

BUAER

# NEWS



Instrument Flight  
Primary Training  
Best Answer Series

July 15, 1943

RESTRICTED

WAR DEPARTMENT  
HEADQUARTERS OF THE ARMY AIR FORCES  
WASHINGTON

June 15, 1943

Rear Admiral John S. McCain  
Chief, Bureau of Aeronautics  
U. S. Navy  
Washington, D. C.

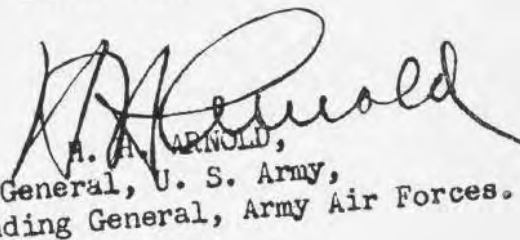
Dear McCain:

The June 15th issue of Buair NEWS Letter featuring the Army Air Forces has reached my desk today. I have gone through the magazine with great interest, particularly the story on the A.A.F. May I congratulate the members of your staff, not only for turning out an accurate and readable account, but for presenting an article in an official Navy publication dealing with the Army Air Forces.

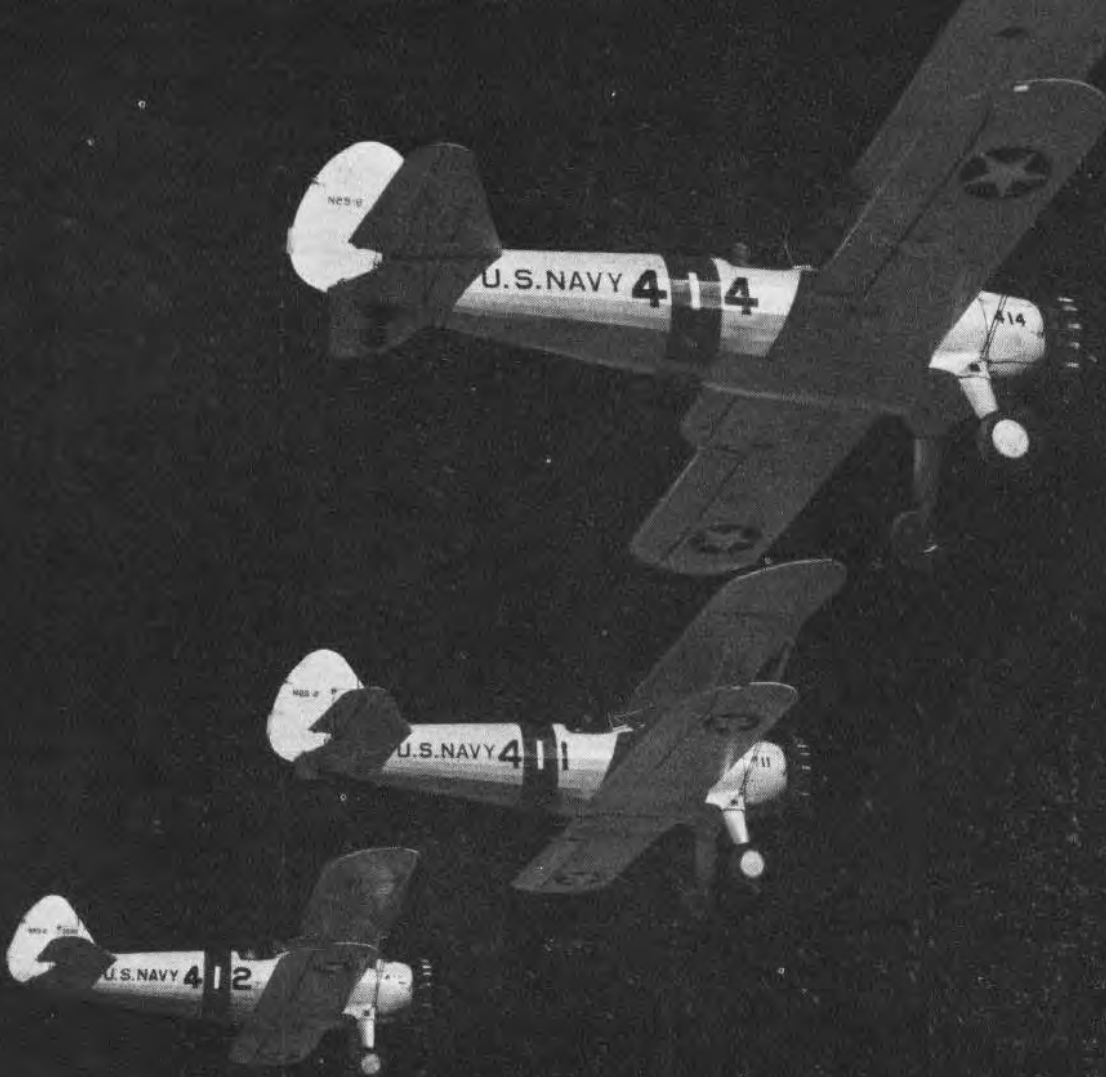
This is the sort of thing that will help achieve a better understanding between the sister Air Services of our Army and Navy. The more our officers and men can know about the planes of each service, how they operate, and the general organizational set-up the better.

With personal greetings and all good wishes, I am

Sincerely,

  
H. H. ARNOLD,  
General, U. S. Army,  
Commanding General, Army Air Forces.

Leading military figure expresses  
opinion on better understand-  
ing between the air services



FROM THE REAR COCKPITS OF THESE N2S-2 PRIMARY TRAINER PLANES, NAVY'S STUDENT PILOTS WIN THE RIGHT TO WEAR COVETED GOLD WINGS

# Primary Training Command

Thousands of Cadets Winning Navy Wings Are Tested in a Formidable Curriculum  
Designed and Maintained by NAPTC

THE Primary Training Command is headed by a rear admiral. From a nucleus of 2 or 3 officers, the command personnel has grown to the present staff of 50 officers, including members of the Flight Standardization Board. Command headquarters are at Fairfax Airport, Kansas City, Kans.

The admiral is charged with administering the entire primary flight training program formerly conducted by establishments designated as Naval Reserve aviation bases. Early in 1943 most of these bases were redesignated as naval air stations, leaving only Squantum and Anacostia as Reserve bases. (NRAB Anacostia is being eliminated from the training program at the present time.)

Early in 1943 NAPTC was given the additional assignment of administering the widely publicized preflight schools located at Del Monte, Calif.; Athens, Ga.; St. Mary's, Calif.; Chapel Hill, N. C., and Iowa City, Iowa.

When Joe Gish enters the naval aviation pilot training program, he gets 15 weeks of ground school instruction at one of the flight preparatory schools, which are supervised by the Bureau of Naval Personnel. Upon successful completion of this school, Joe gets 12 weeks of elementary flight training at a Civil Aeronautics Administration War Training Service school. Although civilians operate these schools, a resident naval officer is on board to advise.

Next Joe enters one of the preflight schools where he continues his academic instruction and puts his body through rigorous toughening-up process. On completion of this 11-week course, he is ready to begin his pri-

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BUREAU OF AERONAUTICS  
NAVY DEPARTMENT—NO. 197



mary flight training. He now has a sound academic background and he's probably in the best physical condition of his life. He is then ordered to one of the naval stations conducting primary flight training.

### Primary Doctrine

At the primary flight training station, Joe continues his academic and physical training for half of each day and flight training for the remainder of the day. Uniformity of instruction is mandatory, so that all the Joe Gishes at all stations are taught the same things. Flight discipline is administered with a firm hand so that good flying habits leading to safety in flight are developed early in the student's flying career. Finally, Joe is never allowed to forget the relation of the details of primary flight training to the flying required by fleet operations.

It is obvious that this phase of Joe Gish's training is one of the most important. It is during this period that he shows that he has—or has not—what it takes.

The stages of instruction at primary training stations and the results to be attained are:

- Stage A—Primary dual: Safety.
- Stage B—Primary solo: Smoothness and precision.
- Stage C—Advanced solo: Precision and rapid coordination (acrobatics).
- Stage D—Final: Qualification to advance to next stage of training.
- Stage E—Formation: Reaction and adaptability.
- Stage F—Night flying: Familiarization and adaptability for night flying.

During stage A, Joe Gish gets ground indoctrination, taxiing, take-offs, climbs, turns, spirals, glides, landings, out-of-wind landings, power-

During stage B, he reviews and practices what he has learned in stage A, and gets additional instruction in steeply banked turns, precision landings, wing-overs, emergency landings, slips to a landing, and how to land in small fields.

### Stage C

During stage C, he receives instruction in acrobatics. He is taught to perform the loop, split-S, snap roll, pylon eight, inverted stall, inverted spin, Immelman turn, and falling leaf.

In stage D, Joe reviews all previous work with stress on smoothness. He moves from the back to the front seat of the plane and gets used to the new viewpoint. Up to this time, he has now been learning to fly, but from here on he must learn to be a military flyer. He now knows how to fly sufficiently well to begin the application of that ability to a military weapon.

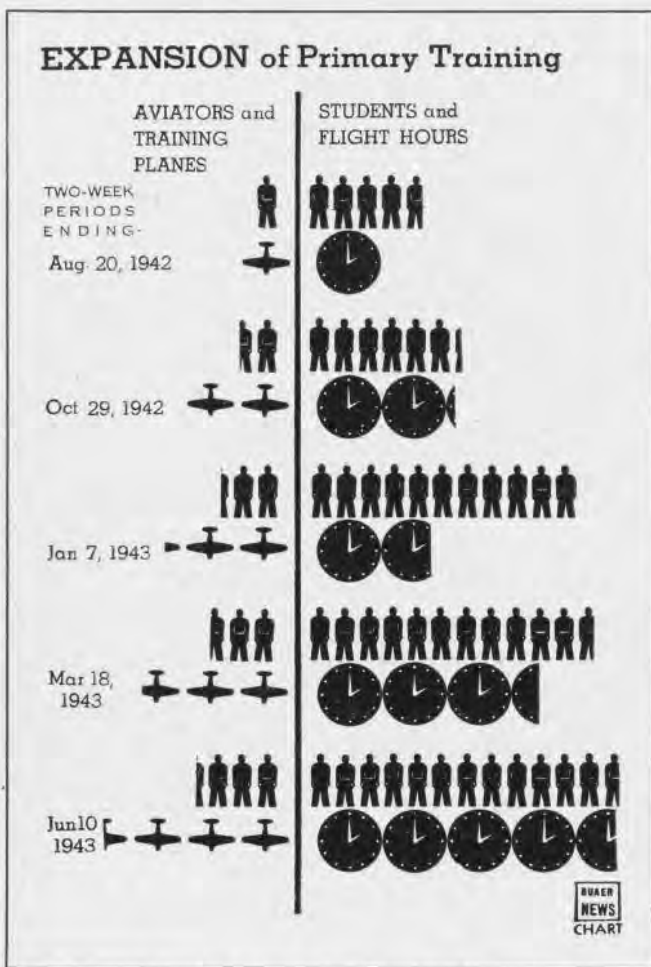
Stage E is formation flying, the students being grouped in threes for this practice. Formation take-off, landing, and shifting positions while in the air are effected.

Stage F is night flying with only flare pots for illumination. After a short instruction, Joe can land during the darkest night with just a few flares placed along the runways.

### Flight Checks

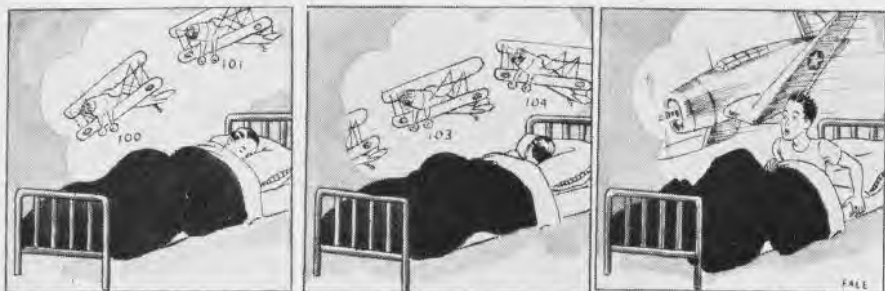
At various stages, as prescribed by the syllabus, students must take check flights with instructors other than their own to see if their progress is satisfactory. If Joe gets an "up" check, he continues the course without interruption, but if he receives a "down" check, his flying career may come to a sudden halt.

After each of these flights the check instructor enters a report of the flight in the student's record, classifying it as satisfactory, unsatisfactory, or incomplete. After completion of the primary dual instruction (stage A), Joe is marked "safe for solo" or "unsafe for solo" by his own instructor; then he is



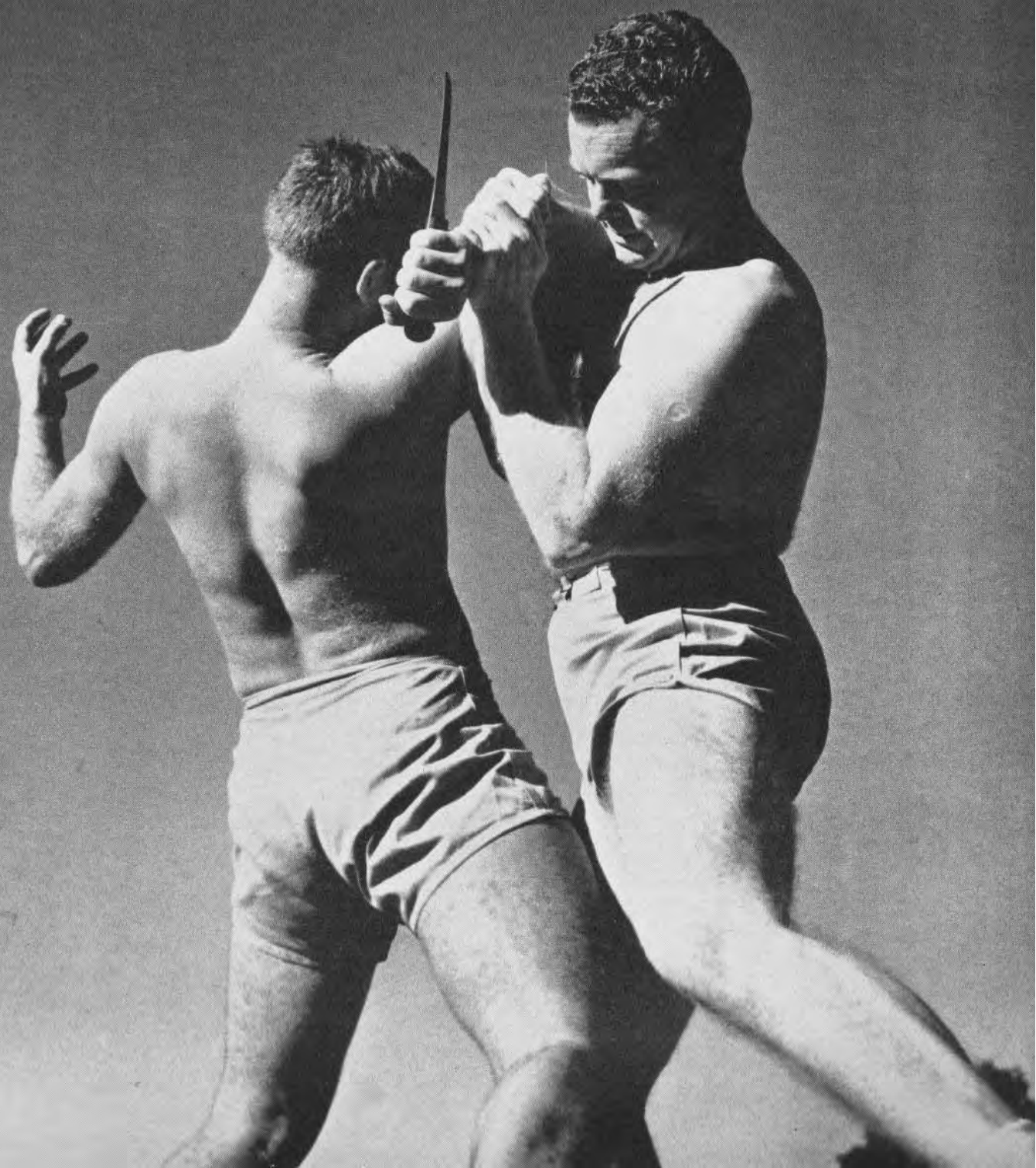
PROPORTIONATE GROWTH TYPIFIES NAVY AVIATION TRAINING PROGRAM

on landings, stalls, spins, instruction in use of compass and brake, and primary emergencies. After meeting prescribed standards in all of these phases, he is considered "safe for solo." During this period, great stress is placed on flying rules and air discipline. The need for this is apparent as air traffic at some of these schools is comparable to peacetime automobile traffic in congested cities.



FAMILIARIZED COMFORTABLY IN N3N TRAINERS, CADET LATER GRADUATES TO HOTTER MODELS

Personal combat develops a fitness to slug  
it out alone with fists or knives . . . part  
of the cadet's rigorous physical training







DEMONSTRATION SHOWS HOW PARACHUTE WORKS



CADETS KEEP EYE ON DAY'S FLIGHT SCHEDULE



STUDENTS VALUE FRONT SEAT ADVICE HIGHLY

checked by one or more other instructors and marked by them. Two out of three "safe" reports are required before he is allowed to solo. For succeeding stages if he gets no unsatisfactory checks, only one "up" check is needed to speed him on his way. However, if he receives a "down" check, he is checked by different instructors up to a limit of three times, and two "down" checks are required before his progress is considered unsatisfactory.

After receiving two "down" checks, a student's past record is reviewed to determine whether he should be given further consideration. If another chance is granted, he is given a few

more hours followed by more checks. He must obtain two "up" checks out of three. If he fails, he is probably through.

### Instructors' School

The Naval Air Station at New Orleans, La., was discontinued as a primary flight training school some time ago and the Primary Flight Instructors' School moved to that station from Corpus Christi and Pensacola. All aviators assigned to duty as primary flight instructors must complete the New Orleans course which serves to standardize the method of instruction throughout all the stations of the Primary Training Command.

### Standardization Board

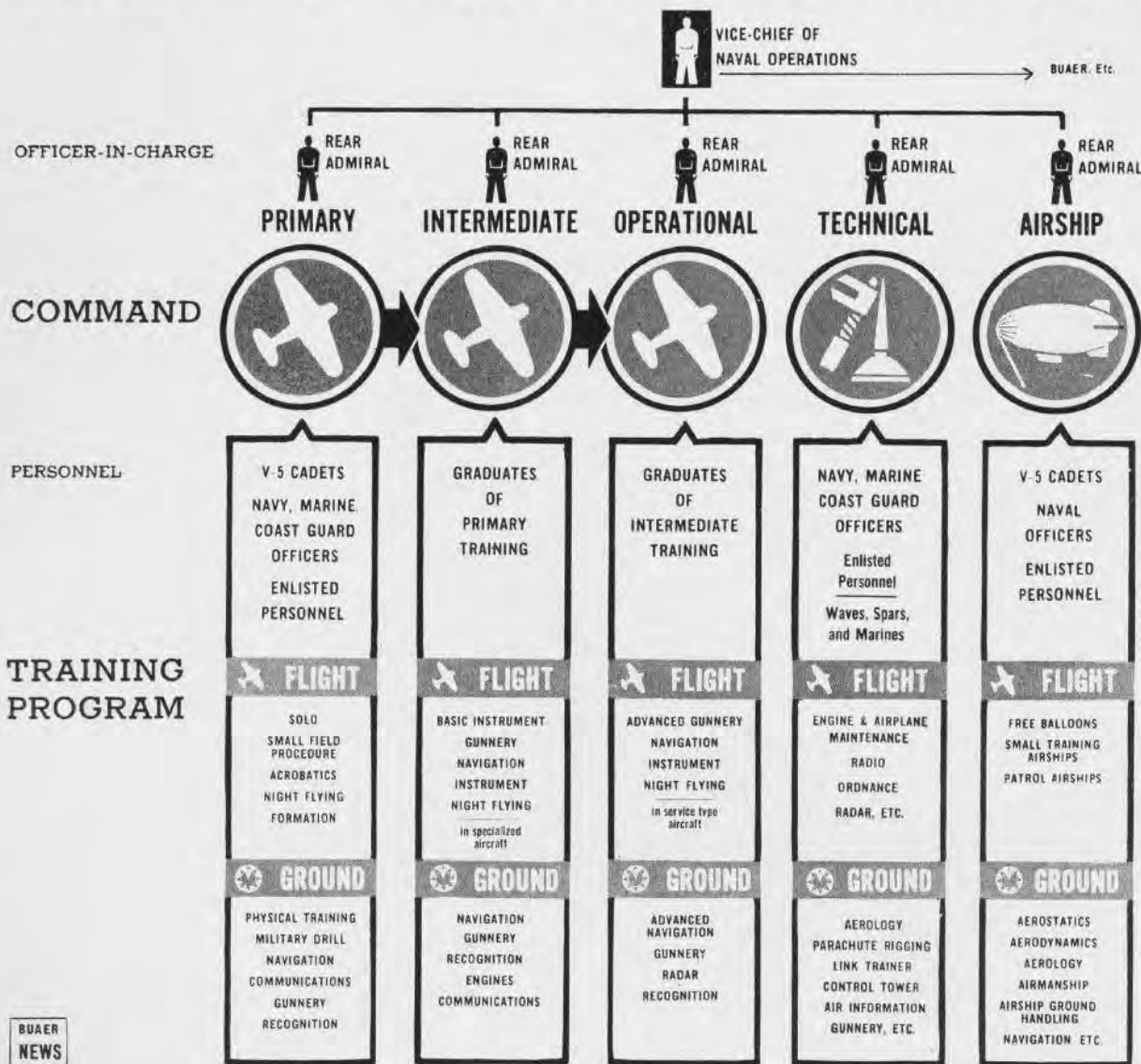
Late last year a Primary Flight Standardization Board was established. This group, which is composed of experienced and capable instructors, was created to visit the primary training stations for the purpose of maintaining a high standard among all instructors, and to see that accepted and standardized methods of instruction are followed.

Board members make frequent and regular visits to all stations, and after riding with the instructors, arrange conferences to discuss all discrepancies from usual procedure. Individuals not suited for duty as instructors are recommended for other assignments.



SPANNING THE NATION, PRIMARY SCHOOLS INSTRUCT THOUSANDS OF AVIATION CADETS IN RIGID FUNDAMENTALS OF NAVAL FLIGHT TRAINING

# NAVAL AIR TRAINING COMMANDS



BUAE NEWS  
CHART

THE Naval Air Operational Training Command was the first of five air functional training commands which now administer practically all training of aviation personnel. NAOTC was followed by Primary Training Command, Intermediate Training Command, and Technical Training Command. The roster was completed with the establishment of Airship Training Command.

Chief of each of the commands is a rear admiral who acts as direct representative of the Navy Department, including all its bureaus

and offices, for all functions within his command, instead of being subordinate to the district commandants. Close coordination of activities which this organization has brought to the training program has done much to increase the quality of the individual graduates and add to the efficiency of training operations.

In addition to the functions listed on the chart (*above*), many important minor operations are now being conducted by the air functional training commands.

An example is the Primary Flight Instructors' School, located at NAS, New Orleans, which, under the direction of CNAPT qualifies the large number of instructors required for the primary flight training program. Another is the Instrument Flight Instructors' School at NAS, Atlanta, under CNAIT where the "full panel" method of instrument flying is being taught. A third is the airship Experimental and Flight Test Department, under CNAT, at the airship station, Lakehurst.



# Nazi Pilot Gets Homesick

Flat-hatter Ignores Goering, Repents for 7 Years

AMONG recently captured German Air Force documents, a file has been found that deals with breaches of flying discipline. A communication signed by Goering lists these cases under the headings of *a*. Arbitrary deviation from prescribed mission for the purpose of visits to acquaintances and relatives, *b*. Arbitrary low-level attacks, *c*. Arbitrary aerobatics below 1,000 meters, *d*. Arbitrary low flying, *e*. Every other type of flying that endangers the aircraft or its occupants.

The *Reichsmarschall* sternly reminds all ranks of the great value of discipline, and of the great burdens being placed on the German people in order to maintain the *Luftwaffe* strong and well-equipped. He threatens severest punishment for all frivolous and thoughtless behaviour which in any way threatens to weaken the striking power of the service.

The remaining documents in the file deal with specific cases and the punishment imposed. For instance, in the period August 16 to November 15, 1941, 10 aircraft were destroyed, 4 damaged, and 18 people killed as a result of such breaches of discipline. In the way of penalty, a total of 478½ months imprisonment was imposed, 52 weeks close arrest and 6 weeks open arrest; 20 men were degraded; and 6 offenders killed were deprived of the honors of a military funeral. The last punishment involved refusal of pension or any other state support to family and dependents.

A particularly bad case was made the subject of a special communication which was to be read aloud to all flying crews in all G. A. F. units at home and abroad. A young fighter pilot under training received orders to take a Bu. 131 (light 2-seater training aircraft) from Schwechat to Villacoublay in France, flying above 1,600 feet.

At first the pilot followed out instructions religiously. But approaching Ulm, he remembered that some of his relatives lived in the neighborhood. He turned off his course and flew over and around their house, three times at heights varying from 320 to 250 feet. By now he was only 3 miles from his parent's home. He decided to pay them a visit. This time he flew over the house five times at 170 to 250 feet.

He then thought it only proper to call on his fiancée now he was in the neighborhood. So he set course for Routlingen and flew four times over the house of his bride-to-be at approximately 150 feet. It was when he was leaving the area and was about to return to his course that he decided to return and land to offer a more personal greeting. An excellent landing was made quite close to the house.

Unfortunately, the girl was not at home, so he had to take off again. The pilot's prospective father-in-law started up the engine and he prepared to depart. However, he hit a tree and crashed on the roadway and turned over. The pilot was uninjured but the passenger, a clerk from unit orderly room, received injuries to his head and right leg.

A court martial was held and the culprit was sentenced to 7 years' penal servitude and loss of all military privileges. He was also deprived of all civil rights for a period of 7 years. The sentence was confirmed by Goering himself who refused all recommendations to mercy and added that any period of the sentence falling within the duration of the war was not to be included in the sentence of 7 years but to be added to it.

## Germans Test Air Trains Gliders Uncoupled in Pre-War Experiments

Towed motorless gliders for passenger and freight traffic to travel not more than 1,000 miles are apparently due to fill a niche in our post-war economic system. The Germans experimented with such air trains before the war and showed that it was feasible to uncouple the last glider and guide it to the ground while the tow plane and the rest of the train proceeded on their nonstop way. Towed and untowed planes moved 42,000 tons of material between June 22, 1941, and October 31, 1941, on the Russian front, according to German statistics.



# GRAMPAW PETTIBONE



## Falling Leaves

An instructor was demonstrating a falling leaf to his student. The maneuver was commenced at 5,000 feet and after about 4 oscillations the controls were transferred to the student to continue the maneuver. Before the instructor realized it, the airplane had descended to such a low altitude that a recovery was impossible. The aircraft crashed at approximately a 45° angle. Both instructor and student received serious injuries.

**BUREAU COMMENT**—There have been several other reports of primary trainer crashes in which witnesses testified they had seen the aircraft descending in attitudes resembling a falling leaf. The above case is the first of these in which the pilot or passenger lived to tell what happened. In view of their experience, it is possible that the pilots of these other trainers also neglected to watch their altitude while concentrating on the maneuver. Instructors and students should be cautioned to watch their altitude during a prolonged falling leaf.

## Psycho-Accident-Analysis



Do you sometimes wonder how you would react in an emergency? Here is the way one pilot with 365 hours flight time reacted when he got caught in a snowstorm.

He was flying a few hundred feet over the water in an SBD-4 when suddenly he found himself in an unfore-casted snowstorm. (In case you have never flown in a snowstorm, it is just like flying in a heavy fog; if you haven't flown in a fog, just keep on being lucky.) Upon entering this snowstorm, the pilot immediately

went on instruments, started climbing, and headed for land. He lost the use of his air speed and rate-of-climb indicators at 3,500 feet. His engine quit when he got near the beach and he landed 300 yards offshore where he was soon rescued from the frigid water by two civilians in a small boat.

At first glance, this looks like a pretty fair performance; the pilot was good enough and lucky enough to get back and tell his own story, which is the most important thing in any accident. It is only when you begin to ask a few questions that you realize just how lucky this pilot really was and how easily there might have been no pilot to tell this story.

The pilot's first reaction in this emergency was perfect, but he didn't follow through. His air speed and rate-of-climb indicators went out because of icing in the Pitot static tube. The pilot did not use the Pitot heating unit, which would have prevented such icing; he did not even know there was such an animal. With 365 hours flying time, he must have known about his carburetor air control and his fuel tank selector valve, however, but he did not use these either. The investigating board was unable to determine whether the engine failure was due to carburetor icing or fuel exhaustion; due to atmospheric conditions and the length of time the pilot had flown on one tank, either might have been responsible. Lastly, he made no attempt to establish radio contact with the base.

Viewed in this light, the pilot's reactions don't look quite so good. His

errors were partly due to lack of experience, but more specifically to lack of familiarity with his equipment and to his not being mentally conditioned to this type of emergency.



All of which indicates the need for more complete indoctrination. Pilots must become more intimately acquainted with their equipment, so they will be able to operate it properly when necessary. This accident further emphasizes the need for "mental emergency drills," as recently recommended in this section. Only by such self-imposed drills will pilots be able to react promptly and correctly when emergencies arise.

## Shifting Winds

**MCAS, MOJAVE**.—This base is a good training ground for the African desert. Climate is hot, rain is a rarity, and humidity, averaging around 25 percent, makes the country ideal for rattlesnakes, coyotes, sagebrush, greasewood, and Joshua trees.

Our trade-mark is the wind, which is high, gusty, and shifty. Thirty-five- and forty-knot winds are not uncommon and velocities have topped 70 knots several times during the last 2 months. These winds, when steady, should provide excellent field carrier-landing practice conditions.

This wind has caused the one severe crash since the group's arrival. A pilot landed in a strong, quickly shifting wind, varying from 11 to 31 knots, west to northwest. The pilot landed with full flaps. A gust lifted his right wing and threw him into a left turn off the runway and toward the control tower. Throttle was applied in an attempt to straighten out, resulting in an increased turn to the left. Full throttle was then applied for take-off. A steep climb was attempted to avoid the control tower, but with flaps down and excessively nose-high attitude, the airplane mashed into the control tower, the left wing hit the railing, and the plane crashed.

In this case the pilot made two errors. 1. Landing with full flaps in a tricky wind of varying velocity, when

HAVE YOU A DILBERT  
IN YOUR SQUADRON?



a wave-off might suddenly have been called for; 2. Attempting to straighten out a landing run from a left turn by application of throttle. (This is a moot question among pilots, and Bureau comment would be appreciated.)



### Grampaw Pettibone says:

Opinion of Bureau experts, expressed in one word, is "NO." Expressed in many words, it is a bit more complicated. Throttle is of help only in the initial stages of a landing run, before the rudder loses its effectiveness; and then only at the first indication of deviation from course. Also, only short bursts of throttle should be used. In the case in question, the use of throttle definitely should not have been attempted.

## Instrument Flight in Unfamiliar Airplanes

Two pilots with 400 hours flight time were practicing instrument flying in an SNJ-4. Evidence indicates that during a recovery from an unusual position the aircraft was stressed beyond its designed limits. The left aileron gave way causing subsequent loss of the left wing. The airplane then went into such a violent spin that neither pilot was able to abandon the plane before it crashed.

Both pilots had accumulated all their recent flying time in the TBF, which has heavy control forces, whereas the SNJ is very light on the controls. It is believed this fact may have been contributory in causing one or both of the pilots to overcontrol during recovery from an unusual position.

As a result of this crash, it was recommended that pilots regularly flying TBF airplanes be prohibited from performing any acrobatics or intentionally assuming unusual attitudes in instrument flight training in SNJ's.

**BUREAU COMMENT**—It is considered impractical for the Bureau to discriminate among designated pilots as to who may have the necessary technique to make instrument flights in various type airplanes. Unfortunately, the TBF is not the only airplane with heavy control forces. Also, it might be equally dangerous for pilots who are normally engaged in flying airplanes with light control forces to attempt instrument flying in an airplane with heavy control forces, without first having refamiliarized themselves with the flight characteristics of such aircraft.

This is, accordingly, considered a matter which must be left to the discretion of the squadron commander. He is in a position best able to evaluate all the circumstances; to require further indoctrination and training where

indicated and to initiate such safety measures as may be necessary to guard the safety of the personnel under his command.

Any airplane can be broken in the air if stressed beyond designed limits. Stress limits of all airplanes are clearly stipulated in BuAer Technical Orders. It is the pilot's responsibility to know and observe these limits. During instrument flights, safety pilots, as the name implies, bear the burden of responsibility for flight safety.

The dangers herein brought out must be fully appreciated to be forestalled. Certainly no pilot should be permitted to make an instrument flight in a type airplane which he has not recently flown. Once pilots understand the dangers involved, ready compliance with this safety measure should be obtained. The amount of refamiliarization necessary will depend on the individual pilot and also on the length of time since he has flown a particular type airplane. In the case in question it is to be noted that the pilots concerned were regularly engaged in flying TBF's. During the preceding three months, one pilot had had no SNJ flight time and the other pilot had had only one-half hour. A perfect set-up for trouble.

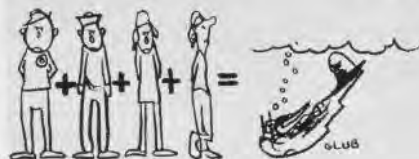
## Faulty Inspection and Test

Arriving at a point 264 miles from land during a navigation flight, the crew of a PBY-5 suddenly discovered that the fuel line to the starboard tank was blocked. At this time there were 150 gallons of fuel remaining in the port tank. Bombs were immediately jettisoned and the airplane was headed for the beach at reduced power. A forced landing was made when approximately 45 gallons of fuel remained. The bow window was broken during this landing; sea choppy, wind 17 knots.

It was discovered, after landing, that the starboard fuel cut-off valve (type D-4), which has external access only, was in the "Off" position and that the handle was missing. The broken window and the state of the sea prevented take-off. The airplane was subsequently lost when a storm came up, while being towed ashore.



The recent history of this airplane indicates it had just undergone fuel-tank repairs. At this time A & R



personnel had noticed the valve handle was not secured to the valve shaft, but had not reported it to the proper authorities. The airplane had passed a satisfactory flight test after coming out of A & R.

The Trouble Board, therefore, correctly determined that this accident, which might very easily have been fatal to all hands, was caused by carelessness on the part of the following personnel: a. Faulty overhaul inspection by A & R personnel; b. Faulty maintenance inspection by squadron personnel prior to flight; c. Failure of flight crew during test flight to check positive fuel flow from both tanks; d. Failure of flight crew to check positive fuel flow from starboard tank during early stages of this flight.

## Misapplication of Caution

After 45 minutes in the air, the pilot of an NE-1 noted a decrease of approximately 250 R. P. M. and immediately landed in a nearby hayfield to check his magnetos. After finding they were functioning satisfactorily, he attempted to take off again. His take-off was exceptionally long, however, due to an up-hill grade, a light wind, and the retarding effect of the long hay on the balloon tires. In an attempt to avoid some trees at the end of the field, the pilot stalled his airplane and spun into an adjoining graveyard from an altitude of approximately 30 feet.



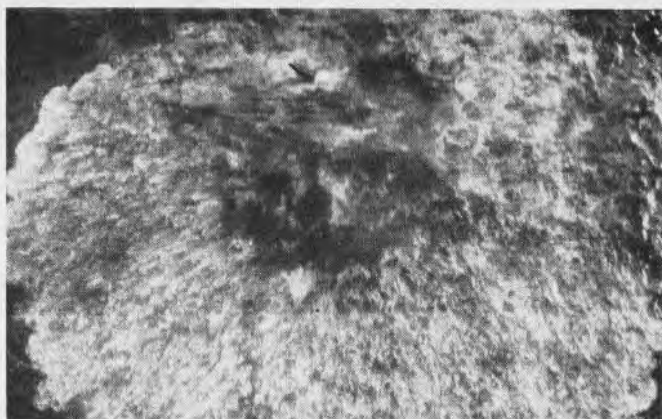
### Grampaw Pettibone says:

No; the pilot didn't bury himself!—He wasn't even injured, but let's hope he interred any misbegotten ideas he may have had about being a "hot" pilot.

This unnecessary washout occurred because of the pilot's lack of knowledge of his equipment. As the Trouble Board pointed out, the mags could have been checked as well in the air as on the ground; also, although the pilot had 650 hours flying time, he didn't know enough to check for a creeping throttle (not uncommon in the NE-1) or to check the carburetor heat control.

Did I say this accident was the result of lack of knowledge? I must be slipping! Change to "gross ignorance."





STALKED BY NAVY PLANE, SUB SEEKS REFUGE IN THE DEPTHS BELOW

SUB DIVES AS DEPTH CHARGE CONVULSES SEA, CREATING PATTERN



TRAPPED AND CONFUSED AFTER RESURFACING, SUB RECEIVES SECOND POUNDING FROM ABOVE; ONE CHARGE STRIKES VESSEL AND BOUNCES OFF

# Surrender At Dusk

**Nazi Sub, Dazed by Attack, Yields to Alert Navy Pilots**

**I**N THE pink dusk of evening, a German U-boat idled lazily on the surface. U. S. Navy aviation pilots on patrol spotted the craft, headed for the scene, and delivered an immediate attack. Depth charges exploded close to the sub which, seeking safety, plunged below.

It surfaced again in about thirty minutes. Another plane was waiting, however, and quickly dropped a load

of bombs. These had a telling effect, for the submarine commenced to submerge and surface like a harpooned whale. Finally, it remained above.

A white flag was displayed and waved back and forth. The submarine was sinking slowly. In about half an hour a cutter arrived on the scene in time to rescue the captain, two officers, and twenty-two ratings. Another victory for U. S. Navy planes!



# DID YOU KNOW?

## Fish Juice Quenches Thirst

### **BuMed Recommends Drink for Driftees**

If your temporary habitat is a life raft and you have caught more fish than you can eat, squeeze out the juice of the flesh and drink it.

This rather unpalatable but perhaps lifesaving advice was given to Navy personnel recently in an article in the *BuMed News Letter*. Fish juice tastes much like the juice of raw oysters and clams, the article says. It has been tested and found safe. A controlled experiment with human volunteers indicated that fish juice can maintain individuals in fairly normal salt and water balance for several days.

## Life Jacket Repels Fire

### **Preservers Fill Five Needs**

Latest developments in the design of Navy lifesaving equipment include a plastic-impregnated fabric which is both flame-repellent and water-resistant.

The standard Navy life jacket and its newest variation, the knapsack jacket, are being made of the new material which is used to cover kapok pads in both types of jacket. Additional fire protection is given both types of kapok jackets by manufacturing them from flameproofed cloth.

The standard life jacket is made with a strong webbing belt carrying a hook, so the wearer can fasten himself to a line to be hoisted from the water. The Navy's five major styles of life preservers have been designed to meet the special needs of men working under varying conditions.

## Requests for Dark Goggles Not To Be Directed to BuAer

Requests for dark adaptation goggles are frequently addressed to the Bureau. It should be noted that these goggles are available at ASA Norfolk and ASA Oakland and that future requests be directed accordingly. Dark adaptation goggles may also be obtained through Aviation Supply Depot, NAF, Philadelphia.

The goggles, which have red lenses, are to be worn by pilots for 20 to 30 minutes before taking off after dark. They do not interfere with the normal use of the eyes such as reading and playing cards, but they greatly increase the probability that such enjoyment can be carried on indefinitely.

## Weather Form Devised

### **Aids Aircraft in Reporting**

To facilitate entering uniform observations on the weather, the Aircraft Weather Reporting Form has been developed for use by operating aircraft.

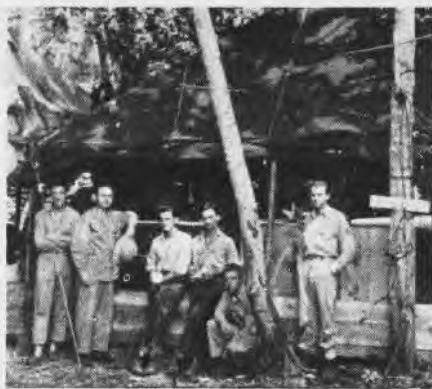
It is tabular in form and observa-



INTERIOR OF GUADALCANAL'S AEROLOGY OFFICE

tions are entered either as direct instrument readings or in code hourly or upon important weather changes.

There are provisions for entering the following: position in degrees and tenths of latitude and longitude, time, altitude of plane, temperature, direction and force of wind, turbulence and icing conditions, present weather, visi-



AEROLOGISTS ARE ACTIVE AT HENDERSON FIELD

bility, type of low, middle, and high clouds, past weather, and barometric pressure if it can be measured by altimeter. There are columns for operational data such as speed, gas, and plane's track, as well as for other information.

After the form is completed it may be enciphered and sent by radio. This is not common practice, but is done in some operating areas where the report is required immediately. The usual procedure is to turn in the completed form to the aerological office upon arrival. The report is then entered on the weather map.

## BuAer Rafts Rescue CAP Crews

### **National Commander Thanks Chief of Bureau**

Life rafts furnished to the Civil Air Patrol by the Bureau of Aeronautics have figured in the rescue of more than 20 members of crews of coastal patrol aircraft forced down at sea.

In the spring of this year 210 Mark I Type D life rafts were distributed to 21 CAP Coastal Patrol Bases. In a recent letter to the Chief of the Bureau, Lt. Col. Earle L. Johnson, national commander of the Civil Air Patrol, expressed his gratitude for the rafts and told of the crews' rescue.

## TBM Joins Fleet

### **Practically Twin of TBF**

Delivery of TBM-1's, *Avenger* torpedo bombers, by Eastern Aircraft Division of General Motors, is now well under way. These airplanes are built to Grumman drawings, and are identical with Grumman-built *Avengers* except where minor differences in detail parts result from differences in production methods.

The operating characteristics of *Avengers*, from the two manufacturers are intended to be identical, while components and spare parts from either source are intended to be, in general, equally adaptable to airplanes from either source. However, there are a very few exceptions in

minor parts, such as detail parts of hydraulic struts. It is therefore considered generally unnecessary to distinguish between TBF-1's and TBM-1's in allocation of airplanes and spares.

Initial TBM-1 deliveries, of course, could not be strictly up to date as compared with TBF's delivered at the same time, because of the time



DELIVERIES OF TBM. TBF'S TWIN. ARE ON WAY

required to get the first airplanes through production. As a result, early TBM-1's were comparable to early TBF-1's, although delivered about a year later. The TBM-1's quickly caught up, however, and now are about one to two months behind TBF's in making changes in production. This lag is accounted for by the time required to develop engineering and change tooling at Eastern, and could be reduced only at the expense of production rate.

The Bureau believes that the TBM-1 airplanes subsequent to the first 50 (that is, No. 24571 and subsequent) are completely equivalent to contemporary TBF-1's in operational characteristics and serviceability. The fact that very few RUDM's on TBM's have been received to date appears to substantiate this belief.

## Antisub Photos

Aerial photographs of antisubmarine attacks are proving of great value not only as concrete evidence of results, but also as aids in training and recognition.

The Photographic Division desires to have all such aerial photographs and original negatives forwarded as rapidly as possible to the Bureau for evaluation and further use. Full information should accompany photographs.

HAVE YOU A DILBERT  
IN YOUR SQUADRON?



## CAN YOU ANSWER THIS PROBLEM IN NAVIGATION?

### Flight from Natal

On September 1, 1943, a patrol plane is ordered to depart from base, Port Natal, Lat.  $29^{\circ}52' S$ , Long.  $31^{\circ}04' E$  at Z. T. 1600 to investigate a ship reported hove to in Lat.  $28^{\circ}10' S$ , Long.  $33^{\circ}20' E$ ; flight altitude 5,000 feet, temperature (+)  $8^{\circ} C$ .; Variation  $15^{\circ} E$ , True Airspeed (TAS) 106 knots; wind 18 knots from  $135^{\circ}$ .



1. What is the Course (Cus)? \_\_\_\_\_
2. What is the distance? \_\_\_\_\_
3. What is the Magnetic Heading? \_\_\_\_\_
4. What is the Calibrated Airspeed (CAS)? \_\_\_\_\_
5. What is the Predicted Ground Speed (PGS)? \_\_\_\_\_
6. What is the Estimated Time of Arrival (ETA)? \_\_\_\_\_
7. What is the 1630 Dead Reckoning (DR) position? Lat. \_\_\_\_\_  
Long. \_\_\_\_\_

At ZT 16-25-35 the navigator observed the sun with a bubble octant, Index Correction (I. C.)  $+1.0'$ ; the  $h_s$  was  $14^{\circ}-23'$ .

At ZT 1635 the radio operator gave the navigator a relative bearing of  $215^{\circ}$  taken on WXC, Lat.  $29^{\circ}-00' S$ , Long.  $31^{\circ}-00' E$ .

Solve the sun sight and plot the line of position (LOP) advanced to 1630, retire the radio bearing to the same instant.



8. What is the position of the 1630 fix? Lat. \_\_\_\_\_  
Long. \_\_\_\_\_
9. What has been the actual Ground Speed (GS)? \_\_\_\_\_
10. What is the revised Estimated Time of Arrival (ETA)? \_\_\_\_\_

On arrival at the reported position and not sighting the vessel, a square search is instigated. At 1745 the vessel is sighted; she does not answer recognition signals and is identified as an enemy raider. A contact report is made, and the plane is ordered to track vessel until the end of evening nautical twilight, and then return to base.

11. What is the time of the end of evening nautical twilight expressed as Local Civil Time (L. C. T.)? \_\_\_\_\_

Just before breaking off contact, drift was observed on the following:

True Heading (TH)	True Airspeed (TAS)	Drift
$050^{\circ}$ -----	110 knots	$12^{\circ}$ left
$100^{\circ}$ -----	110 knots	$5^{\circ}$ left
$005^{\circ}$ -----	110 knots	$10^{\circ}$ left

12. What is the wind? Force \_\_\_\_\_  
From \_\_\_\_\_

The navigator figured his 1835 Dead Reckoning (DR) position, Lat.  $28^{\circ}-35' S$ , Long.  $33^{\circ}-40' E$  when he changed heading to return to base, True Airspeed (TAS) 110k.

13. What is the Magnetic Heading? \_\_\_\_\_

In order to obtain a good cut the navigator selected the stars Peacock and Altair, and made the following observations:

ZT 18-41-26	Peacock $h_s$ $49^{\circ}-44'$
ZT 18-49-54	Altair $h_s$ $41^{\circ}-46'$

Solve the two sights and plot the 1845 fix.



14. What is the position of the 1845 fix? Lat. \_\_\_\_\_  
Long. \_\_\_\_\_
15. What is the Magnetic Heading (MH) to base? \_\_\_\_\_
16. What is the Estimated Time of Arrival (ETA)? \_\_\_\_\_

(Answers on page 28)

# 25 YEARS AGO THIS MONTH

## Naval Aviation 1918

*July.*—Navy Airship B-12 given up for lost by the Navy Dept. after it had drifted off Atlantic Coast for 2 days. Crew had nothing to eat and very little water—forced to descend on surface of the ocean where they were rescued 300 miles at sea by the S. S. *Skagern*, Swedish merchantman.

*July.*—Lt. A.L. Gates, U. S. N. R. F., assumes command of Naval Air Station at Dunkerque. Lieutenant Gates was later shot down inside the German lines and held prisoner throughout the remainder of the war. [Artemus L. Gates is now Assistant Secretary of the Navy for Air.]

*July 3.*—Lt. Comdr. H. C. Van Valzah assumes command at naval aviation school, Massachusetts Institute of Technology.

*July 6.*—The patrol boat *Asie*, making a round trip from France to the Azores, tows an observation balloon aloft for 25 consecutive days at a height of 200 meters. This establishes a record for this type of aircraft.

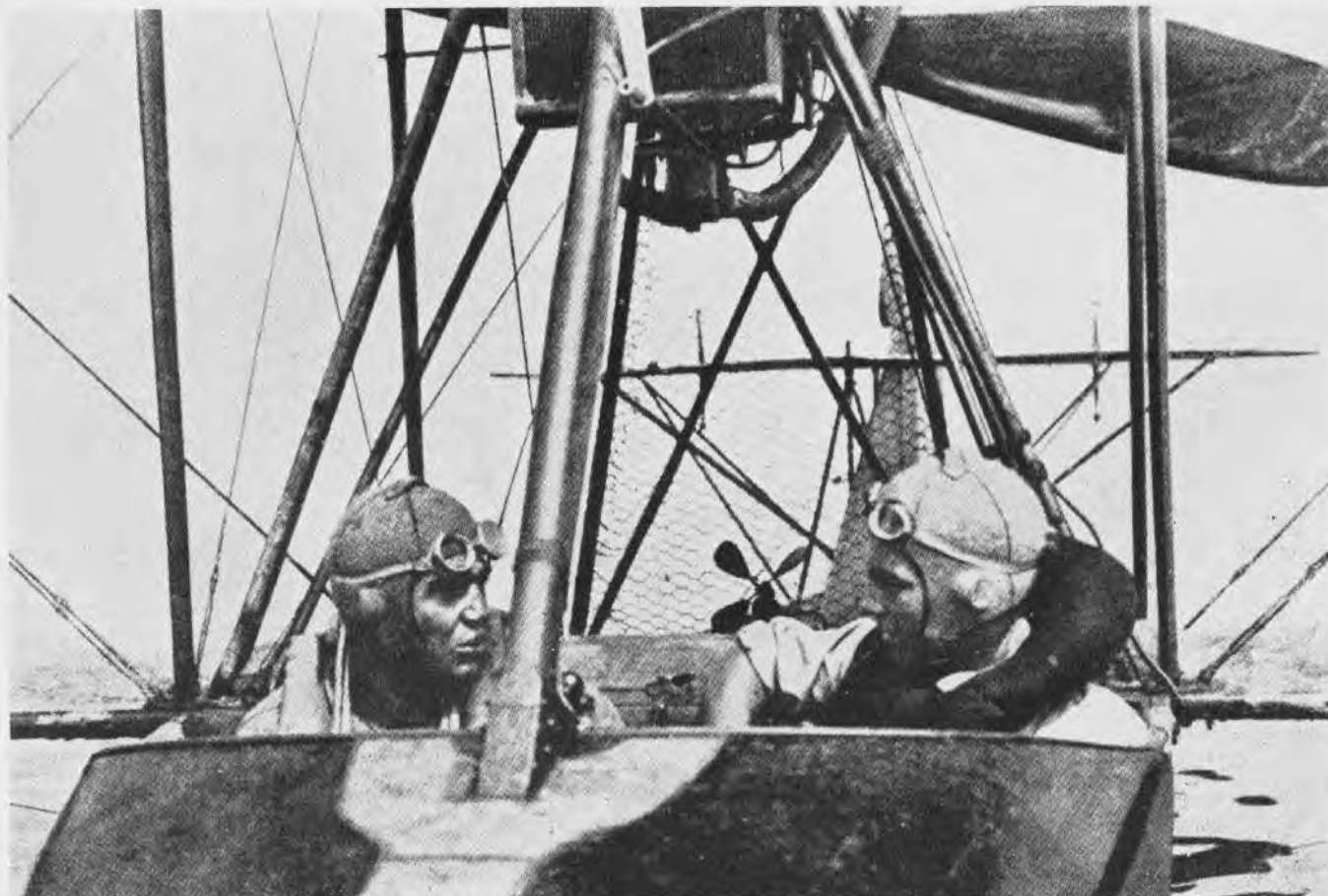
*July 8.*—Memorandum to Capt. H. I. Cone requests urgent development of new type U. S. seaplanes due to "fast enemy seaplanes which have recently appeared in the North Sea."

First flight of American-built H-16 in Europe at Pauillac.

*July 9.*—Capt. H. I. Cone writes to Navy Department. Advises use of self-propelling lighters in order to get seaplanes near enemy bases. Self-propelling barges eliminate the use of destroyers to tow lighters. Recommends "Mustin's design." Also plan of tenders to refuel seaplanes in order to give them wider range is recommended as follows: "The question of building a

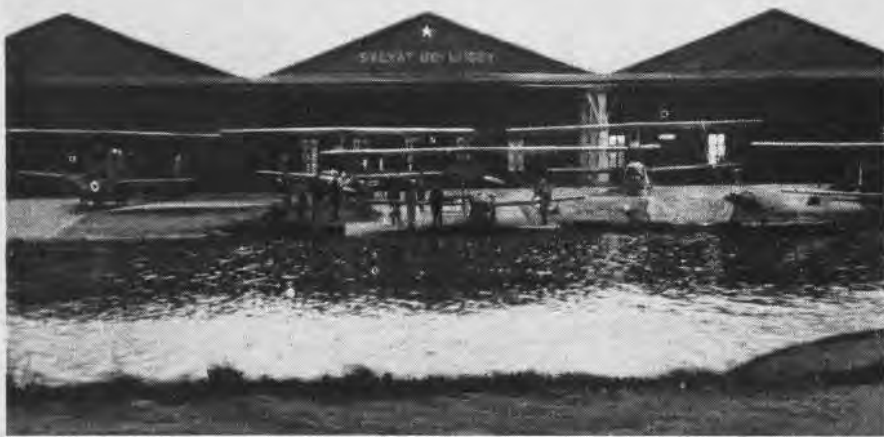
seaplane carrier should be taken into consideration. While the United States may not especially require a vessel of this type for present military operations, it appears advisable to have this development in hand so that it could be made use of in case the military situation should change. Use of seaplanes to be flown from large fighting vessels for the purpose of scouting and range-fighting should be experimented upon and carefully studied in the United States also."

*July 13.*—The first Marine aviation force, consisting of Squadrons A, B, C, and Headquarters Company leave Miami, Fla., for further transfer to the Northern Bombing group in France. This force consisted of 107 officers and 654 enlisted men. When Squadron D joined in October 1918, the number was increased to 149 officers and 842 enlisted men.



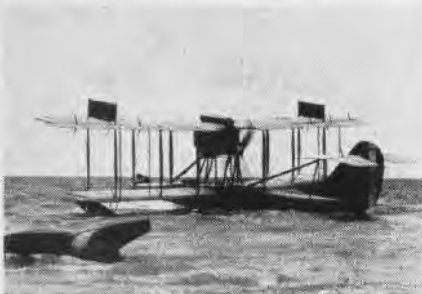
"DI" GATES AND DAVE INGALLS IN AN F BOAT DURING WORLD WAR I. BOTH BECAME, IN INVERSE ORDER, ASSISTANT SECRETARY OF NAVY FOR AIR





NAVAL AIR STATION AT PORTO CORSINI, ITALY, USED FOR BOMBING OPERATIONS IN WORLD WAR I

July 16.—First American kite balloon flown from trawler at Brest.



HS-1L SEAPLANE USED IN PATROL OPERATIONS

July 17.—Pola bombed by United States naval aviators, destroying five hangars and damaging the Austrian battleship, *Badenburg*.

First American aircraft flies in Ireland, a Goodrich Caquot towed by HMS Sloop *Flying Fox* and piloted by Ensign Carl E. Shumway.

Lt. (j. g.) Harry Guggenheim ordered to Italy to investigate and report upon the conditions that were hindering the Navy from obtaining certain aircraft that had been ordered from the Italian Government.

July 18.—The Day Wing of the Northern Bombing Group Marines sail from New York aboard the transport *DeKalb* to serve in the Dunkerque area at Flanders, under command of Maj. A. A. Cunningham.

July 19.—Two planes from NAS Montauk, L. I. reported by wireless first news of sinking of U. S. S. *San Diego* off Fire Island when it struck submerged mine. Planes were on regular antisubmarine patrol.

July 20.—A launch with Assistant Surgeon A. R. Stevens and Philip Galaman, Quartermaster 2/c(A) and four other seamen went out into the English Channel in response to the re-

port that a seaplane was in distress. Shelled by German shore batteries, launch was sunk. Stevens and Galaman swam to West Dunkerque and were picked up exhausted. Two seamen were lost.

The destroyer U. S. S. *Cushing* towed kite balloon. Test successful in every way.

July 21.—German submarine *U-156* appears off Cape Cod and attacks shipping. Submarines immediately attacked by *HS-1* Flying Boat piloted by Ensign Eric Lingard and Ensign E. M. Shields, assisted by Chief Petty Officer E. H. Howard. The submarine was forced to submerge even though all of the bombs were duds.

July 23.—Naval Air Station established at Porto Corsini, Italy, for bombing operations against Pola. Lt. Comdr. J. L. Callan in command [now Capt. J. L. Callan, U. S. Naval Attaché to Governments in Exile in London]. The Italians had most ambitious plans but lacked the raw material to carry them out. They were more than willing to accept assistance from the Allies.



COMMANDER J. L. CALLAN

July 30.—The Day Wing disembarked at Brest, France, and proceeded to its aerodromes between Calais and Dunkerque where they established camp and prepared the aerodromes for use. The personnel of the Day Wing was completely organized and ready for service 2 weeks after their arrival in France. Only a small part of the planes and equipment of this organization arrived at Pauillac, France, before the organization reached France.

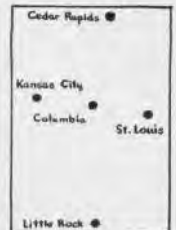
## BEST ANSWERS

Can You Name Them?

### II—Flying the Weather

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

1. A pilot is planning a flight from Cedar Rapids to Little Rock. Just before taking off, he receives the following sequence reports from Kansas City (KC), Columbia (CA), and St. Louis (LS):



KC N 1630C 12@21/2 053 26 20.2 17  
CA X SPL 1630C 4@2V 982/30/29^35  
LS N 1630C 8@5 026/40/33^12

Judging from these sequence reports the worst route would be—

- a over Kansas City  
 b between Kansas City and Columbia  
 c over Columbia  
 d between Columbia and St. Louis  
 e over St. Louis

2. A pilot flying in the edge of a typical tropical cyclone at about 15° south of the equator would be in greatest danger if the wind is blowing from the—

- a south  
 b west  
 c northwest  
 d east  
 e north

3. A searching party looking for a cadet who crashed into a mountain because of eddy currents would most likely find the plane—

- a near the leeward crest of a ridge, headed uphill  
 b in the valley, headed downstream  
 c near the windward crest of a ridge, headed uphill  
 d near the windward crest of a ridge, headed downhill  
 e near the leeward crest of a ridge, headed downhill

4. The most powerful and destructive of all winds occur in—

- a tropical cyclones  
 b hurricanes  
 c squall-line thunderstorms  
 d tornadoes  
 e typhoons

5. A pilot is most likely to be able to fly safely under a thunderstorm if it is of the—

- a air-mass type  
 b warm-front type  
 c cold-front type  
 d occluded-front type  
 e mechanical convection type



SNB PANEL BOARD DURING FLIGHT UNDER INSTRUMENT CONDITIONS FROM NAS ATLANTA, WHERE PILOTS GET TRAINING AS INSTRUCTORS AT IFIS

# INSTRUMENT FLIGHT

**Attitude System, Forged in Crucible of Experience, Strengthens Weak Links in the 1-2-3 Method**

UNITED Nations air fleets, flying under cover of darkness or clouds to smash at the Axis, are depending on their flight instruments to help reach their military objectives.

This fact, brought out by communiques from war fronts, explains why the Navy today is putting increased pressure on instrument flight in its aviation training schools.

Tactically, darkness and cloud cover give a pilot concealment until the moment he strikes. To use this natural "camouflage," however, he must be able to fly comfortably,

safely, and accurately by reference to flight instruments and still complete his mission.

Combat operations proved it was necessary that student pilots receiving their wings have the knowledge leading to this ability, with only practice and experience needed to become experts. Technical Order No. 47-42 of June 18, 1942 (canceled and modified by T. O. No. 41-43) made history in naval aviation by changing the basic method of instrument flying.

Instrument Flying! Prior to T. O. No. 47-42 the mere mention of the

words made cadets squirm. It meant they had to forget everything they had learned, up to that point in their training, and start again in order to master a new art. This was a misconception common to most instrument instructors but started the student off with one strike against him. A number of instructors took this fact to heart, thereby pitching another strike by taking their work too seriously and assuming the attitude of "stand back boys, you bother me."

In a minority of cases, students had the third strike called due to their in-



herent inability to control the aircraft from instrument indications or as a culmination of the effects of the strikes already called. Prior to the war, the facts above meant little, owing to the lack of emphasis placed on ability to fly "on instruments." On few occasions did instrument flying ability become a military or life-and-death necessity in naval aviation.

Early in the war the English found it mandatory to use clouds and darkness for concealment during operations. The Navy soon made the same discovery. Necessity for an accurate, safe, and comfortable method of flying on instruments became apparent immediately and the 1-2-3 system in use met none of these conditions except the "safe." Military developments in aircraft increased the speed and range of airplanes or made them heavier and bulkier—any one of which made the 1-2-3 system obsolete for accurate comfortable control.

The 1-2-3 system of airplane control on instruments is still an essential part of any pilot's training although it suffers from two main disadvantages.

### Two Weak Points

1. Attitude of the airplane can only be read indirectly in any one of the three planes of space by interpreting and integrating the indications of at least two instruments. For example, the indications of turn needle and ball bank must be interpreted and integrated to recognize the attitude in the rolling plane; attitude and direction in the yawing plane by turn needle and magnetic compass; and in the pitching plane by change in altitude and air-speed. Each of these instruments is subject to certain inaccuracies or lag. Necessity for interpreting and integrating indications on several different instruments to determine attitude of the airplane places an undesirable and unnecessary strain on the pilot.

2. Many of the indications of these instruments promote inaccuracy of performance when large changes in attitude have been made, inadvertently or otherwise, causing extreme indications. For example, after recovery from a steep dive with high air speed, the nose of the aircraft may be pulled up into a dangerously nose high position with little effect (except stopping any increase) on air speed meter.

Operational conditions encountered by our military pilots at present,



GROUND SCHOOL: NAVAL PILOTS ARE TRAINED AT IFIS TO BECOME INSTRUMENT FLIGHT INSTRUCTORS



PILOT UNDER HOOD OF SNJ DURING INSTRUMENT FLIGHT (BELOW), AND IN LINK COCKPIT (ABOVE)





require many hours of instrument flying without rest. The easiest and most direct method must be used. Weather minimums during operations cannot be observed to the extent of insuring safe old-time minimum ceiling on return from combat. This necessitates greater accuracy and precision of control by pilots for their instrument approaches and in some cases instrument landings.

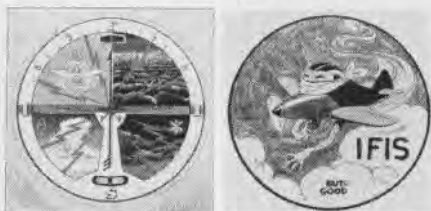
### Use Full Panel

The Navy partially answered this problem by T. O. No. 47-42 in which it was "directed that instrument flight training and practice be based on the use of the full instrument panel." This, in effect, means using all available operating instruments.

A great many pilots interpreted this sentence (in the technical order) to mean using directional gyro and gyro horizon to the exclusion of turn and bank and compass. A characteristic of the horizon is its bank and pitch error. If indications are followed blindly in a turn, this will cause considerable loss of altitude. Such error washes out after 360° of turn but altitude is not regained. If, however, horizon is checked occasionally with altimeter, the pilot realizes the necessity for increasing pitch or raising the nose during a turn.

As all pilots know, an airplane will lose altitude during a turn if the nose is not raised. This in itself should be sufficient cause to raise the miniature plane on the horizon without knowledge of the pitch error. The bank error of the horizon in a turn may be disregarded due to its lack of apparent effect on the airplane attitude, except for a slight decrease in indicated bank.

The horizon is dependable up to 70° of pitch (nose down or nose up) which is sufficient for all but the most violent acrobatics. In the rolling or banking plane it indicates properly up to 110° of bank and, as it is impossible to hold an airplane at even 90° of bank for any period of time, there should be no doubt of its indication of bank except in acrobatics. To stay within safe limits and not even approach the turn-



OFFICIAL IFIS INSIGNA AND HUMOROUS DESIGN

## Sensory Illusions When Flying by Instruments Originate in Ear



Pilots who fly by instruments so often are fooled by their sensory organs that they learn to distrust them and rely on the instrument panel to figure out their plane's attitude.

Seat of most of the wrongful sensations is the intricate mechanism of the inner ear and the best cure for the inclination to fly "by the seat of the pants" is to watch the instruments, especially the gyro horizon.

The following are some of the sensory illusions which may be noted during instrument flying:

1. During a steep turn centrifugal force may produce a sensation of ascent. (Pilot's reaction—push controls forward.)

2. Returning to level flight from a steep turn, the removal of the strain of centrifugal force from the body leads to a feeling of less than normal weight and a sensation that the aircraft is falling. (Pilot's reaction—pull back on the controls.)

3. Where an aircraft skids in a turn, the sensation is that of a tilt opposed to the direction of the true turn.

4. In instrument flying a false sensation of turning often occurs in straight and level flight. This may be due to—

- The eyes working in conjunction with the ears and receiving false sensations from the latter.
- False sensations of rotation produced in the inner ear when motions caused by turbulent air are recorded.
- Correction of the course for propeller torque by the rudder,

which frequently gives a sense of turning.

5. During a sharp turn, movement of the head often leads to the feeling that the aircraft is diving or tipping; and during a spin the sensation of going beyond the vertical. (Pilot reaction—pull back on the controls.)

6. Pilots are apparently more subject to vertigo when nervous, tired, or tense. Occurrence among wing men in formation flying is common under conditions of reduced visibility. It is caused possibly by the lack of horizon or plane of reference, or the skidding and maneuvering necessary to maintain position. The most common sensations are of diving, approaching a stall, or flying in some unusual position, and the pilot's reaction is to recover from whatever attitude he feels he is in, correction usually resulting in a vertical spin or dive, and often in a fatal crash.

A good general rule for flying personnel to remember is, "The sensations will deceive, but the instruments tell the truth."

bling point of the horizon, attitude should be kept within 60° of level in pitch and 90° of bank.

Directional gyro must be checked occasionally with magnetic compass since it may precess as much as 3° to 5° in 15 minutes. Gyro must be set to magnetic heading and not compass heading—in other words, it is set after applying deviation to compass heading.

### Compasses All Lag

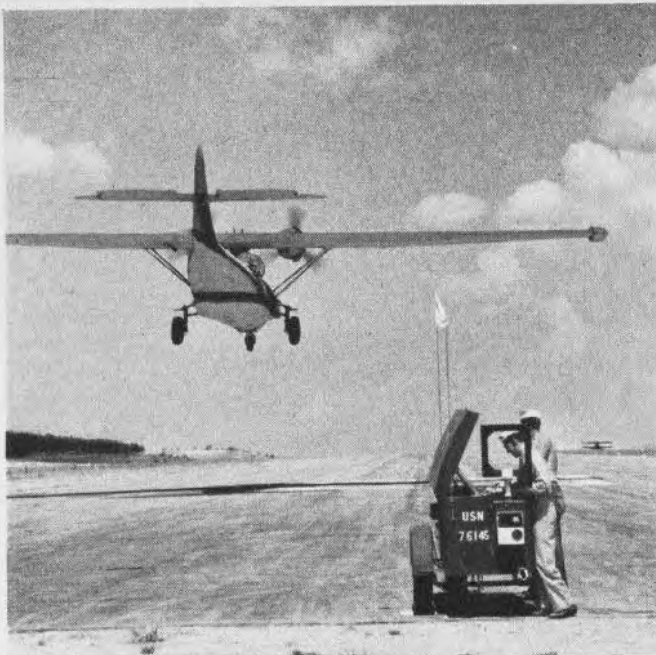
All magnetic compasses are subject to slight error in indication on straightening out after a turn. This is called the "period" and may be for 3 minutes

or more. Care must be used in setting the gyro after a turn until compass is indicating properly. The D. G. is dependable on the bank and pitch plane up to 55° of bank at which time it will spin and must be reset in level flight.

Many pilots do not realize the importance of engine controls in full panel instrument flying. Each pilot should establish three speeds for the airplane he must fly on instruments and know the tachometer and manifold pressure readings necessary for each.

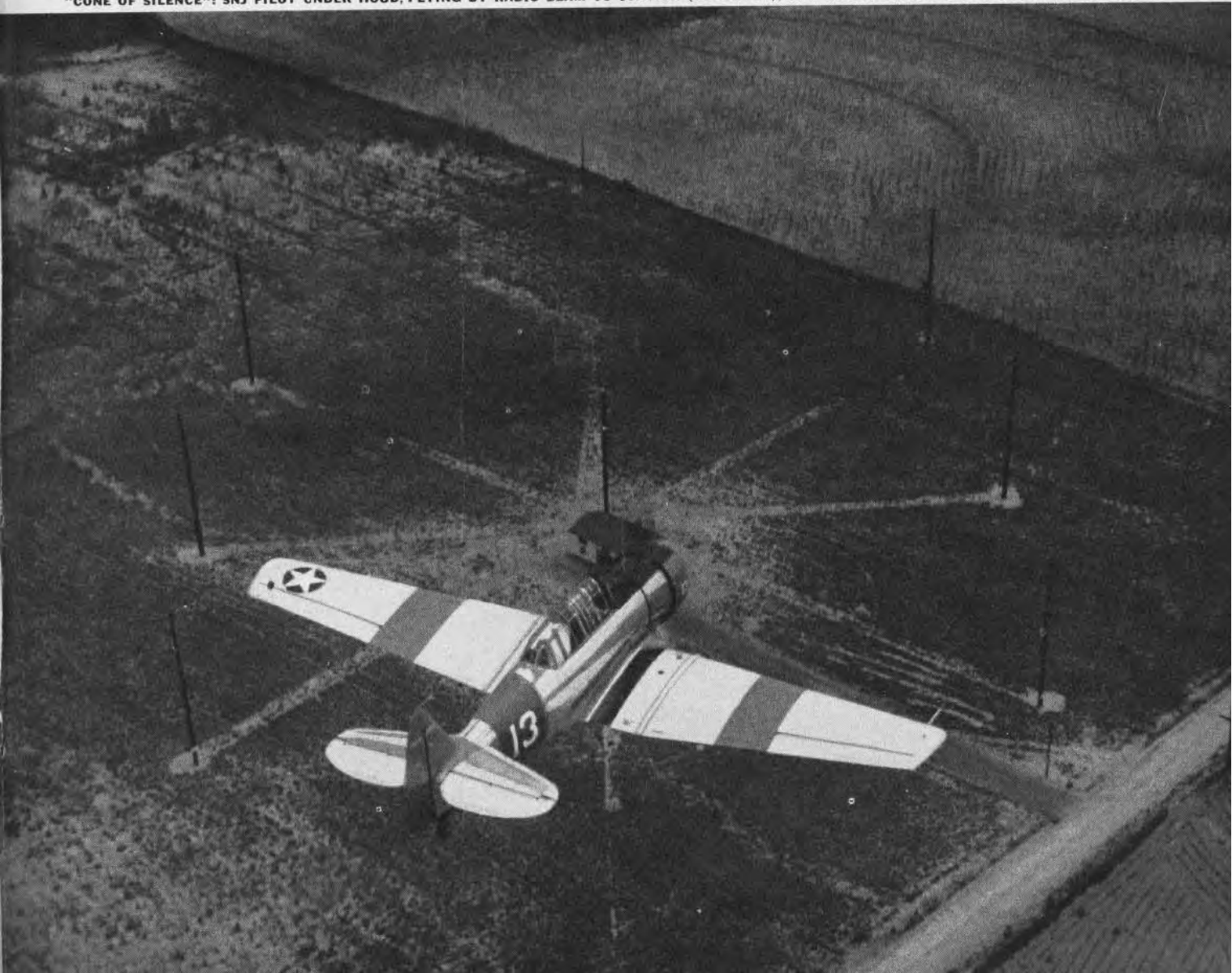
These speeds should normally be:

1. Slow speed, approximately 20 knots



YB-ZA RADIO MARKER INFORMS PBY PILOT THAT HE IS OVER RUNWAY      EXPERIMENTAL YB-ZA EQUIPMENT TRANSMITS CURVED BEAM FOR LANDINGS

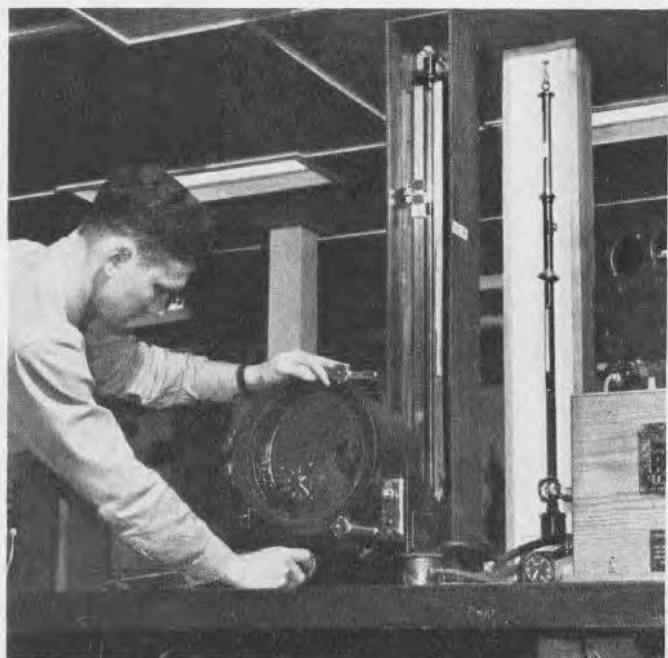
"CONE OF SILENCE": SNJ PILOT UNDER HOOD, FLYING BY RADIO BEAM TO STATION (IN CENTER), NOW KNOWS EXACT POSITION FROM LANDING FIELD



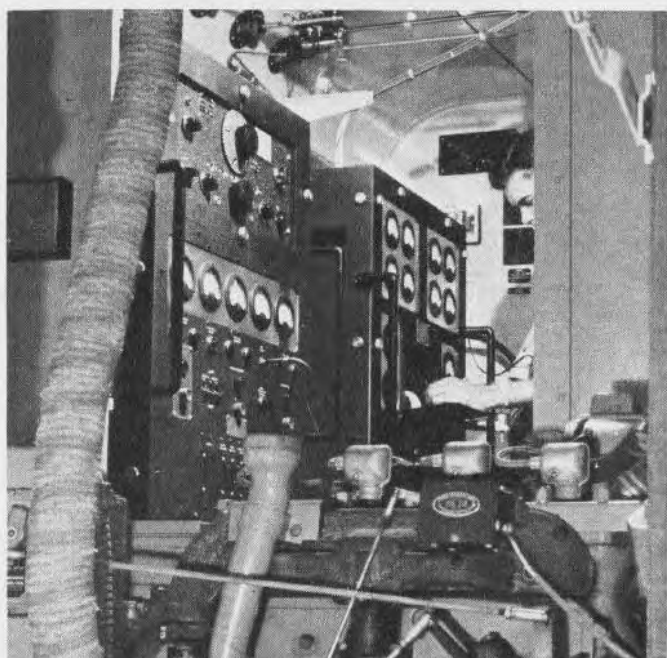




FLIGHT INSTRUMENTS LIKE THIS ALTIMETER ARE TRUSTWORTHY AND SENSITIVE, CAREFULLY TESTED AND REPAIRED; PILOTS TREAT THEM WITH RESPECT



IFIS]STRESSES NEED FOR INSTRUMENT CARE IN REPAIR SHOP LECTURES



RADIO LANDING PATH EQUIPMENT IS HOUSED IN TRAILER ON AIRFIELD



above stalling used for instrument approaches and landing approaches; 2, normal cruise, speed at which the airplane is usually flown on operations for normal fuel consumption and range; 3, high speed cruise, highest speed used in tactical operations.

### Level Flight Easy

Knowing power control setting for these speeds and indicated air speeds, it is a simple matter to establish level flight. In addition, the pilot should know the proper angles of bank for each of these speeds to establish a specific rate of turn. The pilot now has the problem of flight "on instruments" because he can establish level flight and make turns at a specific rate, at any speed.

The foregoing indicates the necessity for constantly checking each instrument with other instruments which parallel its indication.

The two attitude gyro instruments indicate attitude in all three planes of space without need for interpretation or integration. The horizon indicates directly the attitude in the pitching and rolling planes and directional gyro in the yawing plane relieving the pilot of any strain caused by interpretation.

"There is no mystery to instrument flying. It is simple and logical and can be learned readily by any good pilot who has the desire to learn."

## IFIS and LITIS

### Instructor Training Emphasized

*Its granddaddy was a pipe organ; it made its debut in an amusement park. Puzzled pilots say it's a concoction of the devil. But the Link trainer is playing an important role in training program of naval aviation.*

The hub of the Navy's instrument flight program today is located at NAS, Atlanta, where Waves are trained to operate Link machines and naval aviators go to "teachers' college" and come out instrument flight instructors.

Both schools are newly formed this year and both are turning out scores of graduates to boost navy pilot production to meet wartime needs.

Graduates of the instrument flight instructors school, called IFIS, do not go into combat service, but are sent to other stations to teach the new attitude method of flying on the whole instrument panel.

To build up a corps of teachers, each naval air station sends its quota

## Royal and Unique Order of IFIS

Brotherhood of the Mystic Pattern Sea

No.



This is to Certify that

has successfully completed Night Pattern "C" at Instrument Flight Instruction School

within the Champagne Limits of 50 Feet Altitude,  $\pm$  Seconds Timing, 8° Heading, 5 mph, and 5° Bank. It is further certified that a record of the date and order in which Pattern "C" was successfully completed is entered in the IFIS Master Progress Log.

GIVEN WITH CONGRATULATIONS

GRAND WIZAR OF THE KINGDOM OF IFIS

CHIEF SCRIBE FOR  
THE REGAL MASTER OF THE AIR OCEAN  
K. M. KING IFIS

CHAMPAGNE PARTY TOASTS FIRST STUDENT IN IFIS GRADUATING CLASS TO FLY PERFECT PATTERN C

to Atlanta for the 45-day course there. Soon nearly 100 instructors will be turned out every six weeks.

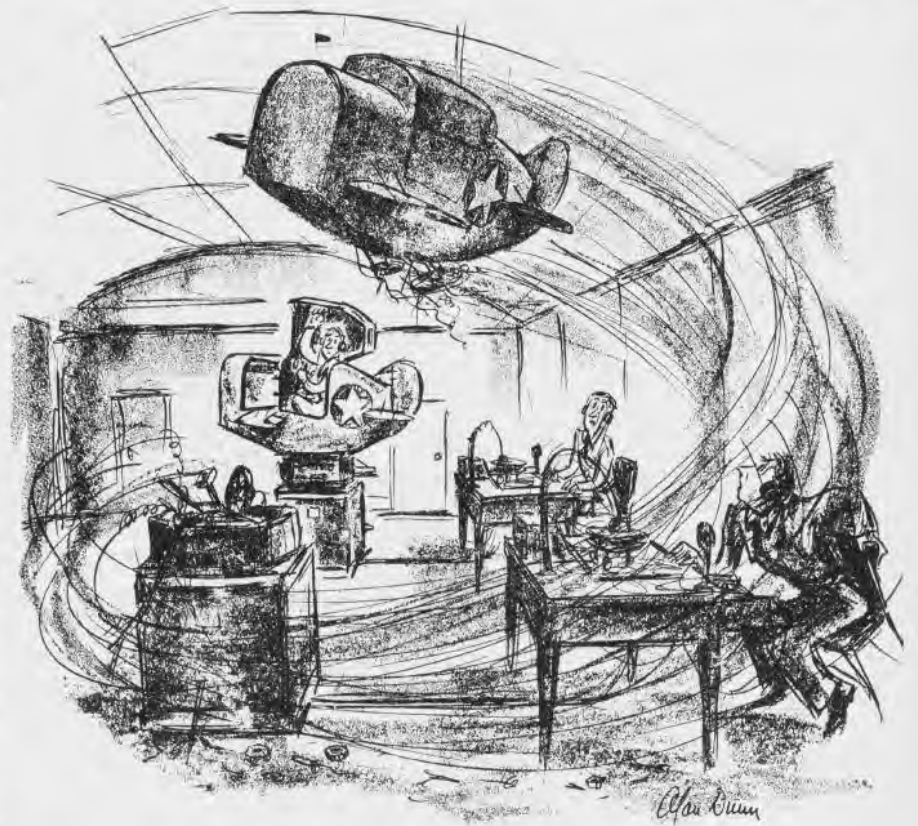
### Waves Learn Link

At the Link Instrument Training Instructors School, called LITIS, enlisted Waves are being put through a ten-weeks' course so they can operate the machines which now specialize in teaching radio navigation aids. Ap-

proximately 200 Waves are training, with classes starting every two weeks.

IFIS students get an hour of Link training and three hours of actual flying each day. They fly to obtain a technique that will enable them to teach instrument flight, so they spend half of their air time instructing others.

This school was not originated to train instrument flight but to turn out teachers of that method of flying. It



has been found that marriage status, age, or previous teaching experience have little effect on whether a student turns out a good teacher.

### Stress Radio Aids

Emphasis at the LITIS school is placed on radio navigation. The average time spent in the machine is about 25 hours. Eventually Waves will operate all machines in this country, with enlisted Navy men and Marines handling them at foreign bases.

LITIS is staffed by civil service women and under them the enlisted Waves learn the techniques which formerly were taught regular pilots at a three months' course at the Link factory. With the outbreak of the war, pilots could no longer be spared to operate Links so the Waves stepped into the breach.

Originally, women with flight time were preferred, although it was proved that actual flying made little difference in the ability of an operator. This original group learned the Link the hard way but they proved that the average woman could be taught enough in eight weeks to fit into the mass production pilot scheme.

### All Ages Get Link

Pilots of all ages and types get Link training, some youngsters direct from intermediate flight, others experienced air-line pilots. Due to the vast area over which the war theater extends, a pilot must know more about navigation than when he flew over short distances and familiar territory.



### What Makes a Good Instrument Flight Instructor

Psychological studies made at NAS, Atlanta, have resulted in the following broad conclusions as to what type makes the best instrument flight instructor:

1. Better than average contact flier.
2. Better than average instrument flier.
3. Highly interested in instrument flying and teaching.
4. At least 300 hours of flying time.
5. Previously instructed in aviation or at least in some subject.
6. High order of mechanical aptitude and comprehension.
7. Analytic ability to pick mistakes of pupil and correct them.
8. Interest in students as individuals.

The Link can train the pilot on the ground in problems he later practices in the air. Patterns and procedures used in radio direction finding and radio range can be practiced under these simulated flight conditions until the pilot is thoroughly familiar with them.

It is impossible to "fly" a Link by the attitude system because that is not a mechanical method and also because it requires the closest reference to the student's past experience in contact flying of the actual plane.

The majority of instrument flight procedures must be taught in an airplane. Experience has shown that the time needed to learn radio aids to navigation can be cut in half by use of the Link.

### Improve on Link

NAS, PENSACOLA.—A squadron at this station has developed adaptations to the Link trainer which, it is believed, suit the machine better for the attitude method of teaching flying.

The Link is equipped with an elevator trim tab, manifold pressure gage, cylinder head temperature gage, an aircraft throttle quadrant with throttle and constant speed propeller controls, and an aircraft artificial horizon.

With a change in throttle, a positive change of attitude is present in the trainer. This affords a good artificial horizon indication on the instrument panel. The aircraft horizon overcomes the horizon bar flutter found in most Links and gives an accurate angle of bank and pitch.

**BUREAU COMMENT**—The Bureau has ordered synthetic directional gyros and elevator trim tabs for all Links. Automatic radio ranges are on order and automatic DF's, YB's and YG's are in the process of development. They will be placed on all Link trainers.

## Two Books That Should Be Read on Instrument Flight

**B**UAEER'S Training Division now has available for distribution two books on *Instrument Flight*, the latest one dealing with *Radio Navigation*

and supplementing the earlier one on flight instruments.

*Radio Navigation* deals with the two basic methods of fixing the position of an airplane—radio ranges and the direction-finding loop. All pilots have been exposed to radio range work but may not necessarily know beam techniques and instrument approaches.

A smaller number of pilots are familiar with the direction-finding loop and techniques of its use. The same is true of the radio compass which utilizes the same principles as the loop.

An understanding of the methods used in the two types of radio navigation aids, discussed in the newest book, will go far in assisting a pilot to understand any other radio aids which may

be developed.

The purpose of *Instrument Flight* (Part 1) is to give naval aviators the ground work of the attitude method of controlling an airplane on instruments. There is no mystery to instrument flying. It is simple and logical and can be learned readily by any good pilot with the will to learn.

The ability to fly an airplane by reference to the instruments is directly proportional to his ability to fly the same plane "contact." The chapter in Part 1 on *Analysis of Maneuvers* is of extreme interest to all aviators.

This book is the standard text for instrument flight training and will be used by all instructors in accordance with directives issued.



BUREAU SENDS OUT TWO NEW BOOKS ON FLIGHT





There is no mystery to instrument flying. It is simple and logical and can be learned readily by any good pilot who has the desire to learn





MARINE AVIATORS AT CHERRY POINT WHO HAVE NOT SEEN COMBAT DUTY LEARN GROUND DEFENSE AND TACTICS IN RIGOROUS TRAINING PROGRAM

# Cherry Pt. Hums With Activity

**Maneuvers and Maintenance  
Busy Marine Corps Fliers  
Preparing for Enemy Combat  
at North Carolina Station**

## Rigorous Combat Maneuvers

Junior officers, regulars, and reserves who have not seen combat duty are reaping the advantages of a rigorous training program in ground defense recently established in the outlying areas of this base.

With its thick woods, semitropical underbrush, swamps, and sandy stretches, the terrain is ideal for combat training. The course consists of one week of instruction in camouflage discipline and ground defense, and one week in the field, during which time the trainee puts into practice the knowledge he has gained in the first week.

On maneuvers the men eat K rations, sleep in pup tents, receive in-



struction in the assembly of .30 cal. and .50 cal. machine guns, and fire these guns and the M-1 on the range.

Most of the men took to maneuvers like ducks to water, says the station. A few broke some fundamental laws of camouflage discipline by tossing match boxes and shiny refuse, such as tops of rations cans, on the ground, and by neglecting to replace native cut camouflage with fresh material. The latter offense is called "Robbing Peter to pay Paul."

## Hard Landings

One of the fighting squadrons here was recently equipped with *Corsairs* after intensive training in SNJ-4's.

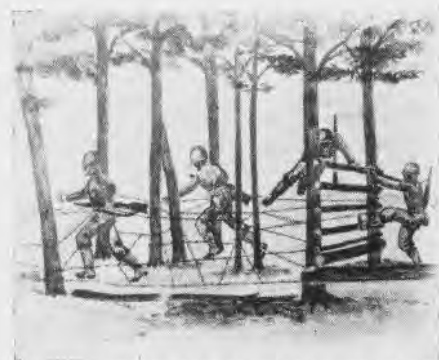
In getting the pilots familiarized some difficulty has resulted from the tendency of pilots to stall the landings

in too hard. It is believed that this caused the wrinkles found in the skin on the fuselages of two planes. One wrinkle was about 2 feet long, running diagonally upward from the wing-root on the left side of the plane, with the bulge outwards. The wrinkle on the second plane was located on the lower half of the fuselage behind the cockpit. This buckled inward and was about one foot long. Until a more complete report can be made on this trouble pilots have been recommended to make wheel landings.



One accident occurred when a pilot making a slow turning approach to the left, lost flying speed and was unable to bring up the left wing before hitting the runway. In an attempt to recover, the pilot "hit the throttle" at the last instant and it is believed that the torque caused the wing to drop even lower. Although the plane was demolished, the pilot was saved from injury by his shoulder harness.

During the familiarization period in *Corsairs* the squadron has been working intercept problems with Charleston Control Area.



TOUGH OBSTACLE COURSE KEEPS MARINES FIT

**BUREAU COMMENT**—it is believed that this trouble may have been caused by small tail wheels. The large pneumatic wheels now fitted reduce the buffeting and allow normal 3-point landings. . . . Power must be applied gradually when in a slow speed, left wing down condition. The effect of sudden applications of power is twofold: 1. Torque reaction tends to put the left wing down, and 2. Prop wash coming up on the port side tends to stall the left wing out first.

"Now tell me, what's your idea of strategy?"

"It's when you're out of ammunition but keep right on firing."

## First Among the First

Marine Corps "firsts" are nothing new, but being first in the Marine Corps might be termed *crème de la crème*. This station has the corps' first horizontal bombing squadron.

Planes used are the famed PBJ's, better known to landlubbers as B-25's. The squadron is now formulating plans for the intensified training of flight and ground crews in all phases of horizontal bombing tactics.

## Epidemic of Groundloops

Recently one of the service squadrons here has been given an opportunity to solve a few operating headaches that stemmed from a mild epidemic of ground-loops and forced landings by new pilots.



Resulting overhauls gave some first-hand experience to personnel, many of whom are just out of trade school. Most of the work was performed under adverse weather conditions ranging from heavy rains to sandstorms . . . severe enough in some instances to curtail work considerably.

## Personnel in the Pink

What with softball, runs over the obstacle course, and field marches for all hands, officers and men of one of the squadrons here have had little opportunity to put on excess weight. The last few Saturday afternoons have been devoted to field marches. The first march was 10 miles and some of the tenderfeet developed hot boxes en route.

## 5-Day Weather Forecasts

### Marines Facilitate Operations Schedules

In order to facilitate further the scheduling of aircraft operations at this station, a program of experimental 5-day weather forecasts was begun recently. The forecasts, issued on Monday and Friday of each week, cover expected sky conditions, precipitation, winds, temperature, and additional details when available. These forecasts are issued in addition to the aviation forecasts issued every six hours, as well as the thirty-six-hour general forecast which is issued daily.

## LETTERS

SIRS:

In the June 15th issue of *BuAer NEWS*, on page 24, under date of June 20, 1918, reference is made to certain pilots flying with the R. A. F., Squadrons 213, 217, and 218. It should be of interest, particularly to those pilots concerned, to know that the Commanding Officer of 217 Squadron R. A. F. at that time is now Air Marshal Sir William Welsh, who is now stationed in Washington with the British Supply Council.

ARTEMUS L. GATES,

Assistant Secretary of the Navy for Air Washington, D. C.

SIRS:

Inasmuch as the R. A. F. Headquarters, Cairo, and the C-in-C, Levant, Headquarters, Alexandria, are desirous of obtaining *BuAer NEWS* for circulation in their respective organizations, it is requested that two additional copies of this publication be forwarded to this office.

OFFICE OF THE NAVAL ATTACHE  
Cairo, Egypt

SIRS:

To correct the records on an item appearing in the June issue of *BuAer NEWS*, this command claims the credit for originating the "Royal Order of Whale Bangers." Due credit, of course, is given Patrol Squadron 53 for publicizing the organization and submitting the picture and speech which appears on page 23.

The story is this: Three planes of this command were operating out of an East Coast air station on detached duty early this year. Late in the afternoon one clear day, one of the planes was returning from a mission. The P. P. C. sighted a "spray or fog" about 2 miles away. He immediately proceeded to the spot and attacked a "large submerged cigar shaped object."

A report was submitted thru the regular channels and "the powers that be" patted the pilot that made the attack and the detachment on the back with a "well-done."

Two days later a dead whale was found near the spot of the attack.

In addition, the Anti-Submarine Warfare Assessment board gave the pilot credit for one whale and no damage to the enemy. (VP-81 report, March 4, 1943.)

The incident gave impetus to the design of a suitable emblem. The medal and the speech of presentation were the thoughts and ideas of a lieutenant of this squadron who had also commanded the detachment.

SQUADRON COMMANDER.  
Patrol Squadron 81, Atlantic.

¶Last week, it is reported, they built a plane in eight hours flat. Five minutes later a pilot took off in it. Six hours later the plant received a cable from him. It read, "I am in Australia. Please send engine."



## Propeller Accumulator Failures

### Explanation and Solution Given

Failures of the synthetic rubber accumulator bag in the accumulator system of the Hamilton standard constant speed propeller have been reported by service. The principal reason for failure of the present design, says the Bureau, is that tightening of the air valve into the accumulator shell by means of lock nuts causes shearing stress to be sustained by bladder material in the annular region compressed between accumulator shell and raised edge of flange on air valve.

This stress shears the bag around the air valve flange, causing leakage of oil around lock nuts and loss in air pressure, thereby rendering accumulator inoperative.

As this stress is maximum when bag is inflated, it is recommended that no torque be applied to nuts on air valve stem when bag is inflated. Careful checks to insure that correct pressure is maintained in accumulator bag is also necessary.

A more suitable means of air valve retention in rubber accumulator bag will be incorporated and replacement bags will be distributed as soon as they are available.

## External Electric Supply

### Motor Generator Units Should Be Used in CV's and ACV's

Correspondence reaching the Bureau indicates that equipment provided to CV's and ACV's for external electric power supply to airplanes either is not understood by ships' personnel or is not delivered. For external power supply for starting and electric and radio test, portable 24-volt D. C. and 120-volt, 800 cycle, A. C. motor generator sets are included as part of ship equipment to be furnished by the builder.

These portable units are plugged into regular ship's power outlets. They are mounted on skid platforms for use with standard lift trucks.

## Clothing Outfit Should Be Complete

Information has reached the Bureau that personnel, both officers and men, are arriving in areas outside the United States, particularly in Australia, with incomplete outfits of clothing and are depending on supplementing clothing by procurement from commercial sources. In view of the difficulty of obtaining clothing after leaving the United States, and particularly in Australia, where the supply of many items is short (especially those manufactured from cotton) and where all clothing is rationed, it is requested that all personnel take necessary steps to equip themselves with complete outfits of clothing prior to departure from the United States.

Personnel in CV's and ACV's are advised to assure themselves of the delivery of the specified motor generator units and make proper representation to the Supervisor of Shipbuilding or BuShips in case of nondelivery.

A few gasoline-driven power units have been allocated by BuAer to CV's and ACV's for trial use. These consist of a small gasoline engine which drives a standard aircraft generator (a spare from one of the planes may be used).

It is expected that the eventual solution to external power supply may lie in the gasoline-driven portable units. Pending services tests and initiation of production, however, presently supplied ships' equipment motor generator sets should be used.

HAVE YOU A DILBERT  
IN YOUR SQUADRON?



## Patterns Save Man-Hours Fabric Also Conserved

NAS, MINNEAPOLIS.—A great saving in man-hours has been accomplished at this station by using patterns for re-covering N2S airplanes. The patterns include upper and lower wings, ailerons, wing and aileron tips, center section, rudders, elevators, and stabilizers.

The fuselage covering is marked and sewed to exact size by using a flat pattern, the cover then being pulled on over the tail; the only hand sewing required being for the handle openings. A saving in fabric is possible by making covers up in advance, thus using the fabric widths available to the best advantage.

Rib-stitching time has been reduced by using a premarked or notched flexible metal pattern or strip. These patterns have a hook on one end to hold them tight against the trailing edge. The pattern strip is then laid against the rib, enabling the operator to locate the exact position of the rib-stitch holes. Their use facilitates keeping the stitches at an exact 90° angle from the surface of the fabric.

[CREDIT TO STAFF SERGEANT E. C. RAINVILLE, R. CHAPUT, AMM2c, AND B. T. LAHART, AMM3c.]

## Removing Broken Easy-Out NAS Devises New Method

NAS, BROOKLYN.—A new method of removing a broken easy-out from a cylinder of a F4F-4 has been developed here by using an arc-welding set and a piece of wire.

Ordinarily this could have been accomplished by grooving around the easy-out with a hollow milling cutter until both easy-out and stud fell away. The exceptional cases are those where the wall thickness in the housing that holds the stud is so small that an oversized stud cannot be installed.

Where the easy-out has been broken off so that it extends out over one side of the broken stud, the same problem arises. This condition makes an ordi-

(Continued on page 26)



# RATINGS IN NAVAL AVIATION

## AEROGRAPHER'S MATE

**Ratings:**

Chief Aerographer's Mate.....	CAerM	\$138
Aerographer's Mate, 1st Class.....	AerM1c	114
Aerographer's Mate, 2nd Class.....	AerM2c	96
Aerographer's Mate, 3rd Class.....	AerM3c	78

**Duties:**  
Reads meteorological instruments. Interprets weather data, and draws weather charts for forecasting.

**Related civil jobs:**  
Meteorologist.



## AVIATION PILOT

**Ratings:**

Chief Aviation Pilot.....	CAP	\$138
Aviation Pilot, 1st Class.....	AP1c	114
Aviation Pilot, 2nd Class.....	AP2c	96

**Duties:**  
Acts as pilot or co-pilot of planes and airships. Does aerial navigation also.

**Related civil jobs:**  
Private or commercial airplane pilot.



## AVIATION ELECTRICIAN'S MATE

**Ratings:**

Aviation Chief Electrician's Mate.....	ACEM	\$138
Aviation Electrician's Mate, 1st Class....	AEM1c	114
Aviation Electrician's Mate, 2nd Class....	AEM2c	96
Aviation Electrician's Mate, 3rd Class....	AEM3c	78

**Duties:**  
Installs, maintains, and repairs all electrical equipment in aircraft.

**Related civil jobs:**  
Electrician, electrical engineer, aircraft instrument worker, aircraft electrician, ignition specialist.



## AVIATION RADIOMAN

**Ratings:**

Aviation Chief Radioman.....	ACRM	\$138
Aviation Radioman, 1st Class.....	ARM1c	114
Aviation Radioman, 2nd Class.....	ARM2c	96
Aviation Radioman, 3rd Class.....	ARM3c	78

**Duties:**  
Operates radio transmitting and receiving equipment of naval aircraft. Enciphers and deciphers messages.

**Related civil jobs:**  
Radio repair man, radio engineer, licensed radio operator.



## AVIATION MACHINIST'S MATE

**Ratings:**

Aviation Chief Machinist's Mate.....	ACMM	\$138
Aviation Machinist's Mate, 1st Class....	AMM1c	114
Aviation Machinist's Mate, 2nd Class....	AMM2c	96
Aviation Machinist's Mate, 3rd Class....	AMM3c	78

**Duties:**  
Maintains and repairs aircraft engines, propellers, fuel systems, brakes, etc. Operates machine shop tools.

**Related civil jobs:**  
Mechanic, aviation mechanic, engine maintenance man, and other jobs.



## AVIATION RADIO TECHNICIAN

**Ratings:**

Aviation Chief Radio Technician.....	ACRT	\$138
Aviation Radio Technician, 1st Class....	ART1c	114
Aviation Radio Technician, 2nd Class....	ART2c	96
Aviation Radio Technician, 3rd Class....	ART3c	78

**Duties:**  
Maintains and repairs aviation radio equipment and equipment using vacuum tube and other radio-type parts.

**Related civil jobs:**  
Radio repair man and radio engineer.



## AVIATION METALSMITH

**Ratings:**

Aviation Chief Metalsmith.....	ACM	\$138
Aviation Metalsmith, 1st Class.....	AM1c	114
Aviation Metalsmith, 2nd Class.....	AM2c	96
Aviation Metalsmith, 3rd Class.....	AM3c	78

**Duties:**  
Repairs and maintains aircraft parts other than engines and ordnance.

**Related civil jobs:**  
Metalsmith, shipfitter, tinsmith, plumber, aviation maintenance man.



## PARACHUTE RIGGER

**Ratings:**

Chief Parachute Rigger.....	CPR	\$138
Parachute Rigger, 1st Class.....	PR1c	114
Parachute Rigger, 2nd Class.....	PR2c	96
Parachute Rigger, 3rd Class.....	PR3c	78

**Duties:**  
Packs and repairs parachutes. Actual jumping experience. Care of fabrics. Operates sewing machine.

**Related civil jobs:**  
Parachute maker, fabric worker, etc.



## AVIATION ORDNANCEMAN

**Ratings:**

Aviation Chief Ordnanceman.....	ACOM	\$138
Aviation Ordnanceman, 1st Class.....	AOM1c	114
Aviation Ordnanceman, 2nd Class.....	AOM2c	96
Aviation Ordnanceman, 3rd Class.....	AOM3c	78

**Duties:**  
Maintains and repairs aviation armaments. Handles and stows explosives.

**Related civil jobs:**  
Gunsmith, electrician, instrument maker, and other civil occupations.



## PHOTOGRAPHER'S MATE

**Ratings:**

Chief Photographer's Mate.....	CPhoM	\$138
Photographer's Mate, 1st Class.....	PhoM1c	114
Photographer's Mate, 2nd Class.....	PhoM2c	96
Photographer's Mate, 3rd Class.....	PhoM3c	78

**Duties:**  
Directs naval photographic unit. Installs cameras in planes. Makes aerial mapping photographs.

**Related civil jobs:**  
Photographer, movie projection operator, aerial map maker.



nary system of removal useless, for it is so hardened and tempered that no drill or cutter can cut through it. To make a hollow milling cutter that will remove an easy-out in that condition would necessitate installation of a club stud of such proportions as would make it impracticable.

### Work Out System

Charles Geller, ACMM (AA), with the aid of Reynold G. Carlson, AM

2/c, an arc welder, worked out the system of removing the easy-out from the cylinder. Using the proper amperage and voltage, a  $\frac{3}{32}$ " stainless-steel welding wire was attached to the broken easy-out. Then with four strokes of a sleeve hammer made here the part came out fastened to the wire.

By using a jig that located the holes for the studs of the rocker-box cover, a new hole was drilled and tapped for a club stud. The surrounding dural

housing was not damaged in any way, but care must be taken to fasten the ground lead of the welding apparatus as closely and securely as possible to the broken easy-out.

## Game Board Checks Students

### Ability in Link Measured

NATC, PENSACOLA.—By use of a game board, students of an observation-cruiser scouting squadron at this center are checked in comprehension and ability in Link trainer, navigation, communication, and recognition weeks before they complete their course.

The game board consists of two rooms, one with the Link and the other a ship with the "admiral" and his staff aboard. A typical problem is given to the student in the Link, who immediately begins his track until he spots the enemy fleet.

After transmitting his contact report, the student sends in amplifying reports, either in code or by voice. The "admiral" decides the strategy and sends further instructions to the scouting plane. When the problem is completed a conference is held and all phases are discussed and corrected.

**BUREAU COMMENT**—This is another of the many useful ways in which the Link can be utilized to further cadet training.

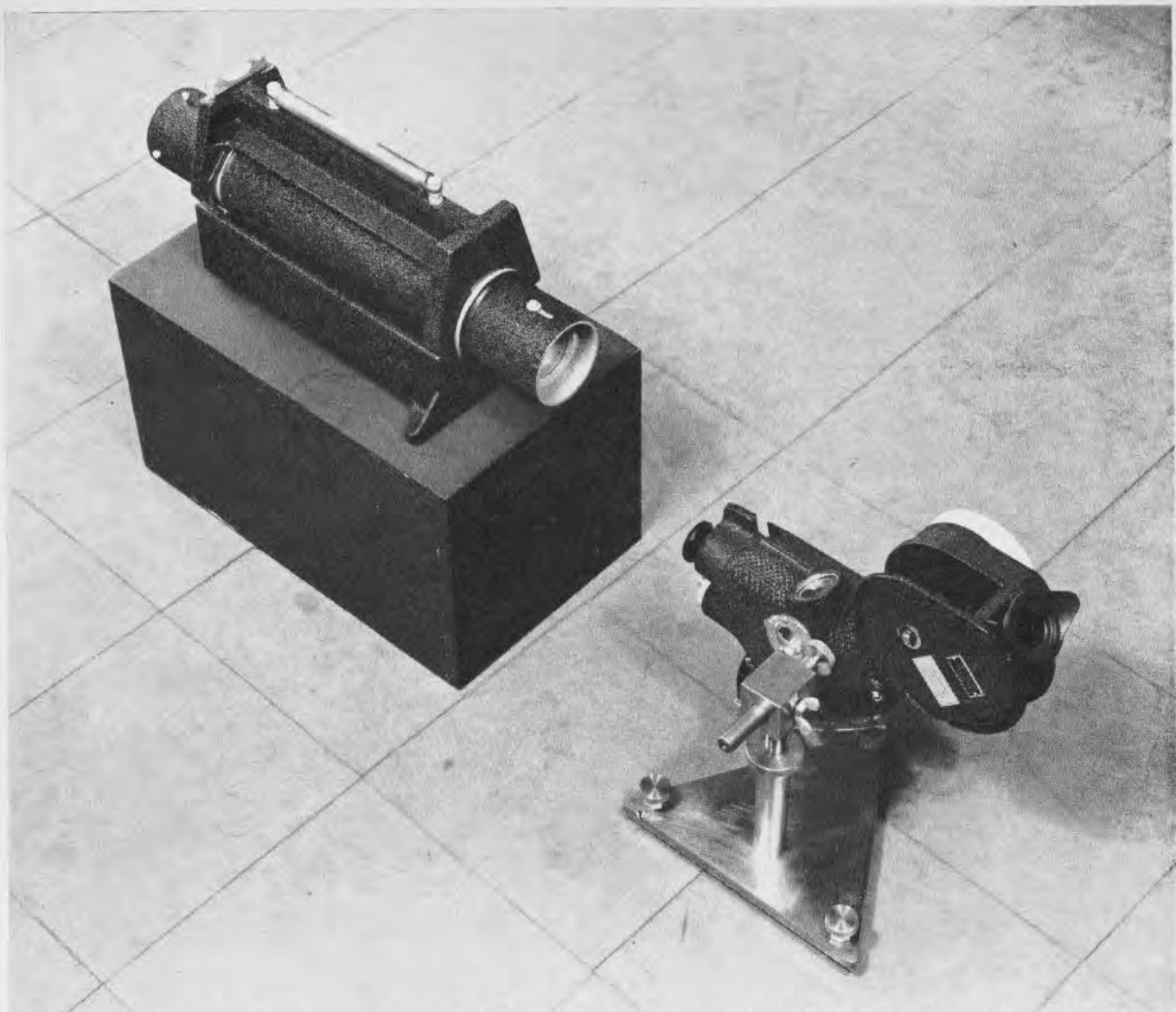
## Air Facility Operating

### Also Acts as ADU

NAF, MINEOLA.—This Naval Air Facility, operating since October, was officially commissioned recently. Its purpose is to modify lend-lease planes of American make for operation with the Royal Navy. Manned by U. S. Navy officers and men with an advisory British staff in liaison status, the facility also acts as ADU for lend-lease carrier aircraft consigned for use of the British Navy.

## THE DEVELOPMENT OF AN IDEA





IMPROVED NEW JIG CORRECTS INDEX ERRORS IN LINK BUBBLE SEXTANTS USED IN CELESTIAL NAVIGATION. JIG CAN BE MADE IN ANY A&R SHOP

## Quonset Uses Improved New Jig With Link Bubble Sextant To Ease Corrections

An improved jig has been developed at the Link Celestial Navigation Training School, Quonset Point, R. I., to permit squadron personnel to make corrections in Link bubble sextants.

Fleet and training personnel are becoming increasingly familiar with the sextant, so that additional information on how to keep it working accurately is invaluable. It has been brought to the Bureau's attention that considerable time is being lost due to large index errors developing in the instruments, requiring that they be sent to shops for correction.

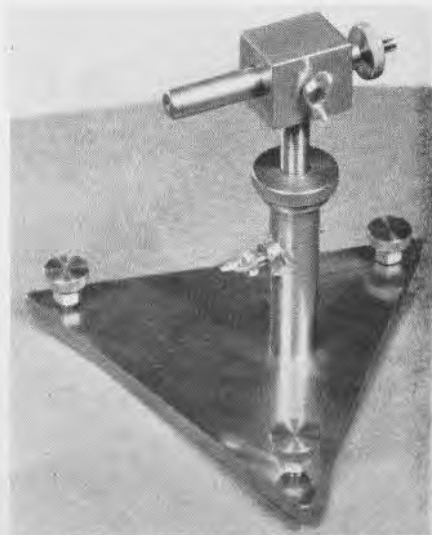
Using this jig, index corrections can be made for  $0^\circ$  altitude, which should satisfy average accuracy requirements. The procedure is sufficiently simple

that instruments on hand can be kept ready for use at all times.

After a sextant has been adjusted to eliminate index error, the correction for spare bubbles can be determined and recorded, permitting accurate readings to be obtained, if necessary to change bubbles during flight.

Blue prints for construction of the jig and detailed instructions for its use may be obtained by writing the Navigation Training Section, Bureau of Aeronautics, 61 College Avenue, Annapolis, Md.

The jig presents no complications in operation or construction. It can be made in A and R shops at a negligible cost and without special equipment, by the regular shop personnel.



JIG SAVES TIME, IS ACCURATE, AND EASY TO USE

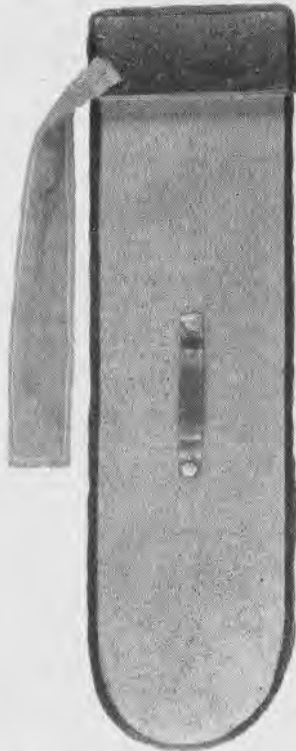


## Shutting Out Sand

### Penetration Prevented Through Intake

MCAS, CHERRY POINT, N. C.—Severe sand and dust conditions which prevail periodically here have caused a number of maintenance problems for line crews servicing F4U-1's.

One of the most difficult is penetration of sand and dust into the air intake and thence through the inner cooler into the blower unit. Sand acts as an abrasive upon the blower vanes



PLYWOOD DEVICE SEALS AIR INTAKE OPENING

and creates excessive wear and resultant loss of pressure. A very small quantity of sand will also freeze the supercharger drain valve (flutter valve) in either open or shut position. Removal of sand and dust requires a major overhaul operation.

To overcome this problem, a device was designed by a master technical sergeant at the suggestion of a Marine gunner. It consists of a wooden plug of nine-sixteenths-inch plywood, shaped to fit the air intake opening, and bound with one-fourth inch felt to create a tight seal. A metal handle is secured to the face of the plug to facilitate insertion and removal.

To guard against failure to remove before flight, each plug is painted a brilliant red, and a 10-inch strip of

red bunting is attached to it to attract further attention. The vertical strip at the inboard end is painted a contrasting green, with the Bureau number of the plane stencilled on it. The step construction of the inboard end is necessary in order to clear the inboard air deflector vane.

Penetration of sand into wheel brakes is another serious maintenance problem. To counteract this condition, a circular wooden plate has been secured to the outboard surface of the wheel. Work is now being done on a design for an improved device.



WOODEN PLATE PROTECTS BRAKES FROM SAND

**BUREAU COMMENT**—Activities will find this application beneficial in that it prevents sand accumulating in the intake while the plane is parked. This general subject has been treated in Technical Note No. 29-43.

## What's the News?

*Your old shipmates are anxious to know what your new unit is doing. The only place they can find out is on the pages of BuAer NEWS. Naturally, it is not always the simplest thing to prepare copy under present conditions. Yet, you will probably admit, some measure of consistent effort should be applied to this need. So, before you forget it, take time out and send BuAer NEWS the dope about your unit.*

## Wooden Bumpers Cut Damage

### Bad Effects of Rough Water Partly Overcome on Approach

NAS, CORPUS CHRISTI—VP squadrons here are confronted constantly with the old problem of planes versus rough water and inexperienced pilots. To reduce damage resulting from PBY's striking concrete ramps, sloping wooden bumpers have been built on each side of the ramps. When a bad approach is made, the plane strikes the inclined wooden obstruction instead of the vertical concrete ramp.

One squadron is also constructing ramps to assist metalsmiths in repairing the bottoms of PBY hulls. The inclined ramps lead to sturdy stands on which the beaching gear will rest. The metalsmith, who formerly had to lie on his back, will now be able to sit upright on a low stool while working on the hull. The inclined ramps will be detachable so that only one set will be necessary for any required number of beaching gear stands.

## Kerosene Removes Sludge

NATC, PENSACOLA—Cleaning oil passages on airplane engines is a simple matter at the Engine Overhaul Division of the A & R Dept. here, thanks to the development of a kerosene wash tank.

With this device, kerosene is circulated under pressure through the oil passages to remove carbon and sludge deposits. One can readily see by the volume of kerosene discharged from oil outlets which passages are clear and which are partially plugged.

### ANSWERS TO FLIGHT FROM NATAL

(See page 11)

- |                   |                    |
|-------------------|--------------------|
| 1. 050°           | 9. 130 k           |
| 2. 157 mi.        | 10. 1714           |
| 3. 044°           | 11. 1832           |
| 4. 98 k           | 12. 23 k, 120°     |
| 5. 103 k          | 13. 215°           |
| 6. 1732           | 14. Lat. 28°54' S, |
| 7. Lat. 29°19' S, | Long. 33°30' E     |
| Long. 31°48' E    | 15. 221°           |
| 8. Lat. 29°10' S, | 16. 1955           |
| Long. 31°59' E    |                    |

**NOTE:** The work should be considered correct if the results fall within the following tolerances: plus or minus 2°, 2 minutes, 2 knots, 2 minutes of time, 2 minutes of latitude, and 2 minutes of longitude.

From frozen Arctic to hot Tropics, Navy aircraft carriers are transporting coveys of fighting planes to immobilize the Axis



On patrol of North Atlantic, snow and ice make flying hard; crewmen of these two carriers might welcome a trade of jobs!

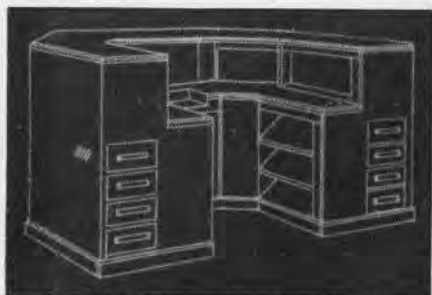




## Radio Console Designed Complete Drawing Available Upon Request

NAS, St. Louis.—The Communications Department at this Station has designed a radio operating console, which has greatly increased the efficiency of its operating personnel. The console, as shown in the attached diagram, is compact, and allows the operator to handle the traffic on several frequencies with ease.

Space is provided for four receivers, with speakers built into the console. The transmitters are operated from a remote panel which also has microphone and key jacks. The mill is directly in front of the operator, who copies incoming traffic as received. Stowage compartments for message



WELL-EQUIPPED CONSOLE IMPROVES EFFICIENCY

blanks and despatch form as well as considerable drawer space enable the operator to have at hand all needed gear. Drawing available on request.

## D/F Position Plotter

The D/F Position Plotter is a lightweight, compact instrument used to plot quickly and accurately the position of a plane, determined by radio bearings. The plotter was developed



NEW DEVICE PLOTS PLANE'S POSITION QUICKLY

in connection with the training of instructors for Link Instrument Trainers at NAS, Atlanta.

The device weighs one pound and consists of a stiff plastic baseboard. A sheet of vinalyte plastic, frosted to take pencil and ink computations, is

attached to the thicker plastic base sheet. Under this transparent face sheet of the plotter the navigator can control, by a knob projecting through the sheet, the combination compass rose and distance grid disc placed between the two surfaces. To operate the plotter the navigator places a standard sectional or regional airways

chart under the grid disc between the top and back plastic sheets. He positions the disc with reference to true and magnetic north.

The Coast Guard has a new rifle which fires so rapidly, it shoots eight times before you didn't know it was loaded.

(Succeeds list of May 18, 1943)

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

June 15, 1943

Airplane	Bulletin	Date	Change	Date
BD-1	11	5-22-43	14	1-30-43
BD-2	6	5-22-43	16	3-6-43
F4F-3	40	5-13-43	128	5-24-43
F4F-3A	33	5-13-43	105	3-30-43
F4F-4	34	6-3-43	89	5-25-43
F4F-7	8	4-14-43	33	5-24-43
FM-1	12	5-13-43	31	5-25-43
F4U-1	13	5-25-43	56	5-27-43
GH-1	6	3-3-43	11	6-1-43
NR-1	5	9-14-42	22	5-4-43
N2S-3	11	4-14-43	21	10-26-42
OS2N-1	22	5-8-43	27	5-8-43
OS2U-1	43	5-8-43	61	4-1-43
OS2U-2	54	5-8-43	73	4-1-43
OS2U-3	47	5-8-43	60	3-25-43
PV-1	3	4-7-43	22	5-29-43
PV-3	4	1-20-43	7	5-29-43
PBM-3	24	5-24-43	73	5-28-43
PBM-3C	21	5-24-43	31	5-28-43
PBM-3R	16	5-24-43	68	5-28-43
PBN-1	2	3-26-43	2	3-15-43
PBY-5	34	5-10-43	124	5-25-43
PBY-5A	37	4-28-43	119	5-25-43
PBY-5B	2	4-28-43	25	5-25-43
PB2Y-3	4	3-25-43	59	5-28-43
PBY2-3R	2	4-7-43	47	5-28-43
PB4Y-1	12	3-27-43	25	5-27-43
R3D-1	3	5-23-41	23	5-19-43
R3d-2	3	5-23-41	24	5-19-43
R3d-3	0		7	5-19-43
R4D-1	9	5-18-43	13	3-11-43
R5D-1	1	5-26-43	3	6-1-43
R50-4	2	8-24-42	10	4-24-43
R50-5	1	1-8-43	3	4-24-43
SBD-1	51	5-29-43	100	5-8-43
SBD-1P	36	5-29-43	60	5-8-43
SBD-2	54	5-29-43	109	
SBD-2P	40	5-29-43	72	
SBD-3	67	5-29-43	127	5-17-43
SBD-3P	54	5-29-43	110	5-28-43
SBD-4	16	5-29-43	32	5-28-43
SBD-5	6	5-25-43	9	5-28-43
SB2A-4	0		29	5-28-43
SB2C-1	8	5-26-43	6	5-4-43
SNB-1	5	4-9-43	13	5-24-43
SNB-2	7	4-9-43	8	5-24-43
SNJ-3	19	5-10-43	18	5-22-43
SNJ-4	12	5-10-43	14	5-22-43
SOC-2	79	1-20-43	116	5-18-43
SOC-2A	8	6-26-42	10	5-18-43
SOC-3	69	1-20-43	90	5-18-43
SOC-3A	6	6-26-43	10	5-18-43
SO3C-1	18	5-18-43	39	5-5-43
SO3C-2	10	5-18-43	25	5-27-43
SO3C-2C	1	2-19-43	2	1-20-43
SON-1	32	1-20-43	63	5-18-43
SON-1A	6	6-26-43	10	5-18-43
TBF-1	51	5-6-43	118	5-25-43

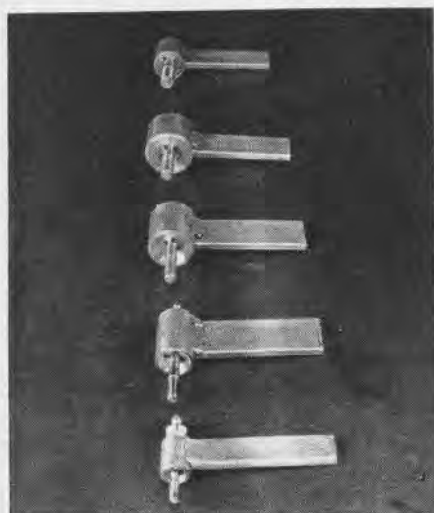
## Enlisted Men Should Read BuAer News

This is just a reminder that *BuAer News* should be distributed among enlisted personnel as well as among officers at your station. The information it contains usually proves of value to ratings, and frequently their activities result in a technical improvement that can be passed on to other stations in *BuAer News*. So be sure that all enlisted personnel in aviation receive *BuAer News*!

## Ball-Bearing Lubricator

### Varied Sizes Facilitate Greasing

NAS, BERMUDA.—A new type sealed ball-bearing lubricator to force grease into airplane bearings has been per-



BEARING LUBRICATOR IS MADE IN MANY SIZES

fectured in the A & R department at this station.

Various sizes of the device can be constructed to fit the different types of



GREASING JOB IS SIMPLIFIED BY NEW DEVICE

bearings which must be greased. It is usually possible to oil the part without removal or using a nut to hold it in place against the lubricator.

## TRAINING FILMS

### Request from the Chief of the Bureau of Aeronautics

All naval aviation activities, including Marine Corps and Coast Guard aviation and operating units, may obtain prints of training films by directing an official request to: The Chief of the Bureau of Aeronautics, Washington, D. C.



- a. *Functional Training Command*—via Training Command.
- b. *Operating Units*—via Air Force Administrative Commands.
- c. *Other activities*—direct to Chief of Bureau of Aeronautics.

NOTE.—Motion-picture prints will be supplied in 16 mm. width and slide films in 35 mm. These films will be shipped for permanent custody.

NAS and commands may arrange to route some films to nearby activities from station libraries or designate films for permanent custody of squadron or unit.

### Projectors (16 MM.)

For these, as well as 35-mm. slide film projectors, direct request to: Chief of BuShips via Chief of BuAer via Chief of BuPers.

### Portable Screens

Request from: Supply Officer in Command, Naval Supply Depot, Mechanicsburg, Pa., or Naval Supply Depot, Oakland, Calif. (No Bureau reference required.)

### Spare Parts for Projectors

For lamps, bulbs, etc. direct official request to: Commandant of the Navy Yard, New York or Mare Island. (Activities should obtain spare parts and accessories from local jobbers, where possible, until the present plan is completed to service requests through Navy channels.)

### Requests for Production

Requests for production of training films should be directed through regular channels to Chief of BuAer. It is essential that naval aviation activities follow the above procedure in securing film prints and equipment. The plan is designed to meet the special requirements of aviation activities in the most direct and efficient manner.

However, if an excess of grease leaks from between the bearing and the lubricator, a gasket cut from cardboard may be placed between them and the nut tightened. The grease is forced into the bearing with a standard gun through a zerk fitting.

[DESIGNED BY JAMES PERRY AYRES,  
AMM1c]

ERRATUM.—In our last, for *His Grace the Duchess of Dorset*, read, *Her Grace the Duke of Dorset*.

—*The Dublin Journal*.



"I wish the old man wouldn't be so danged dramatic about the dead line!"



## Lights Lick Tree Hazard

### Enable Pilots to Judge Altitude

NAS, PENSACOLA.—Trees surrounding the landing mat at the Naval Auxiliary Air Station, Bronson Field, form a natural hazard to night flying. As no provision had been made for permanent night-lighting equipment, one squadron invented its own system which has proved 100 percent successful.

As an aid for students in judging altitude, a series of three portable boundary lights erected on masts approximately 40 feet high were placed just inside the trees at the ends of each runway.

If a student can't see the red lights, he knows that he is too low, thus giving him ample time to pull up. Since this system has been in operation during night flying activity at the squadron, not one 5-A plane has received a scratch.

**BUREAU COMMENT**—This recipe sounds good and should prove of value to other units. Which brings up the point of disseminating information. Don't hide your light under a bushel; let others profit from your developments. BuAer NEWS is the best medium for spreading the word on ideas not so important as to require special reports.

## Preparing Map Surface

### Marine Group Develops Formula

MCAS, MOJAVE.—A Marine Air Group here has developed a simple recipe for preparing a combination situation map and overlay.

Results are obtained by spraying any map heavily with thinned airplane dope. (This MAG found the best was clear nitrocellulose, Navy Aero. Spec. D-12g; thinner T-25.) When it dries, the map can be rolled up. Original lines are not crowded or obscured, yet the surface will take vivid markings in any shade of nonalcoholic India ink. Marks can be rubbed off with a damp cloth and new developments or installations inked in. Chinese marking pencils also can be used effectively.

### BEST ANSWERS

To Questions on page 13

1.d 2.d 3.a 4.d 5.d

(Succeeds list dated May 20, 1943)

## LATEST NUMBERS OF ENGINE BULLETINS AND CHANGES

June 15, 1943

Engine	Pratt & Whitney		Wright		Date
	Bulletin	Change	Bulletin	Change	
R-985	174				Being issued.
R-1340	191				Do.
R-1340	192				Do.
R-1535	216				Do.
R-1830	314				Do.
R-1830	315				Do.
R-1830	316				Do.
R-1830	317				Do.
R-1830	318				Do.
R-1830	319				Do.
R-2000	31				Do.
R-2000	32				Do.
R-2000	33				Do.
R-2800	63				Do.
R-2800	64				Do.
R-2800	65				6-4-43.
R-2800	66				Being issued.
R-2800	67				Do.
R-2800	68				Do.
R-760			79		Do.
R-760			80		Do.
R-975			19		Do.
R-975			20		Do.
R-1820			326		Do.
R-1820			327		Do.
R-1820			328		Do.
R-1820			329		Do.
R-1820			330		Do.
R-1820			331		Do.
R-2600			83		Do.
R-2600			84		Do.
R-2600			85		Do.
R-2600			86		Do.
R-2600			87		Do.
R-2600			88		Do.
R-2600			89		Do.
R-2600			90		Do.
R-2600			91		Do.
R-2600			92		Do.
R-2600			93		Do.
R-3350			16		Do.
R-3350			17		Do.
Continental					
R-670			8		6-4-43.
R-670			9		6-9-43.
R-670			10		5-29-43.
Ranger					
V-770			16		5-24-43.
V-770			17		Being issued.
L-6-440			1		Do.

## Push in Right Place!

In spite of warnings against mishandling airplanes, "green" crews on carriers occasionally use the wrong system of moving them on the decks, shoving against movable parts instead of at regular places.

Some planes are provided with spots marked "push" for the information of deck crewmen. Shoving on the landing gear or the fixed part of the stabilizer might be used to propel a plane, but not the wing flaps and elevators,

as in the photograph.

The pilot of a plane which is abused frequently in this manner is likely to



get surprising response when the time comes for him to operate the controls.



LITIS, Link Instrument Training Instructors' School at Atlanta, prepares Waves for the job of teaching pilots radio navigation aids and flight patterns





## DORNIER Do 217 E2

### GERMAN BOMBER

Span—62 feet 5 inches.

Length—56 feet 5 inches.

Service ceiling—29,000 feet.

Approximate speed—325 m. p. h. at  
17,000 feet.

**DISTINGUISHING FEATURES**—Twin-engine, shoulder-wing monoplane. Blunt, tapered wings with round tips. No dihedral. Long narrow fuselage with thick nose. Dorsal turret in rear of the cockpit. Has twin fins and rudders set outboard of the tail plane.

**INTEREST**—This aircraft was introduced during the first part of 1942. It is used for level precision bombing, and has also been in action as a torpedo bomber against convoys. In addition, this Dornier operates as a dive bomber and for this purpose sometimes carries a novel "umbrella" type jettisonable diving brake in its tail, used to slow its speed. The Do 217's are very formidable airplanes and it takes the most modern of fighters to deal with them. They are the current Dornier bombers, the older Do 17Z being now an obsolete model.