiency under all conditions. Panels for the PBM-3, PB2Y-3, and PBY-5A are available. They are exact duplicates of the operational models. A generalized panel designed to represent the overall characteristics of the higher horsepower twin-engine planes is also being produced. Panels are so designed that the instructor and student have separate stations. Take-off, flight, and landing procedure may be followed through in all required detail. Movement of the various controls and switches results in the correct corresponding movement of the dials and indicators. The instructor's panel contains repeating instruments and tel-lights to indicate the actions being performed by the student, and is also equipped with controls for setting in various emergency conditions such as increased cylinder head temperature, icing, fuel system failure, ignition failure, etc. Net weight of the device is 1,000 lbs.; shipping weight is 1,250 lbs. Power required to operate the device is 110 volts, A.C., one phase. Space required: 7′ x 5′ x 5′. The device has a student capacity of one to eight. Two persons are required to operate it. Size of device varies with size of original equipment. Instructor's panel is shown at top; students' panel in center. (DEVICE 12-E-1)

PILOT COCKPIT REPLICA is a copy of the front cockpit of an airplane. It is designed to familiarize pilots with various cockpit arrangements, without grounding operational aircraft. Replicas representing F4F-4, F4U-1, F6F-3, SBD-5, SB2C-1, and TBF-1 are now available. Structure represents upper portion of fuselage from forward cockpit bulkhead to a station just abaft the seat and is constructed of wood covered with a plywood skin. Original windshield is copied faithfully. An adjustable seat, lap and shoulder safety belt, and parachute mockup are installed. Instruments are represented by photographic or "silk screen" reproduction. The controls simulate those of operational plane. (DEVICE 12-Z)

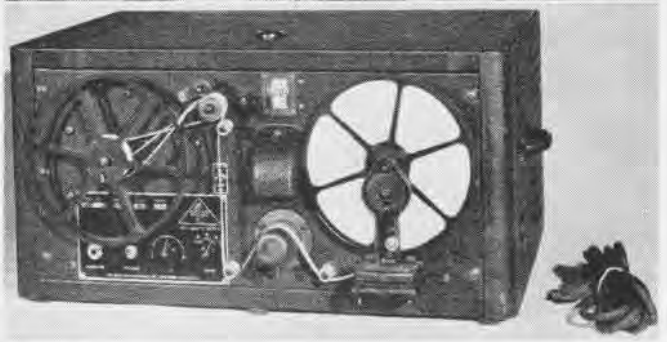


RECOGNITION — Handy Device Contains Views of 108 of More Important Operational Planes Used by Allied and Axis Air Forces

FLASH RECOGNITION CARD CASE is a pocket-size device which may be used to practice recognition of aircraft. It operates on principles which conform generally with the flash system of recognition. Device consists of a metal case with a window in the front wall through which student can see a picture of an airplane. This window is normally covered by a pair of overlapping leaves. When the student presses a thumb button located at one end of the device, the leaves swing open, expose the card momentarily, and then close. A deck of 54 cards is provided with each device. Cards are printed on both sides and show views and chief characteristics of 108 operational planes. (DEVICE 5-RR)



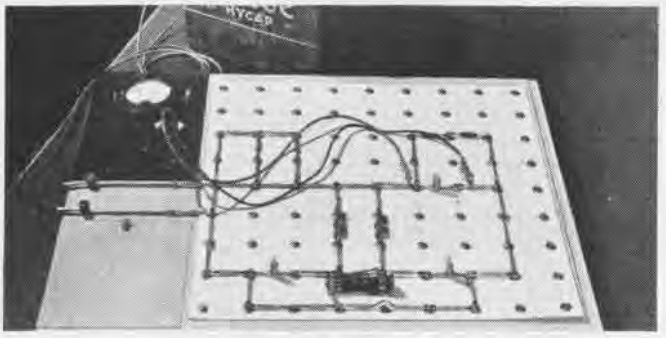
COMMUNICATIONS — Instructor's Transceiver Unit and Automatic Code Keyer and Inker Aid Study of Naval Communications



INSTRUCTOR'S TRANSCEIVER UNIT is a battery-operated two-way radio-telephone transmitting and receiving set. It is similar in design to the DEVICE 8-D-1, student's transceiver unit, and may be used in conjunction with that unit. Frequency of operation is approximately 111.8 megacycles. Set comes complete with batteries, collapsible antenna, and special earphone-microphone assembly. Device may be used for communication between students and instructors where one is remotely located from the other in activities such as gunnery ranges, lighter-than-air landing practice, etc. Range for satisfactory communication is limited to approximately three miles over fairly flat terrain. (DEVICE 8-D-2)

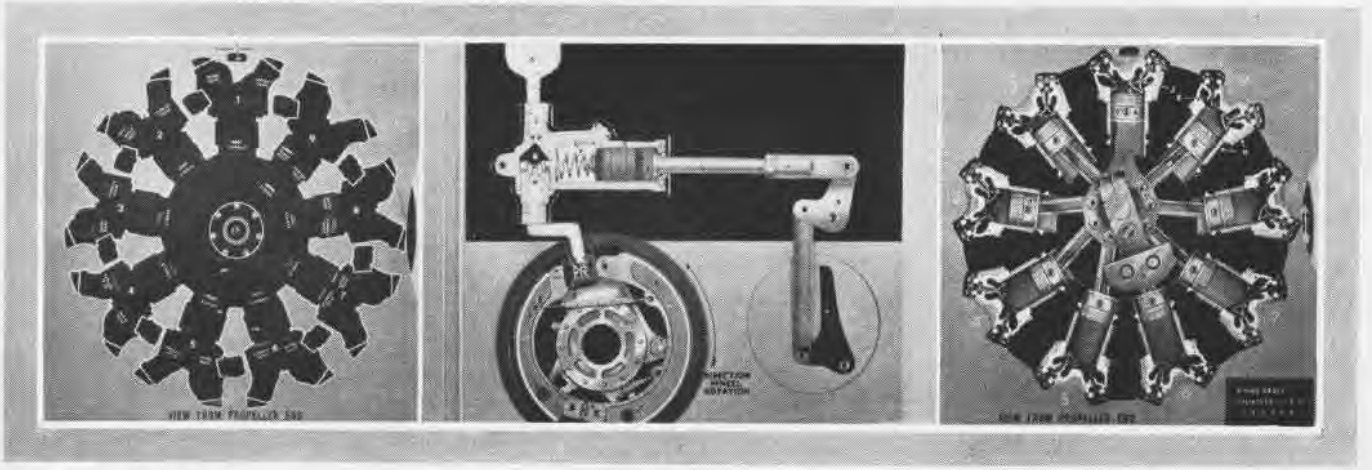
AUTOMATIC CODE KEYER AND INKER is frequently referred to as code learning equipment. The keyer is a compact, portable apparatus which can be used for code practice by aviation watch standing classes, student aviators, radio operators, etc. It also can be used in aviation radio service schools to supplement regularly installed Navy code oscillator installations. One keyer has sufficient power to produce signals which can be heard through headphones by large classes. It has been used successfully by Army Signal Corps. An inker, blank tape rolls, and reels for storage of coded tape come with each keyer or set of keyers. One inker is designed to service one or more keyers. (DEVICE 11-C-3)

GROUND SCHOOL — Individual Wiring Board Is Used for Instruction and Demonstration in Principles of Basic Electricity



INDIVIDUAL WIRING BOARD provides a means of instruction and demonstration in basic electricity. Evenly spaced studs on surface of board are designed to support connecting links, lamps, resistors, switches, solenoid, and buzzer. Links and units may be connected to form various circuits which are operated through power leads on left side of board from a battery source. A check of ohm, ampere, and volt readings for the entire circuit can be made by use of test leads from the meters. A three-way switch is provided for selection of required reading. Blank cardboard templates are provided in the board's storage compartment upon which representative wiring diagrams may be drawn. (DEVICE 11-A-12)

AIRCRAFT DEMONSTRATORS consist of fixed and movable cardboard layers 12"x12"x$\frac{3}{8}$" with hinged covers. In the RADIAL ENGINE DEMONSTRATOR, pistons, articulating rods, master rods, piston pins, dynamic damper and crankshaft center are movable. Upon turning a cardboard friction wheel, position of moving parts at any crankshaft position may be studied by students. In the RADIAL ENGINE FIRING DEMONSTRATOR, intake stroke, compression stroke, power stroke, spark and exhaust stroke are shown for all cylinders at any crankshaft position. Opening and closing of intake valves and exhaust valves are also graphically illustrated. In the HYDRAULIC BRAKE DEMONSTRATOR all parts and valve action are shown with the aid of moving parts as well as visually by means of a color code. (DEVICE 11-A-13)



WRECKED Jap *Zero*, guarded by Fiji infantrymen, is viewed by New Zealand officers while Seabees nearby rebuild landing strip taken from enemy by Marines after it was strafed, bombed and shelled by Navy task force and Army planes, in coordinated invasion

CONVERTED carriers of *Independence* class join task forces in Pacific area combining cruiser speed with carrier striking power

EMPTY shell cases attest to the violence of anti-aircraft fire over newly gained beachhead. Shell cases are saved and refilled

LETTERS

SIRS:

Enclosed is a memoriam written by one of the pilots of Fighting Squadron Six to our former squadron and later Group Commander, Lieutenant Commander Edward H. O'Hare, USN.

This poem very aptly expresses the deep feeling we who served with "Butch" all felt on learning of his loss and it occurred to me that it might be possible to include this in one of the future issues of NAVAL AVIATION NEWS.

"Butch" was extremely well liked by all who knew and worked with him and was of course known throughout the Nation. He did his first great job almost two years ago in Fighting Squadron Three and later took command of that squadron. The name of the squadron was changed in July, 1943, to Fighting Squadron Six, but there was no change at that time in the personnel or otherwise. Lt. (jg) Rodgers, who wrote the poem, served with "Butch" for about nine months, almost all of the time being spent in the war zone of the Pacific.

All of us in the squadron feel that this memoriam is most appropriate and timely and would appreciate it greatly if you can publish it in a future issue.

Sincerely,

CHARLES W. MCCORD,
Lieutenant, USNR

Fighting Squadron Six

MEMORIAM

Lieut. Comdr. "Butch" O'Hare

Yours is peace for an endless time,
And yours is the berth you sought;
These hearts of ours are pained, yet proud
In the glory of how you fought.

No more will the gay-colored flags at mast
Call you and your men to land,
For the "Cast" you answered in silence at night
Was sent by a Mightier Hand.

Perhaps where you went the sea breeze blew
With a fullness in its blast,
As you approached the deck of the heavenly ship
With a "roger" to the last.

And He on His bridge returned your salute;
The report of your battle won,
Then echoed the hearts of all of us
With a "Very well done, my son!"

—GEORGE F. RODGERS,
Lieut. (jg) USNR

ANSWERS TO PLANE PARTS QUIZ

on inside back cover

1.4 2.5 3.5 4.1 5.2 6.5

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

SIRS:

On Christmas Day, Earl W. Sandel, ARM2c, a 19-year-old scrapper from the sand lots of Brooklyn, defeated the three-time Golden Gloves Champion of Chicago to become the bantamweight boxing champion of the entire South Pacific.

In seven hotly contested bouts, actually his first in leather, he spectacularly annihilated the champions of New Hebrides, New Caledonia, Samoa, Fiji, New Zealand and those of the Solomon Islands. His coach, L. A. Grissom, chief aviation pilot,

of Porterville, Calif., taught Sandel the ropes and was well pleased with the results.

Said "Gentleman Sandel": "My greatest ambition is to score a personal kayo on Tojo. I'll moider the bum."

COMMANDING OFFICER, VD-1

Pacific

SIRS:

It is requested that distribution of NANews be increased from 10 copies to 35 for the Commanding General, Headquarters, Army Air Forces Eastern Flying Training Command, Maxwell Field, Ala.

CHIEF, TRAINING AIDS DIVISION, AAF
Office of Asst. Chief, Air Staff, Training

New York, N. Y.

SIRS:

Some time in the past we made a request for extra copies of NAVAL AVIATION NEWS so that one copy could be placed in every cadet's room. This request was granted as an experiment to see if this distribution would have real value, and we feel that a report on the outcome would be interesting and of value to you.

We made a very complete survey of all the cadets in the regiment, and almost without a single exception the cadets felt that it would be a real loss to them if this circulation were discontinued. They are highly enthusiastic about this publication. It is the one official source of up-to-date information that they have, and we are hopeful that you will continue to send the necessary copies for this distribution as we feel that it helps to keep up the enthusiasm of the cadets during this period while they are waiting impatiently to get on with their flight training.

COMMANDING OFFICER

Iowa Pre-Flight School

SIRS:

Article 1708, par. 3, U. S. Navy Regulations 1920, states that "officers and enlisted men of the Navy and Marine Corps who formerly served in the Army and received campaign badges or medals for such service, and who subsequently joined the Navy, shall be permitted to wear such badges or medals with their naval uniform."

The question has arisen if this article also can be construed to authorize the wearing of Army wings with the naval uniform. The particular case involves an aviation machinist's mate who previously held a commission as a second lieutenant, USA, Signal Corps (Aviation Section), and was a qualified pursuit and instructor pilot. He was honorably discharged while holding such rank and subsequently enlisted in the Navy.

Your opinion in this controversy will be appreciated.

ENSIGN, USNR

NAS, Terminal Island

¶ Article 1708 should not be construed to authorize wearing of Army wings with the naval uniform. The wings are regarded as a part of the uniform, not a badge or a medal. Wearing of Army wings is not prohibited by any constitutional or statutory provision, but would be contrary to existing Uniform Regulations, U. S. Navy, inasmuch as no provision is made for the wearing of wings, other than Navy, on naval uniforms.

SIRS:

Enclosed is a cartoon believed suitable for publication in NAVAL AVIATION NEWS. This drawing appeared in the publication of this Squadron, *HedRon Horizon*, and

was received with such enthusiasm it is felt it would be of interest to your readers.

HEDRON 9-2

Pacific

BEST ANSWERS

to questions on page 8

1.d 2.d 3.d 4.d 5.c

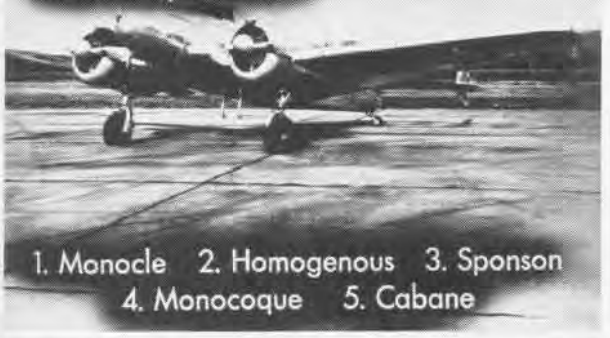
PIX QUIZ

WHAT DO YOU KNOW ABOUT

PARTS OF YOUR PLANE?

Question 1

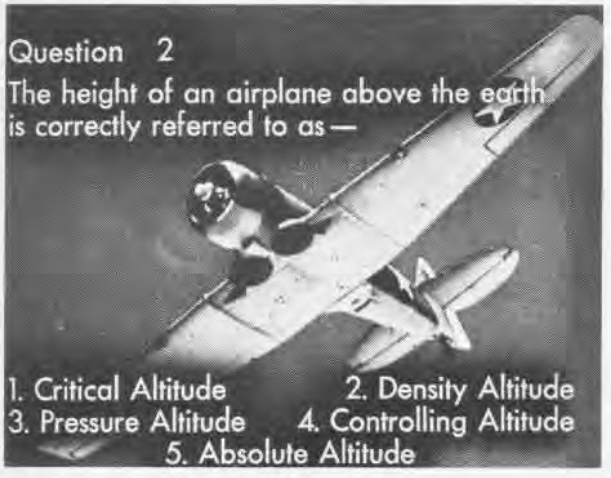
What type of fuselage is structurally stiffened by its skin—



1. Monocle 2. Homogenous 3. Sponson
4. Monocoque 5. Cabane

Question 2

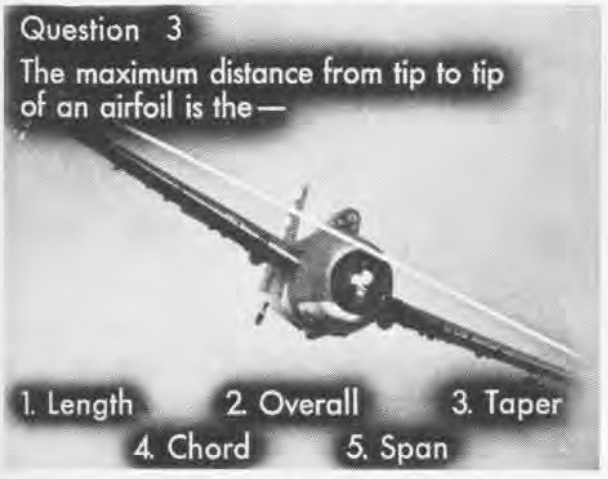
The height of an airplane above the earth is correctly referred to as—



1. Critical Altitude 2. Density Altitude
3. Pressure Altitude 4. Controlling Altitude
5. Absolute Altitude

Question 3

The maximum distance from tip to tip of an airfoil is the—



1. Length 2. Overall 3. Taper
4. Chord 5. Span

Question 4

The opposite of Sideslip is—

1. Skid 2. Bank 3. Dive
4. Climb 5. Glide

Question 5

An arrangement of struts used for bracing an airplane is called—

1. Nacelle 2. Cabane 3. Monocoque
4. Chandelle 5. Cellule

Question 6

An instrument that measures the attitude of an aircraft with respect to the horizontal is called—

1. Level Gauge 2. Angle Indicator
3. Slant Indicator 4. Telltale 5. Inclinometer

The manufacturer builds the plane, the mechs service and repair it, but the pilot generally pays the penalty for miscalculations or mistakes. Common sense dictates, therefore, that the naval aviator know the plane he flies. Complete familiarization with the aircraft is one of the cardinal principles of combat flying. It follows that the aviation cadet must be conversant with all the terms in common use and their exact meaning. This is especially true for the parts that make up the plane. Check your knowledge of plane parts, then **see page 40.**

Write your answers here

1..... 4.....

2..... 5.....

3..... 6.....

LIBERATOR MAKES ATTACK; SECOND TORPEDO HAS NOT YET HIT WATER

LOOKING AFT: DEPTH CHARGE EXPLODES AS SUB IS BULLET-SPRAYED

NAVAL AIR IN ACTION

THESE scenes showing destruction of a Nazi sub in the Atlantic typify the part Naval Aviation plays in neutralizing the U-Boat. "Heck, that's a Nazi submarine!" exclaimed the Navy *Liberator* pilot when a crew member spotted an object in the water. Three *Liberators* dropped 33 depth bombs and strafed the vessel, and two Army planes loosed ten demolition bombs. Heavier arming of U-Boats has not given the Nazis the answer to the Navy's assault from the air.

SMOKE POURS FROM CONNING TOWER; CHARGES HAVE DONE THEIR WORK

LAST ATTACK STRADDLES CRAFT FRANTICALLY ATTEMPTING TIGHT TURN