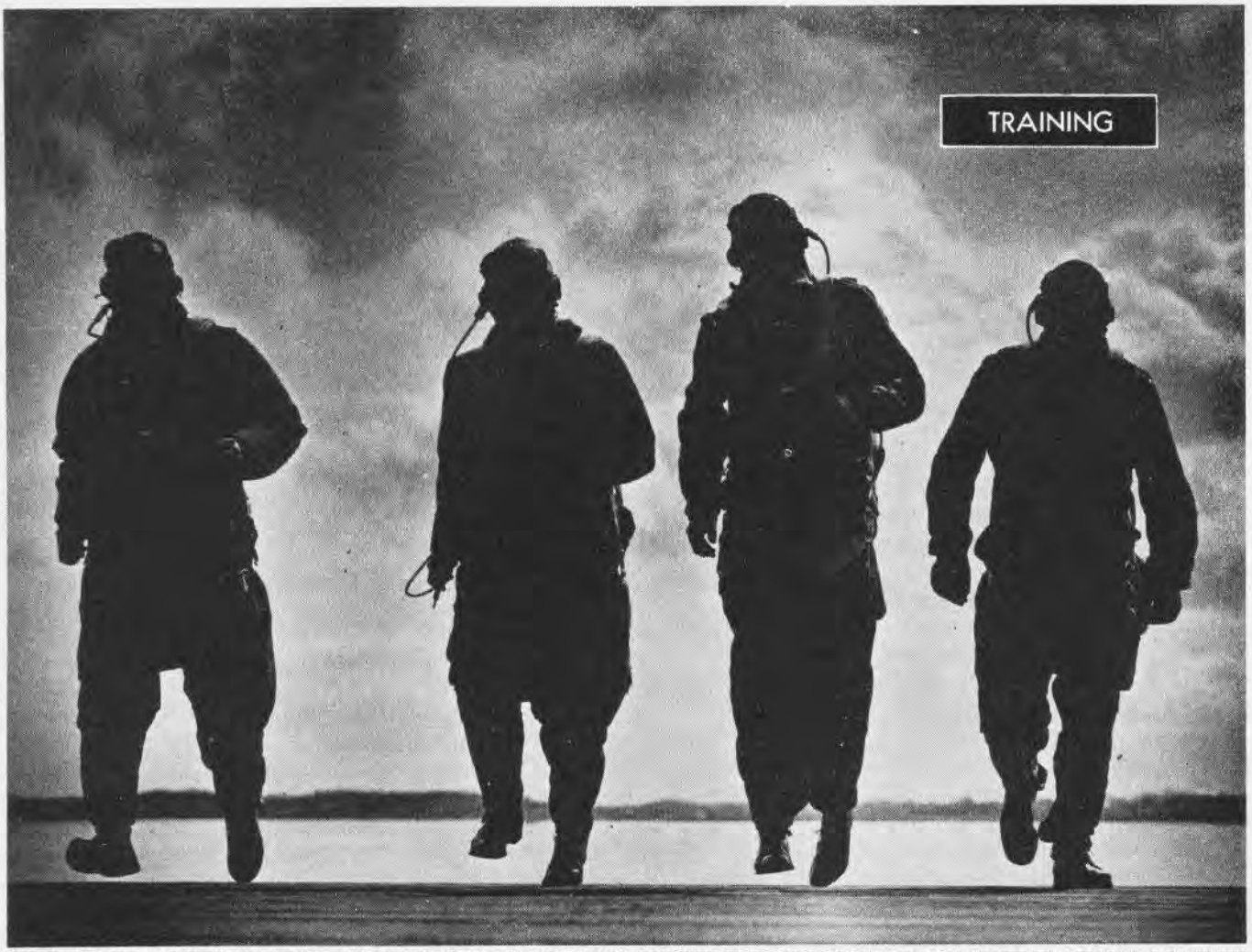
BuAER NEWS

Intermediate Flight
Navigation Training
Grampaw Pettibone

Aug. 1, 1943
RESTRICTED

With a moving star "ceiling" overhead and a projected "ground" underneath, the Link Celestial Navigation Trainer enables plane crews to learn teamwork without danger of accidents. The trainer is one of the Navy's new devices to teach navigation, vital in today's global war. (*Navigation Training*)



DURING INTERMEDIATE FLIGHT, NAVAL AVIATION CADET FLIES SNJ PLANES, BRIDGING THE GAP BETWEEN "YELLOW FIGHTERS" AND THE REAL THING

Intermediate Flight

Graduating from the "Yellow Fighters," Cadets Learn To Handle Hotter Models at Pensacola and Corpus

UPON completing primary training, the naval aviation cadet has been through 15 weeks of ground school, 12 weeks of elementary flight training at a CAA–WTS school; 11 weeks of physical toughening and academic instruction at a pre-flight school, and finally, 12 arduous weeks of primary training itself.

His ability to fly, to conduct himself as an officer, and to absorb the necessary ground instruction, has been proved. The mission of the 14-week intermediate training syllabus is to make the cadet a military pilot. The organization charged with this task is known as Naval Air Intermediate Training Command, and is headed by a rear admiral with headquarters at Pensacola.

The command is divided into three main activities: NATC Pensacola, NATC Corpus Christi, and the Instrument Flight Instructors' School, NAS Atlanta. Headquarters of the training centers at Pensacola and Corpus Christi are located at the main stations but the six auxiliary fields at each center are operated as separate commands, giving greater flexibility and freedom of action.

The first 4 weeks of intermediate are devoted to basic training. The cadet flies VSN type planes, larger and heavier enough than primary trainers to bridge the gap between the "yellow fighters" and the real thing. Formation and divisional tactics are practiced—take offs, join ups, break ups, and landings—until the cadet is thoroughly familiar with the new plane.

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He then moves on to basic instrument training, where he gets his first taste of the Link trainer, radio range flying, and flying on instruments "under the hood."

During intermediate, the cadet is assigned to the specialized type of aircraft he will fly throughout his career as a naval aviator. Many factors are carefully weighed before this assignment is made—personal preference, flight and ground school grades, reaction to altitude tests, etc. His specialized training embodies three main groups: VPB, VO–VCS, and VC, the latter being further subdivided into VF, VTB, and VSB.

If selected for VO–VCS the cadet is initiated to water landings and seaplane handling in N3N's on floats. OS2U's are used for scouting and spotting problems, gunnery and bombing runs, and navigation and instrument flights. During the course he is also checked out on the catapult.

The VPB group learns the fundamentals of twin motor operation in SNB's before actually taking to the water in PBY's. Some of these cadets continue their training in twin engine land types and are ultimately assigned to shore based patrol units using land planes. The VPB cadets concentrate

DILBERT WAS NOT ABLE TO TAKE CRITICISM

on long over water navigation and instrument hops, bombing runs, and free gunnery.

The VC group continues flying VSN type planes, no operational aircraft being used until operational training is reached. Simulated carrier landings, gunnery, navigation, instrument flying, dive bombing, torpedo tactics, and night flying are, however, practiced.

Each of the specialized squadrons handles one type of training only. Most of them operate from the "satellite" fields where students obtain valuable experience in squadron operation.

Ground training is as intensive and well rounded as flight instruction. Every method of teaching is utilized—lectures, exercises, motion pictures, and practical problems taking their turn. In addition to the scheduled instruction, flight time lost because of bad weather is used for additional ground training.

The muscles acquired in pre-flight training are not neglected in intermediate. The same emphasis on physical fitness prevails in the athletic program of calisthenics, obstacle course running, and swimming. Other types of recreational athletics are available to relax the tension which most of the cadets feel at one time or another.

The high point in the career of the cadet is his graduation from intermediate and the ceremony in which Navy Wings are pinned on his chest. He receives his commission as ensign, USNR, or second lieutenant, USMCR, but his training is not finished. The new officer soon finds himself on the way to operational training or to instructors' school.

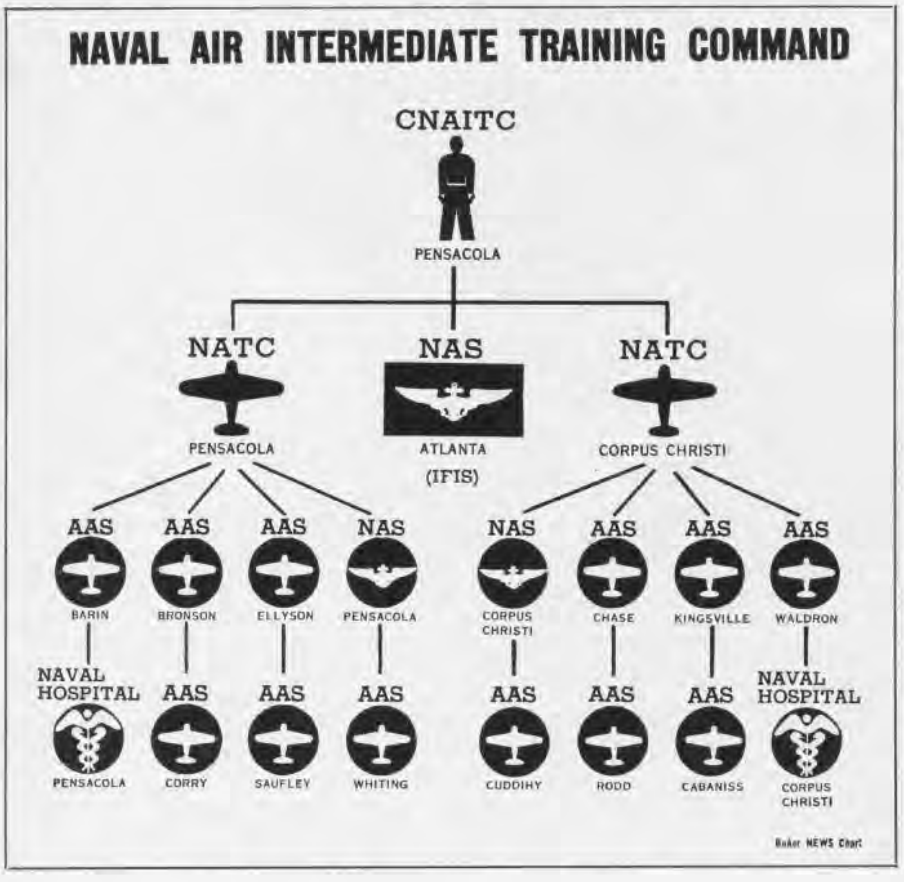
Most important of the instructors' institutions is the Instrument Flight Instructors' School at NAS Atlanta. It was established to spread the gospel of the "full panel" method of instrument flying, and to aid in publicizing this valuable technique throughout the fleet as rapidly as possible.

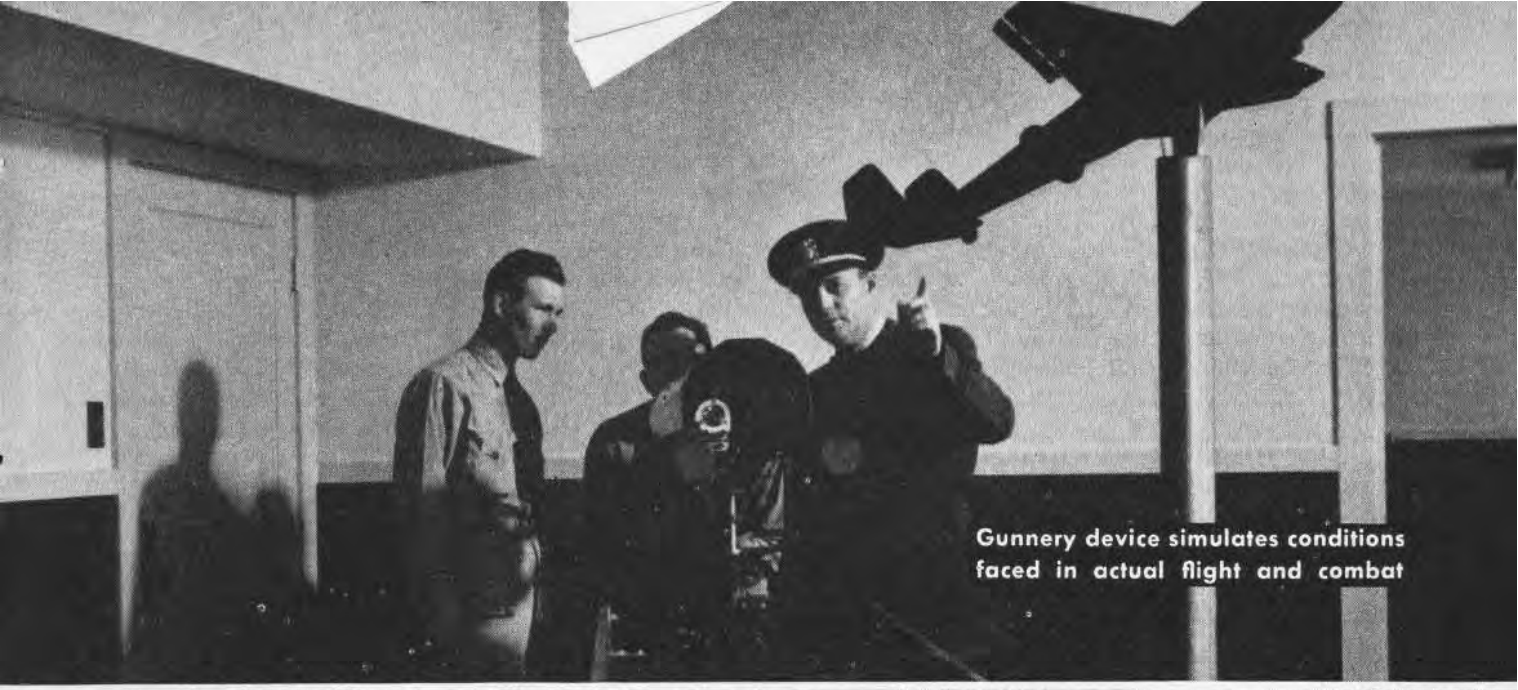
A secondary activity at Atlanta is the Link Trainer School where enlisted Waves receive instruction in operating Link trainers. Graduates are rated as specialist petty officers on completion of the course. Other Waves study to be control tower operators. A school for maintenance and operation of radio flying aids also is being established.

Two less widely known activities of the intermediate training command are the School of Aviation Medicine and the Photography School at Pensacola.

The School of Aviation Medicine is designed to *1*. Train medical officers as flight surgeons (2 months of aviation medicine theory and 6 weeks indoctrination in flying); *2*. Train reserve medical officers as aviation medical examiners (2 months of lectures and practical work in the aviation examining room); *3*. Train hospital corpsmen as aviation technicians (12 weeks of study and practical instruction). The job of the school is "to keep as many men at as many guns as many days as possible."

The Photography School gives a





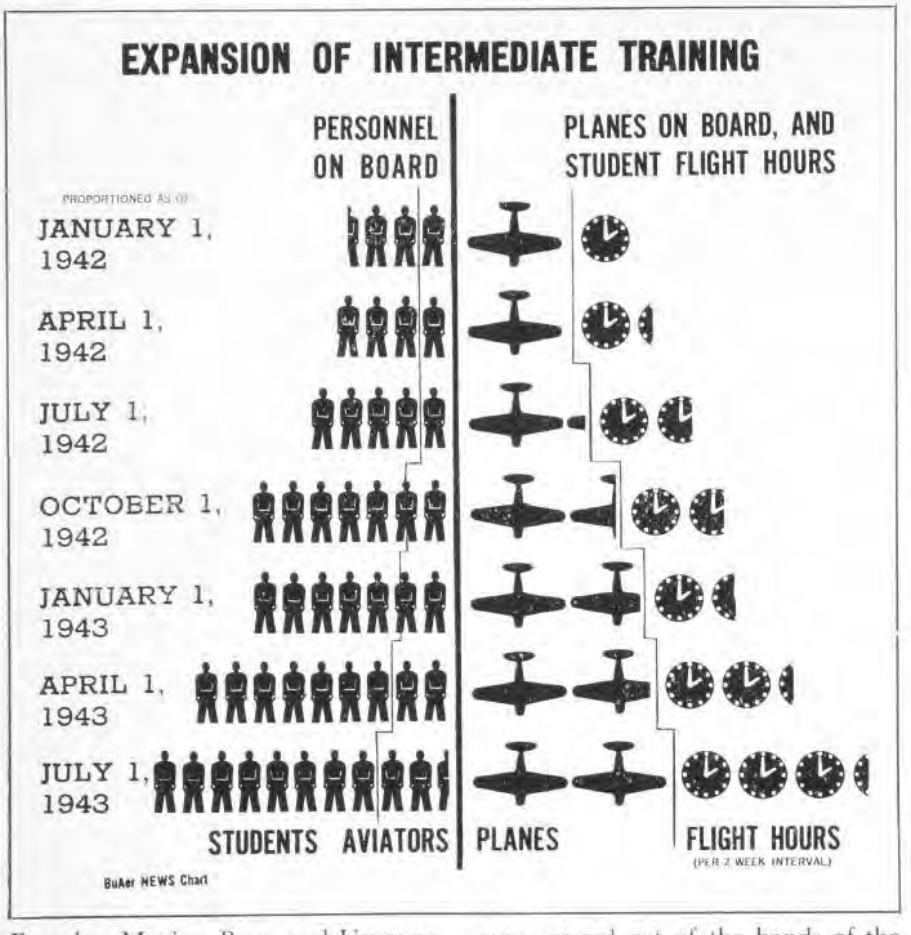
Gunnery device simulates conditions faced in actual flight and combat

Cadets at Corpus get oxygen mask instruction in low-pressure chamber

VO–VCS cadet takes initial hop in sturdy sea-going primary trainer

thorough course to officers and enlisted men in aerial photography, preparing them for duties as photographers and photographic officers with aviation activities.

Intermediate training has assumed an international flavor with the presence of cadets from the United Kingdom and France at Pensacola, and from Argentina, Brazil, Chile, Cuba, Ecuador, Mexico, Peru, and Uruguay at Corpus Christi. These men take the same training right along with our own U. S. cadets. Most of them have already been commissioned as officers, and they are organized separately from the cadet regiment, discipline being in the hands of their own officers.



HISTORIC PENSACOLA LINKS NAVY'S PAST WITH PRESENT

In 1825 a board, composed of three famous naval officers, Bainbridge, Biddle, and Warrington, was appointed by the Secretary of the Navy to select a navy yard site on the Gulf Coast. The importance of this strategical position in reference to the Caribbean was early recognized and the present location of the naval air station was chosen.

Little action was taken on the new site until 1836, when Congress voted appropriations for construction of what was then a modern navy yard. Shops were erected, docks built, and construction begun on many wooden war vessels.

At the beginning of the Civil War the Confederates took possession of the yard and held it until 1863, then evacuated the position. Fort Pickens, on Santa Rosa Island, however, never passed out of the hands of the Union forces. Retreating from Pensacola, the Confederates destroyed all buildings, including the hospital. Admiral Farragut took over the station and used it as a repair base for Gulf squadrons until the war's end.

Upon cessation of hostilities Congress again voted money for reconstruction of shops, and some of these buildings are still used to house air station activities. But the usual postwar period of naval depression set in, this being accentuated by obsolescence of wooden men-of-war. Finally in 1910 the yard was placed on the inactive list.

In 1912 a Marine Expeditionary Force was maintained at Pensacola. In October 1913 a Board of Aeronautics headed by Captain Washington Irving Chambers was appointed to formulate policies regarding naval aviation, a new development that was being explored for its combat possibilities. The board recommended that a permanent aviation station be established at the old navy yard.

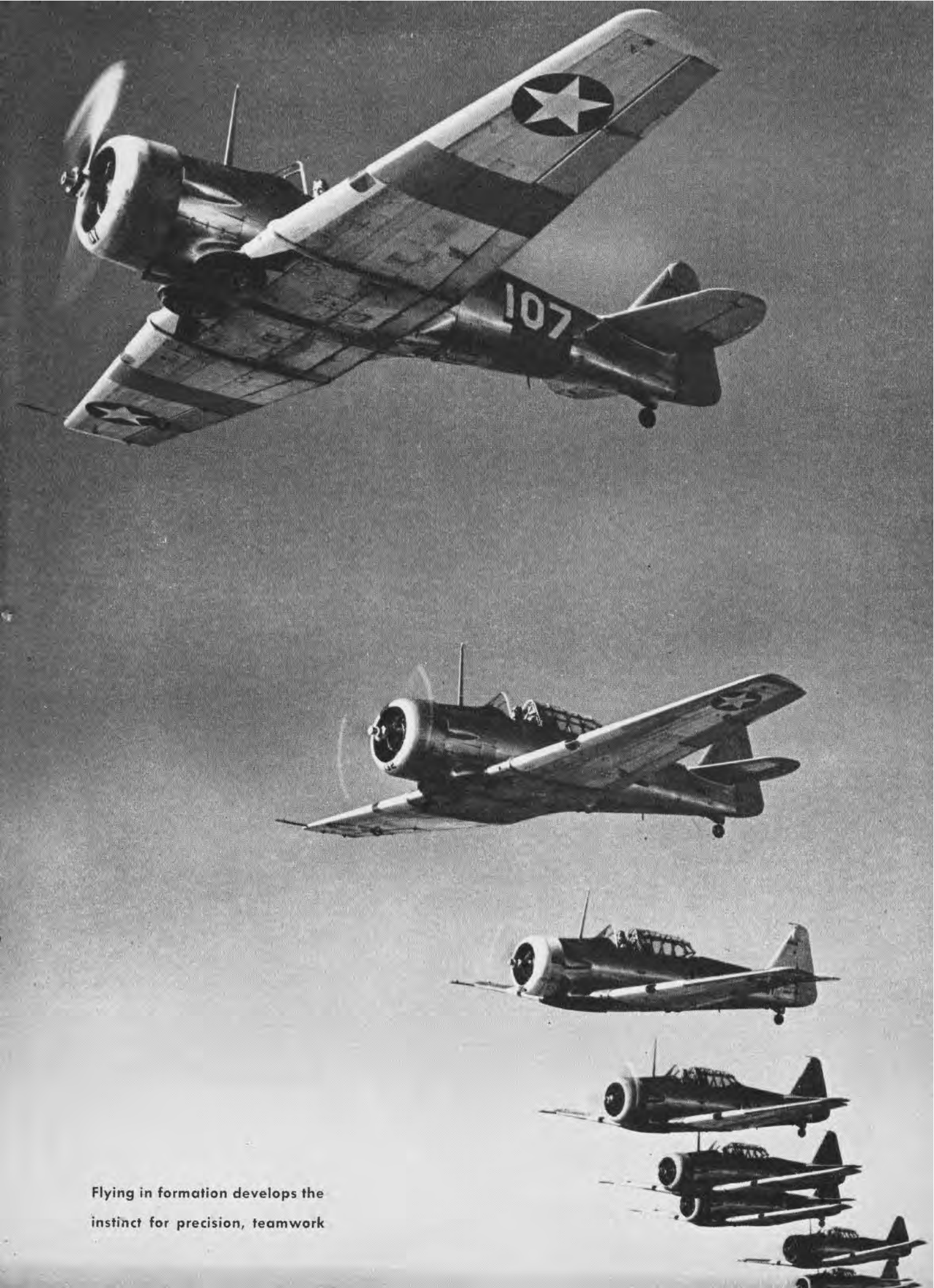
Up to this time the small aviation unit of the Navy had been constantly on the move between Annapolis, San Diego, and Guantanamo—shuttling that was anything but conducive to aviation training. Thus, in 1914, in accordance with the Board's recommendation, the Navy's entire aviation force was put aboard the old battleship U. S. S. *Mississippi* and the collier U. S. S. *Cyclops* at Annapolis and taken to the Pensacola Navy Yard. The *Mississippi* was assigned to remain in this base as aviation ship.

Lt. Jack Towers had charge of the flight school which began to function as soon as canvas hangars were erected. Planes at his disposal were eight Curtiss jobs fitted with OXX–2 engines, two Wright planes fitted with four-cylinder Sturtevant engines, and a Burgess flying boat powered with a 70 hp. Renault engine.

Spare parts were not to be had and much ingenuity was used to manufacture necessary materials. There were no skilled mechanics and pilots worked far into the night to make possible a short flight on the following day. Official funds were scarce and pilots frequently dug deep into their own pockets to make it possible for them to fly.

The first active expedition was dispatched from this station in 1914, when planes accompanied the fleet to Mexican waters. These planes did excellent work scouting behind the lines which surrounded Vera Cruz. During odd hours they carried on instruction work, officers of the fleet being students.

By 1916 a well-defined flight course had been established, though it was modified from time to time as crashes removed a plane from the flight list. The course was 18 months in length and comprised a very thorough ground school in addition to a fairly complete flight course.



Flying in formation develops the instinct for precision, teamwork

GRAMPAW PETTIBONE

Gas Line Air Locks

While cruising at 3,000 feet, the engine of an SBD–1 failed but started again at 300 feet after the pilot had shifted fuel suction several times. Upon regaining altitude to 600 feet, the engine again failed and a forced landing was made during which the airplane received major damage.

Investigation after the crash revealed that the left main tank was empty, but the right main tank was full. No defect was found in the fuel system. It was the opinion of the Trouble Board that: *a.* the accident was caused by loss of fuel supply occasioned by air locks in the fuel system; *b.* the air locks were caused by the pilot running the left main fuel tank dry and then shifting suction back and forth between the left and right main fuel tanks in his efforts to keep the engine running.

***BUREAU COMMENT*—When switching tanks after fuel exhaustion from one tank, make the action definite. Switch to a tank you know is full and work the wobble pump until fuel pressure is regained. Never haphazardly shift the fuel selector valve back and forth from a full to an empty tank because, as in this case, you will cause air locks to be formed. The pilot in the above case apparently was not sure which tank was full and which tank was empty. Don't let this happen to you.**

Poor Judgment Complicates Rescue

Without waiting to analyze the situation, the pilot of a J2F–5 landed immediately when he sighted an overturned scout seaplane with the crew sitting on the main float. This was a commendable display of zeal and prompt action, but under the circumstances, a rather poor display of grey matter. The sea was choppy, with a 25-knot wind blowing. The port wing tip float of the J2F was carried away on landing and the airplane capsized, leaving 5 men, instead of the original 2, to be rescued.

Two very good reasons why this landing should not have been made, in addition to the state of the sea, were that there was a destroyer only 15 minutes steaming away and the scout crew were in no immediate danger. This error in judgment resulted in the loss of one badly needed J2F–5 and, under slightly varying circumstances, might have resulted in the loss of all personnel involved.

Buckle That Safety Belt!

NATC, PENSACOLA.—Pilots in a patrol squadron at the air station here buckle their safety belts carefully since a solo student was thrown from the seat when his PBY waterlooped and practically was demolished.

The pilot said that when the plane started to waterloop to starboard, he kicked it to port and was thrown from his seat, the plane then completing its uncontrolled turn to the left.

When the plane stopped, both engines had been torn from their moorings, one resting in the navigation compartment and the other ripping through the starboard side at the radio compartment and falling to the water. Fortunately the occupants of the plane were not seriously injured and escaped in a rubber raft.

Grampaw Pettibone says:

One buckled safety belt probably would have lessened the severity of this accident. This is a good time also to repeat the warning about insuring that patrol plane crews are wearing life jackets and are safely stationed on all take-offs and landings.

Some people can learn only the hard way: by experience. Unfortunately, in aviation you don't always get a second chance.

Tie a String Around Your Finger

During dive-bombing practice, an SB2A pilot commenced a dive from 14,000 feet with his diving flaps closed. He failed to notice his error and continued in the dive until he reached the normal pull-out altitude, at which time he began his recovery. There was insufficient altitude to regain level flight, however, and the airplane crashed at high speed.

Grampaw Pettibone says:

There have been several accidents similar to this—all with the same result. A pull-out begun at normal altitude, from a dive made with dive flaps closed, is seldom completed above ground. The reason for this is that the speed increases so much when the diving flaps are closed that at least *twice as much altitude* is necessary in which to recover.

Wide-awake shipmates will check each other's dive flaps and warn a careless pilot over the radio, but the danger is too great to depend on this. It is your neck and it is your responsibility. This is such a simple thing, but it is terribly important, so get it firmly fixed in your mind.

OPEN DIVING FLAPS BEFORE EACH DIVE

UNORTHODOX LANDING.—This is what happened when a primary student failed to look out of both sides of his cockpit when he was coming in for landing. Your ball, instructors!

Torque Danger

The pilot of an SB2A–4 was making an approach for a landing. His left wing dropped at an airspeed of approximately 80 knots when the airplane was 50 feet above the ground. Full throttle was immediately applied to regain control, but this resulted in a

violent nose-down turn from which the pilot was unable to recover.

The Trouble Board considered the underlying cause of the crash to be due to the inexperience of the pilot and the immediate cause to be the reaction of the airplane to a sudden application of full power. This tended to roll the airplane to the left (due to torque), and at low speed there was not enough control to overcome this.

Grampaw Pettibone says:

That's right and it is much more serious to have your left wing drop than the right, because torque, due to the propeller rotation, always pulls to the left. In fact, torque would tend to pull up the right wing, if it were down.

This torque effect is especially noticeable in high-power airplanes and there isn't any easy cure for it. The best thing to do is never to let yourself get into such a predicament, particularly at low altitude. There is no need to be stalled in your landing approach 50 feet in the air.

A spot that requires special attention in this regard is carrier approach. Throttle and speed are reduced at this time and control is easily lost if a radical maneuver is attempted. Therefore, in a wave-off, be sure to e-a-s-e on your throttle and make your pull-up and turn-away as smooth and shallow as possible.

Regarding carrier landings, remember if your approach is lousy and you feel your position is dangerous, there is no disgrace in taking a voluntary wave-off.

But whatever you do, don't decide to take a voluntary wave-off after you get the "cut" signal. That used to be the unforgivable sin in carrier landings, but the number of trouble reports now listing this as the cause of the accident indicates this is no longer considered a crime. What's the matter!—the results of these accidents indicate that this rule is as important today as it ever was.

Grampaw Pettibone on Life Jackets

This is one item of equipment which is usually thought of as being just about foolproof and simple enough for a baby to operate. That's the bunk! This sort of thinking only leads to carelessness, and that *always* leads to trouble in aviation. Here's an example to prove it.

An SBD–4 went in off the carrier during a landing. Both pilot and passenger were wearing life jackets, but nothing happened when they pulled the toggles. One CO_2 bottle had been improperly seated and failed to function. One previously used CO_2 bottle had not been replaced. The oral inflation tubes on the other jacket had been left open and the CO_2 went right on out through these vents.

These easily preventable malfunctions resulted in one death and one near-miss. Believe me, life jackets are only as "fool" proof as the people who use them. A little indoctrination and well-placed pressure should insure that they are properly serviced, inspected and handled; and thus ready for use when needed. A life jacket that won't function may well become a death jacket.

One for Ripley

A pilot was seen to bail out of an F4F–4 at approximately 175 feet altitude. He didn't pull his parachute rip cord, but the parachute opened anyway and thereby saved his life.

Here is how it happened. When the pilot bailed out he was struck by the airfoil balance of the rudder. This balance ripped open the parachute pack, allowing the chute to stream. The airfoil balance was later found entangled in the parachute canopy which was ripped across the top.

Grampaw Pettibone says:

The usual statement about living on "borrowed time" doesn't apply in this case—this is stolen time.

While we're talking about parachute jumps, I'd like to issue a warning against standing up in the cockpit and pulling the rip cord before jumping. This has occurred several times, usually with fatal results; either the jumper is killed by the tail of the airplane or the parachute hangs up on the tail and the pilot crashes with the plane. This sort of thing doesn't happen because people don't know any better; it happens because some people get excited in an emergency and do the wrong thing.

The way to insure against this is to hold *mental* emergency drills. First, figure out the best method of getting clear of your particular type airplane under varying conditions. Then, when you are flying along with some extra time on your hands, hold mental bailing-out drills; imagine a serious fire, with the airplane in a right spin, and visualize in detail exactly what you would do. Then imagine other predicaments (collisions, etc.) in which you might have to jump—and mentally jump.

That's what the smart guys do, not only with parachute jumps, but with every other kind of emergency. Such drills are interesting, they keep you on your toes and help pass the time away—and, boy, how they pay off when the real thing happens!

CALLING ALL SQUADRON COMMANDERS

Can Your Pilots Navigate?

Faulty Technique Following Oil Leak

While engaged in section tactics at 6,000 feet, the engine of an F4F–3 began losing oil. The pilot attempted to reach a nearby field under full throttle, but the engine froze and an immediate forced landing resulted in the complete destruction of the aircraft.

BUREAU COMMENT—**This pilot made a serious error in applying full throttle after he realized oil was being lost. Normally, a reduction in r. p. m. and manifold pressure will allow more time for a forced landing. High r. p. m. and manifold pressure will hasten the depletion of the remaining oil and thus cause an early failure in the engine. When loss in oil pressure is experienced, an increase in throttle should be resorted to only in cases of emergency.**

Sonnet to a Sap

Dilbert is so dopey that his mind stands still.
Very short on talent; awful weak in skill.
When he flies a Catalina *or a swift* Corsair
He's never in formation, he's in his C. O.'s hair.
His take-offs are erratic, his glides too steep.
All the time he was in training
He kept instructors straining,
But they thought their plan of braining
That dumb cadet named Dilbert would have to keep.
So Dilbert's instruction was more than ample.
In any maneuver he'll give you a sample
For what it is worth: an awful example!
Better men than Dilbert is, have laughed at his mistakes
While learning not to make them. And that is what it takes.

Navy Planes Rescue Army Fliers Adrift

Patrol Craft Add to Their Long List of Accomplishments as Survivors of B-17 Crash Are Located after Five Days

IF the story of Navy patrol planes is ever pieced together and published in complete form, it will provide many volumes of exciting reading. Among the frequent accomplishments of the PBY is rescue work, for which the flying boat is justly renowned. Eddie Rickenbacker, adrift on the Pacific, is alive today, and his crew with him, thanks to the bloodhound tactics of a Navy OS2U on a mission of search.

Navy patrol pilots know, however, that for every stirring page of exploits, hundreds must be devoted to humdrum duty. The popular conception of glamour soon fades out in the long hours of listening to the drone of an engine over monotonous tracts of water, often under a scorching sun.

NAVY OS2U LOCATED EDDIE RICKENBACKER DOWNED IN PACIFIC

This picture tells the story of an Army brigadier general and his staff of 15 whose B–17 was forced down in the Pacific, sinking so quickly no supplies could be broken out. Army patrol pilots spent 5 days in an extensive search without success.

Contact finally was made with the lost party by a Navy PBY. Afloat in three rubber rafts, the survivors had been without food and water the whole length of time. Occupants of one raft, including the general, were taken aboard the PBY, and another plane was called to pick up the others.

RESCUE BY PBY OF ARMY GENERAL AND HIS STAFF. THEY SPENT FIVE FOODLESS, WATERLESS DAYS IN SOUTH PACIFIC ON THREE RUBBER RAFTS

DID YOU KNOW?

Wrist Watches for Pilots

Supply Points Will Distribute

Bureau of Aeronautics has initiated procurement of wrist watches for distribution to all naval aviators, naval observers, and naval pilots. Watches will be issued in accordance with joint Bureau of Aeronautics and Bureau of Supplies and Accounts circular letter of April 6, 1943, which is being amended to provide for addition of wrist watches to optional items of flight clothing listed on enclosure (A) thereof.

Delivery is to be made by the contractor to Aviation Supply Annex, Norfolk, Aviation Supply Annex, Oakland, and Naval Aircraft Factory, Philadelphia, in a 40–40–20 ratio. Delivery schedules call for initial delivery of 5,000 watches in July 1943, and delivery rate of 10,000 per month thereafter until the contract has been completed.

"Shortage" of Free Gunners?

BuAer Asks Review of Jackets

Information reaching the Bureau of Aeronautics indicates that new aircraft squadrons are being formed without sufficient trained free gunners to man all gun positions completely.

On the other hand, reports are continually received showing that large numbers of enlisted personnel—graduates of free gunnery schools—are assigned to duties other than for which they were trained. This apparent inadvertent diversion of free gunners has resulted in their assignment to fighter squadrons and to various other duties such as manning a boat, towing an antisubmarine target, etc., for unduly long periods of time.

Aircraft gunners are no different from other aviation specialists, such as radiomen, in that their proficiency drops rapidly without constant practice.

The Bureau appreciates that it is a Commanding Officer's prerogative and duty to utilize personnel under his command to accomplish whatever tasks are assigned him, yet is unable to reconcile the shortage of free gunners when there are approximately 3,300 men graduating monthly from gunnery schools and units.

The Bureau suggests that a review of enlisted personnel jackets may prove profitable in uncovering trained aviation free gunners.

Americans to Fly Higher

Chemical Ingredient Aids Equipment

American long-range bombers soon will be able to fly higher into the stratosphere and stay there longer through the use of a chemical ingredient which increases by 50 times the high altitude life of carbon brushes for airplane generators.

This announcement was made recently by the Westinghouse Electric and Manufacturing Company. The discoverer of the ingredient, Dr. Howard M. Elsey, research chemist for the company, said: "Generators equipped with treated brushes are now able to deliver electric power at normal capacity for 100 hours or more above 30,000 feet. Untreated brushes wear out in an average of 2 hours, and they may fail in a few minutes if the generator is called upon to deliver large amounts of power."

New Carrier Designations

On 10 June 1943 the SecNav authorized the following Aircraft Carrier designations effective 15 June 1943.

CV — *Aircraft Carriers*
These include all the 27,000-ton class (*Essex*) plus all existing aircraft carriers built as such as the *Saratoga* (CV3).

CVB—*Aircraft Carriers, Large*
Class would include any carrier larger than CV.

CVL—*Aircraft Carriers, Small*
10,000-ton class converted from former CL's.

CVE—*Aircraft Carriers, Escort*
These include the conversions to auxiliary aircraft carriers from merchant vessels, tankers, and the "Kaiser" built vessels. These vessels are now reclassified as "Combatant Ships."

"Confidential Bulletin"

New Periodical To Publish Data Above Restricted Class

BuAer's Training Division is preparing for monthly publication a *Confidential BuAer Bulletin*, the first issue of which will be distributed about August 1st.

Need for a confidential publication stems from numerous inquiries being made by aviation activities for additional information on a wide variety of subjects, ranging from design and development of planes and power plants, armor and arming arrangements, numbers and types of planes. Being of confidential classification, the *Bulletin* will contain information that cannot be published on the restricted pages of *BuAer* NEWS.

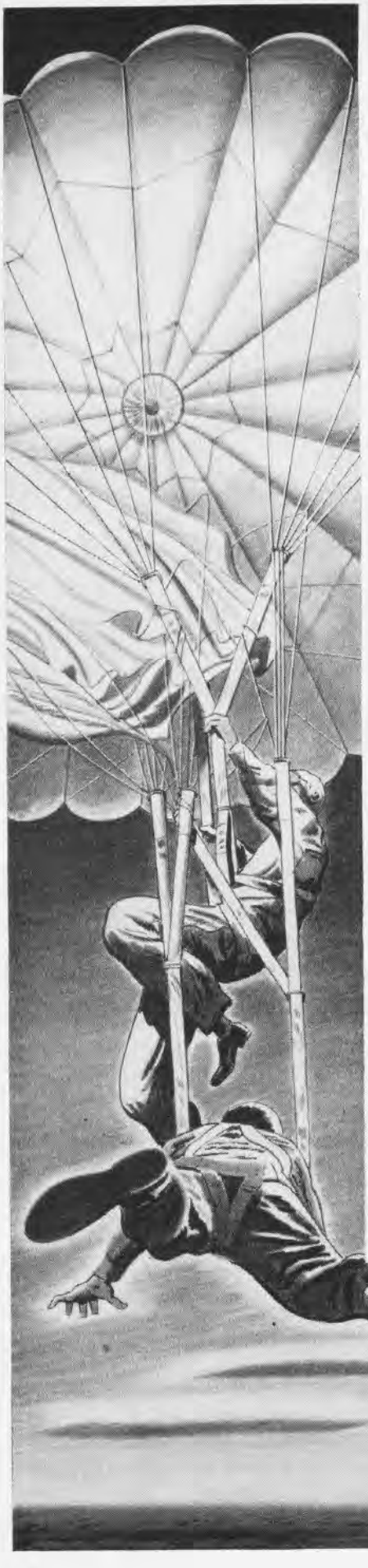
Nonconfidential material should be sent to *BuAer* NEWS, as usual.

To Start New Orleans-Guatemala Line

The Pan American Airways states it will start thrice-weekly service between New Orleans and Guatemala City soon, one stop to be made at Merida, Mexico. Boeing Stratoliners will be used. The route is approximately 1,075 miles, with the travel time about six hours. Proving flights are now under way. "Passengers from Chicago will be able to reach the Canal Zone in 21 hours," PAA says.

TWO RIDE ON ONE CHUTE

Escape Follows Air Entanglement—Strong Onshore Breeze Helps



NAS, MIAMI.—A BT–1 from this Station crashed into the sea about 100 yards east of the town of Hollywood. Both the occupants of the plane survived the accident by parachuting. The circumstances of the case are unusual, but fortunate for the survivors.

Ensign G., pilot, and E. L. Elwell, AM2/c, passenger, were conducting dive bombing on the maneuvering target boat. On one dive Ensign G.'s plane, a BT–1, was seen by the chase pilot to be heading normally except that it appeared to have considerable excess speed.

At the bottom of the dive, Ensign G.'s plane pulled out normally and started to climb away from the target in a shallow left turn. At this point, about 1,200 feet, the plane started to roll slowly to the right and when on its back, one parachute was seen to blossom out below and behind it.

The chase pilot immediately headed for this chute and upon closing in discovered that there were two bodies, not one, suspended from it. Furthermore, the canopy and shrouds of the lower individual were tangled about the body of the upper. The chute with its two passengers floated down into the water about 300 yards offshore.

Upon striking the water the chute did not spill, but commenced to act as a sail in the strong onshore breeze, towing the two airmen through the water. Elwell, the passenger, whose chute had opened, rode along on his back somewhat in the manner of a surfboard.

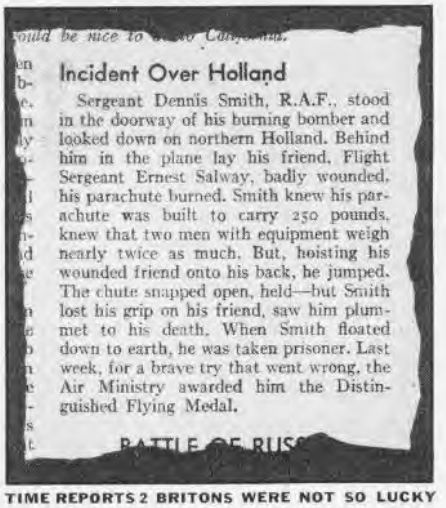
Goes Under Water

Ensign G., extremely lucky up to this point, was dragged along beneath the surface like a drogue. The chute, the surfboarder, and the sea anchor continued on into the beach at a good clip.

When it got sufficiently close, many willing hands assisted the two airmen to dry land. Ensign G.'s heart had stopped, it was found, but he was revived by timely artificial respiration, and suffered only a few broken bones. Elwell was merely shaken up and bruised.

Neither Ensign G. nor Elwell could give a coherent account of what had occurred. The former, in fact, could recall nothing of the accident. It is supposed that the pilot failed to split his flaps, and in his pull-out either blacked out or tore off an aileron, or in some manner damaged the plane to the extent that he thought it necessary to abandon the plane.

Both occupants must have jumped together, it is supposed, and Elwell hit Ensign G.'s chute in such a manner that he became completely entangled—a fortunate occurrence for Ensign G., since he was apparently unconscious throughout the occurrence.



ould be nice to ... California.

Incident Over Holland

Sergeant Dennis Smith, R.A.F., stood in the doorway of his burning bomber and looked down on northern Holland. Behind him in the plane lay his friend, Flight Sergeant Ernest Salway, badly wounded, his parachute burned. Smith knew his parachute was built to carry 250 pounds, knew that two men with equipment weigh nearly twice as much. But, hoisting his wounded friend onto his back, he jumped. The chute snapped open, held—but Smith lost his grip on his friend, saw him plummet to his death. When Smith floated down to earth, he was taken prisoner. Last week, for a brave try that went wrong, the Air Ministry awarded him the Distinguished Flying Medal.

BATTLE OF RUS...

TIME REPORTS 2 BRITONS WERE NOT SO LUCKY

Lotion Tempers Sunburn

Navy Carefully Selects Preparation Against Rays

To help aviators forced down at sea avoid serious sunburns, the Navy is equipping all new parachute and life raft safety kits with a 3-ounce tube of the best sunburn lotion obtainable.

As an added ounce of prevention, the Bureau suggests that men on duty in tropical areas acquire as heavy a sunburn as possible during any idle moments they may have. This will help protect them against blisters and perhaps fatal sunburn when adrift in life rafts.

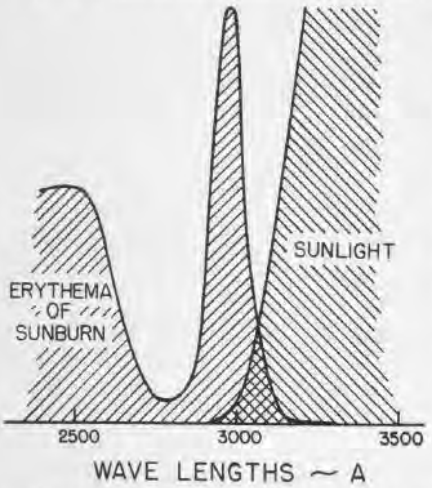
The lotion was selected after scientific tests of 12 different commercial types of creams by the Naval Medical Research Institute.

Thick Skin Protects

Contrary to common belief, the tan shade one's skin acquires from sunburn is not what protects it from worse burn, but the thickening of the dead layer of skin on the outside. This acts as a semiopaque screen to the live cells underneath.

Medical authorities at the Institute state that lotions are almost worthless unless applied before a sunburn is received. Their value, it was said, lies in the fact that they shut out wave-lengths of sunlight which produce burn.

It is commonly believed that salt



water increases susceptibility to sunburn and repeated exposure to sunlight may lead to skin cancer. Reports from survivors of torpedoings or plane crashes indicate that it is a mistake to remove clothing while adrift on rafts since this leads to severe sunburning and suffering.

Where possible, survivors are counseled to use a sailcloth or piece of parachute as a sunshade. Even on a hazy or foggy day, one can be badly sunburned because the minute water particles do not absorb the sunburn-producing light waves.

Use of sulfa drugs in war areas has resulted in a new medical finding that men using them are more sensitive to the sun's rays and sunburn.

Army Technical Orders

To eliminate extra paper work and unnecessary delay in filling requests for Army Technical Orders (ATO's), field activities should write to the Bureau of Aeronautics, Publications Section, just as they would for any other technical publications pertaining to maintenance, servicing, and overhauling of airplanes, engines, accessories, etc. The same procedure applies to requests for Army Field Manuals (FM's) and Army Technical Manuals (TM's) published by the Adjutant General's Office. Naval aviation field activities have been ordering directly from the Commanding General, Air Service Command, Technical Data Section. These requests are simply forwarded by the Air Service Command to the Bureau for action.

Navy Conserves Rubber

Savings in Radio and Electrical Equipment

The Navy is setting an example for civilians in conserving limited rubber supplies. Two million pounds of crude rubber is being saved by BuAer in substituting reclaimed and synthetic rubber in the manufacture of self-sealing tanks for airplanes. Here are some estimates of savings now being made:

Self-sealing fuel hose—a saving of 350,000 pounds of crude rubber in the 1943 aircraft program by use of synthetic rubber. Aviation flying boats, suit bags, life jackets, oxygen equipment, wading suits, rain suits, and life rafts—a saving of 350,000 pounds of crude rubber will be accomplished in the 1943 program by use of substitute materials. Parachute seat cushions—a saving of 500,000 pounds of rubber accomplished in 1942 by the substitution of hair for rubber.

The Bureau has outlined a conservation program for 1943, which it expects will save from 400,000 to 500,000 pounds of crude rubber in radio and electrical equipment alone.

LETTERS

Sirs:

During my visit to the Eastern Aircraft Corporation plants at Trenton and Linden, New Jersey, I was made acquainted with a very unique happening that resulted in a contribution to the Navy Relief Fund of $5,334.38.

As an incentive to complete the Linden plant's production on schedule, the management designated the last plane due in June as *Miss Victory*. The plane was painted with aluminum paint to make it easily identifiable and incentive signs were placed on it. One of the workmen in the plant, Leo Zebolfski, an electric installer, was passing the plane and found a penny on the floor close to it. He felt that this might be a good luck token for the pilot and affixed it to the fuselage with a piece of scotch tape.

Another workman, L. E. Duda, added a one-dollar bill. Within thirty hours the ship was completely covered as is shown in the picture with the total sum mentioned. By that time the ship had moved off the production line, so it became necessary to place oil cooler cans to collect remaining contributions which the workers wished to make. These amounted to $76.84, and will be used to buy cigarettes for the plane's crew.

Due to the fact that this was an unplanned activity, the question arose as to the disposition of the money. A meeting was held with representatives of the management and the shop committee of the union. It was decided that no better use could be made of the fund than to contribute it to the Navy Relief Society.

RALPH E. DAVISON, *Rear Admiral.*

Sirs:

We have been receiving, infrequently, copies of *BuAer* NEWS which we read with a great deal of interest, as we believe it contains very informative articles.

It is our request that this Squadron be placed on the permanent mailing list and we further request that back issues starting with January 1, 1943, be sent to us.

SQUADRON COMMANDER
CV-33

¶Our distribution list recently was analyzed and increased to provide for the rapid increase in squadrons. CV-33 and other activities hereafter should receive an adequate number of copies regularly—or tell us about it.

NAZI CREWMEN MAKING BREAK FOR AA GUNS ON FORWARD DECK CROUCH AS DEPTH CHARGE FROM PLANE UPHEAVES SURROUNDING WATER

NAVY PLANES PLAGUE U-BOAT

Nazi Resistance is Nipped as Naval Aviators Link Bombing Attacks with Strafing

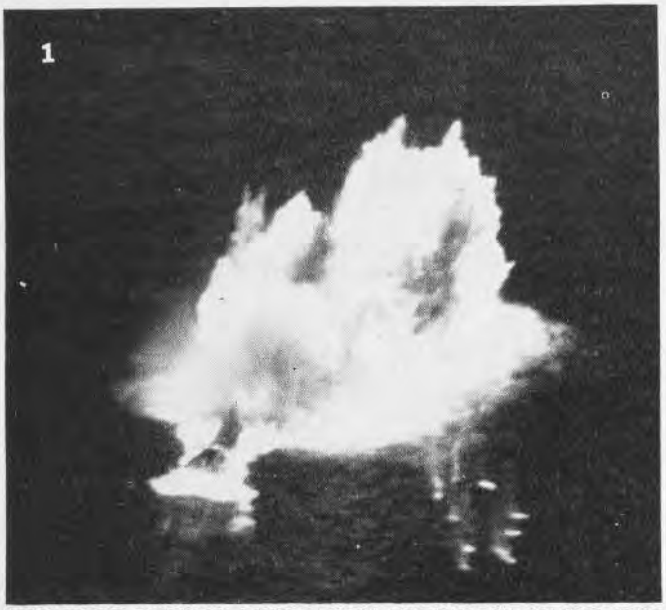
Gunnery Plays Leading Part in Anti-Sub Drama

EVIDENCE that the U-Boat menace is cracking under an intensified Allied drive appears in these Fleet Air photographs. Circumstances and net result are similar to those in the submarine story in the previous issue of *BuAer* NEWS.

The action took place in the Atlantic where Navy planes subjected a German sub to repeated attacks with depth bombs and strafing. Activity lasted for twenty-three minutes, after which the submarine blew up and sank, seventeen of its crew being rescued by an American destroyer.

The ill-fated sub was spotted by hawk-eyed Navy airmen as it skulked below the surface, only its nose protruding. As the craft came into full view, it was rocked by depth charges. Crewmen crawled out of the conning tower to man the guns, but their attempt was frustrated by strafing from Navy planes. The bombers, meanwhile, renewed their attacks with depth charges.

The sub finally was caught in the midst of an explosion, and breaking in two, slipped below the surface. The final chapter is shown as Navy planes encircled the spot where the sub made its farewell. Wake in background shows zigzag path craft took.



NAVY PILOTS ANNOUNCE ARRIVAL WITH UNORTHODOX CALLING CARD

SCENE IMMEDIATELY AFTERWARD REVEALS ALMOST FULL LENGTH OF SUB

SUB TRIES ZIG ZAG MANEUVERS IN EFFORT TO ESCAPE DEPTH CHARGES

STRAFING BY NAVY GUNNERS RENDERS THE NAZI AA WEAPONS USELESS

CAUGHT IN EXPLOSION, SUB BREAKS IN TWO AND DISAPPEARS BELOW

THEIR JOB FINISHED, NAVY PLANES ENCIRCLE SPOT WHERE SUB WAS

SHORE STATIONS

Unique Seaplane Ramp Built

Cost and Time Saved

NAS, BERMUDA.—A unique seaplane ramp utilizing no structural steel has been completed at this station at a cost less than half the appropriation set aside for the job. The time in building was half the time needed to complete two other smaller ramps by the more conventional method of sinking large piles.

Explained in simplest terms, the ramp is a concrete barge, 100 by 80 feet, built on land, floated into position and sunk. To construct it, a large pit, whose bottom was two feet below mean low water, was dug and diked on the seaward side.

After a layer of sand and rock was made on the bottom of the pit, the bottom slab of the ramp was poured. The second step was to bulkhead the ramp into seventy compartments, making each bulkhead airtight. The top slab of the ramp was not formed until the ramp had been towed from its former drydock to deeper water.

This feature of its construction caused some headaches among the builders, however, as the waves threatened to engulf the ramp because it lacked a cover. (The builders, looking back, now feel that it would have been better to dig the pit deeper and place the top slab while the ramp was still on the beach.)

By building up the sides with planking, they were able to keep out the waves until concrete could be poured. Dredges worked on the section of the waterfront, meanwhile, putting a 10 percent grade on the bottom so that the ramp would rest easily in place.

When it was towed into place and seacocks opened and compartments filled with water, the ramp settled into place with the outboard edge 10 feet below mean low water.

One of the most difficult problems was the pouring of a 35-foot section which ties the ramp to the beach. Much of the pouring was done under water. Rising tides and waves threatened to spoil the concrete at the water edge by rippling it while it was soft. The action was counteracted largely by diking the area with sandbags.

In this type of construction, cost is reduced by eliminating the expenses of divers and dredges for long periods of time. The cost of heavy structural steel also is done away with. A ramp constructed on shore has the added advantage in that it can be built anywhere and towed to the desired site.

Oh, You in There?

High "Wind" Stumps Student

NAS, SANFORD, FLA.—The student pilot was busy taking drift sights and working out his problem under the hood of the Navi-Trainer. He was concentrating on instruments and had no thoughts of adverse weather.

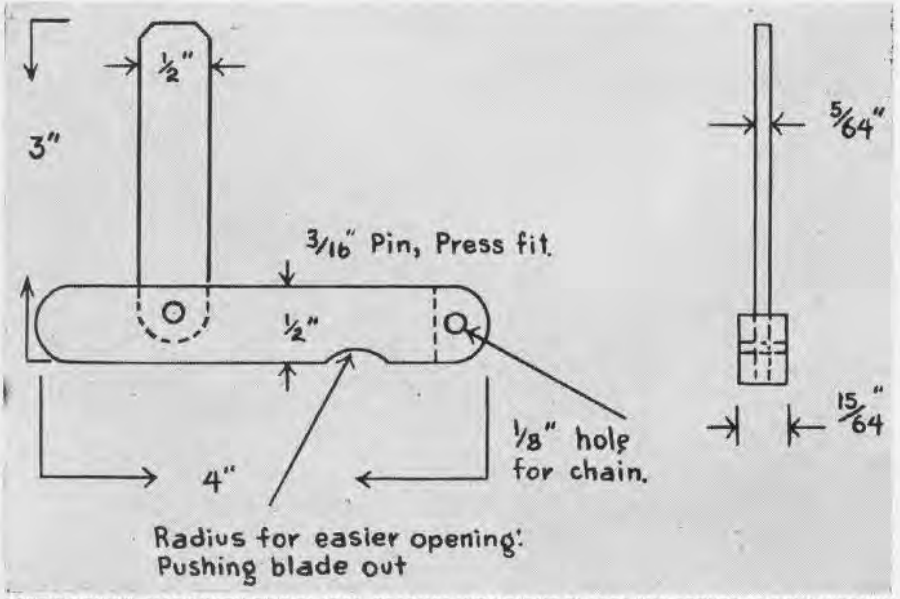
Suddenly something went wrong. The trainer turned around, picked up speed, careened wildly across the hangar deck. The student pilot tightened his grip, waited for the crash.

No crash came. Cautiously he lifted the hood, peered out. A husky aircrewman with a passion for neatness and a horror of "articles adrift" was lashing the little trainer to a stanchion in a secluded corner of the hangar.

The student pilot swears he had at least a 90-knot cross wind.

"I thought of sending some of these cigars to the front."

"How can you be sure the Nazis will get them?"



SCREW DRIVER, MADE WITH TWO BLADES, REACHES INTO TIGHT PLACES AND SERVES AS DZUS WRENCH

Little Screw Driver

Handle Reaches Tight Spots

MCAS, EL CENTRO.—A handy little screw driver which serves also as a Dzus wrench to get into tight places under hot cowlings has been devised at this station.

By getting a better grip on the screw, the device has less chance of shearing the slot in the screw. Since it has no long handle, it can be used in tight places where a regular screw driver would not fit. It can be made with two blades by changing a few dimensions, with one blade for larger Dzus screws. Half-inch long ends are either welded or pinned in allowing for the length of the blade.

[DESIGNED BY CORPORAL J. VETICK]

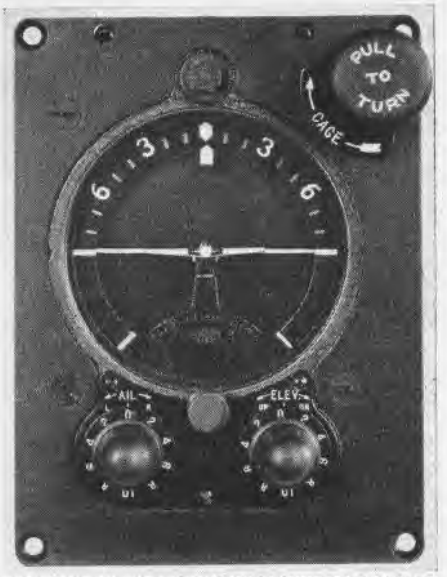
Automatic Pilot Necessary?

Bureau Cites Need in Combat

MCAS, CHERRY POINT, N. C.—Keeping the bank and climb unit of the automatic pilot of SBD's in working order has been difficult in one of the squadrons here.

Pilots do not agree on the necessity of the automatic pilot as an accessory to these planes. Should it be decided that the automatic pilot is superfluous, it would be possible to install the type of horizon used in the SNJ which is believed superior. Some improvement has been noted in operation of the bank and climb units since a recent visit of a Sperry representative who offered several useful hints on automatic pilot maintenance.

Another controversy revolves around the substituting of post and ring sight in favor of telescopic sight. A decision may be unnecessary with the advent of the SBD–5 electric sight.



BANK AND CLIMB UNIT, MARK 4 AUTOMATIC PILOT

BUREAU COMMENT—This is one of the first reports received by the Bureau in which pilots did not consider the automatic pilot to be a combat necessity. Since it is believed that the majority of pilots consider it a necessity, they will continue to be specified for VSB planes.

Naturally the ordinary gyro ho… longer life and requires less mainte… the bank and climb unit of the autom… simply because the latter has bank a… pick-off system attached. However, … proper use and maintenance, the automatic pilot should perform satisfactorily for a period of time comparable to that of the gyro horizon. It is therefore believed that the automatic pilot should not be replaced with a directional gyro and gyro horizon.

The little green booklet, *Let Elmer Take Over*, which can be obtained from the Aviation Supply Officer, Philadelphia, will prove invaluable in keeping the automatic pilot in good condition.

The Mk 8 illuminated sight is now the standard sight for VSB airplanes.

French Master English

Shorter Tests Quicken Grasp

NAS, DALLAS.—Flight problems have been solved with ease by Free French students in flight training at this station, but language has been a difficulty. When students' examination grades kept falling below average, a survey was made and it was discovered that while French students could speak and understand spoken English, their ability to read lagged. They were unable to translate written English fast enough to complete a normal test.

Tests were shortened and a list of technical word translations in each subject compiled. Now the French cadets are wagging an English tongue with the same ability with which they executed their first take-offs.

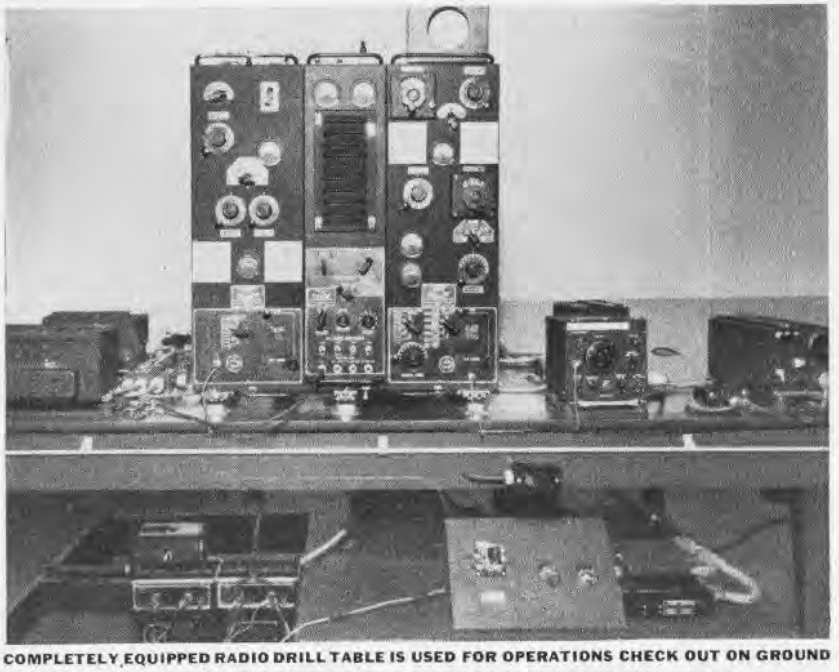
Piper Cub Outsmarts SNJ

Slow and Maneuverable, It Finds Wrecked Plane

NATC, PENSACOLA—One of the Piper Cubs proved its worth here recently when it located a wrecked plane after several faster SNJ's had failed to do so.

The SNJ's had searched for 2 days when the Cub joined the quest. Due to the Cub's slower speed and extreme maneuverability, the pilot was able to spot the missing plane by circling in slow turns and drifting downwind into the area where the plane was believed to be.

The vegetation surrounding the crashed plane was so dense that the same pilot, over the territory the following day in an SNJ, couldn't see the remains of the plane even though he knew its exact location.



COMPLETELY EQUIPPED RADIO DRILL TABLE IS USED FOR OPERATIONS CHECK OUT ON GROUND

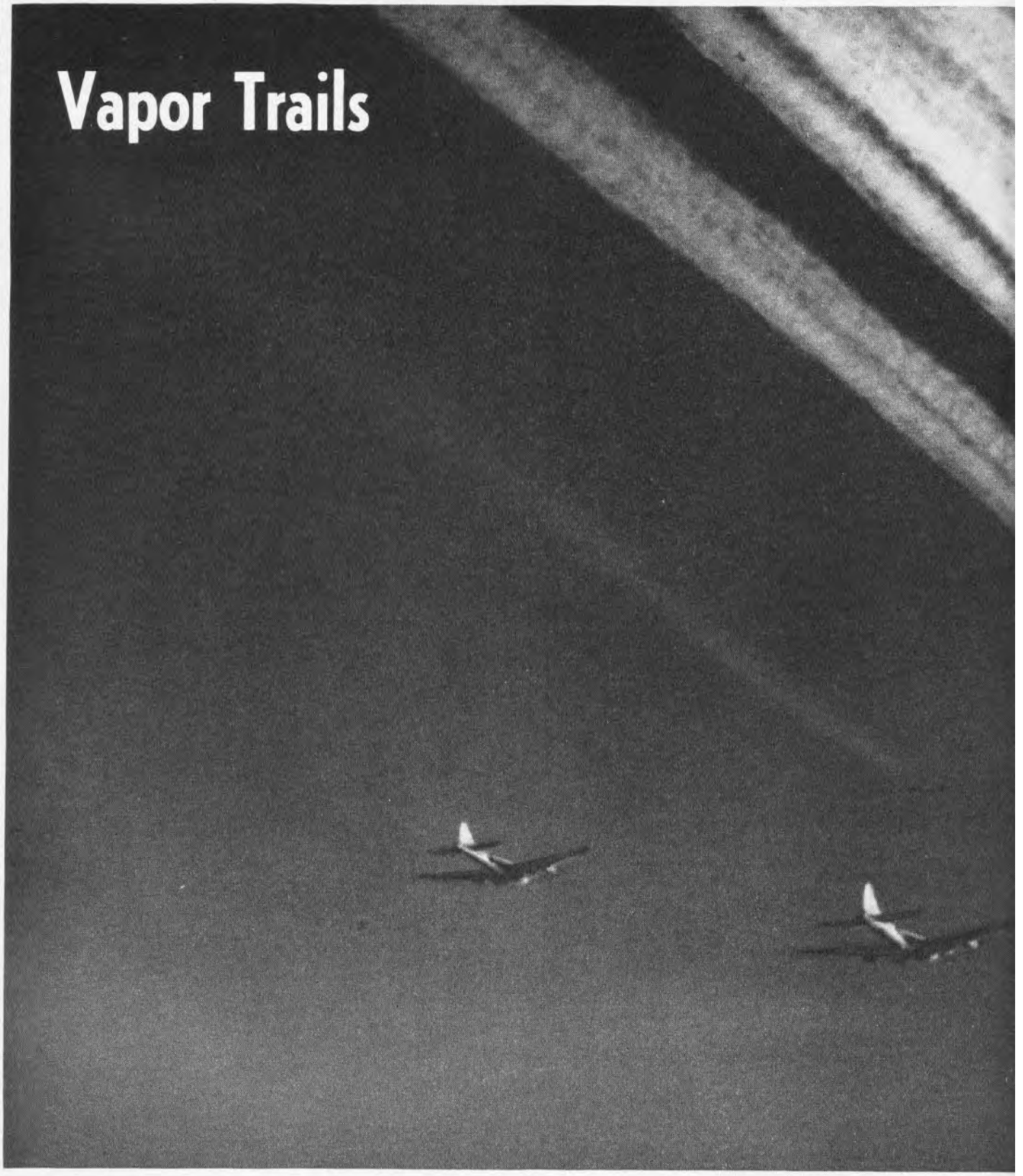
Check Out in Radio Equipment Speeds Mastery

NAS, JACKSONVILLE.—A patrol bomber squadron here has improved its training course for radiomen and pilots by mounting a complete set of spare radio gear on a table for practice operations.

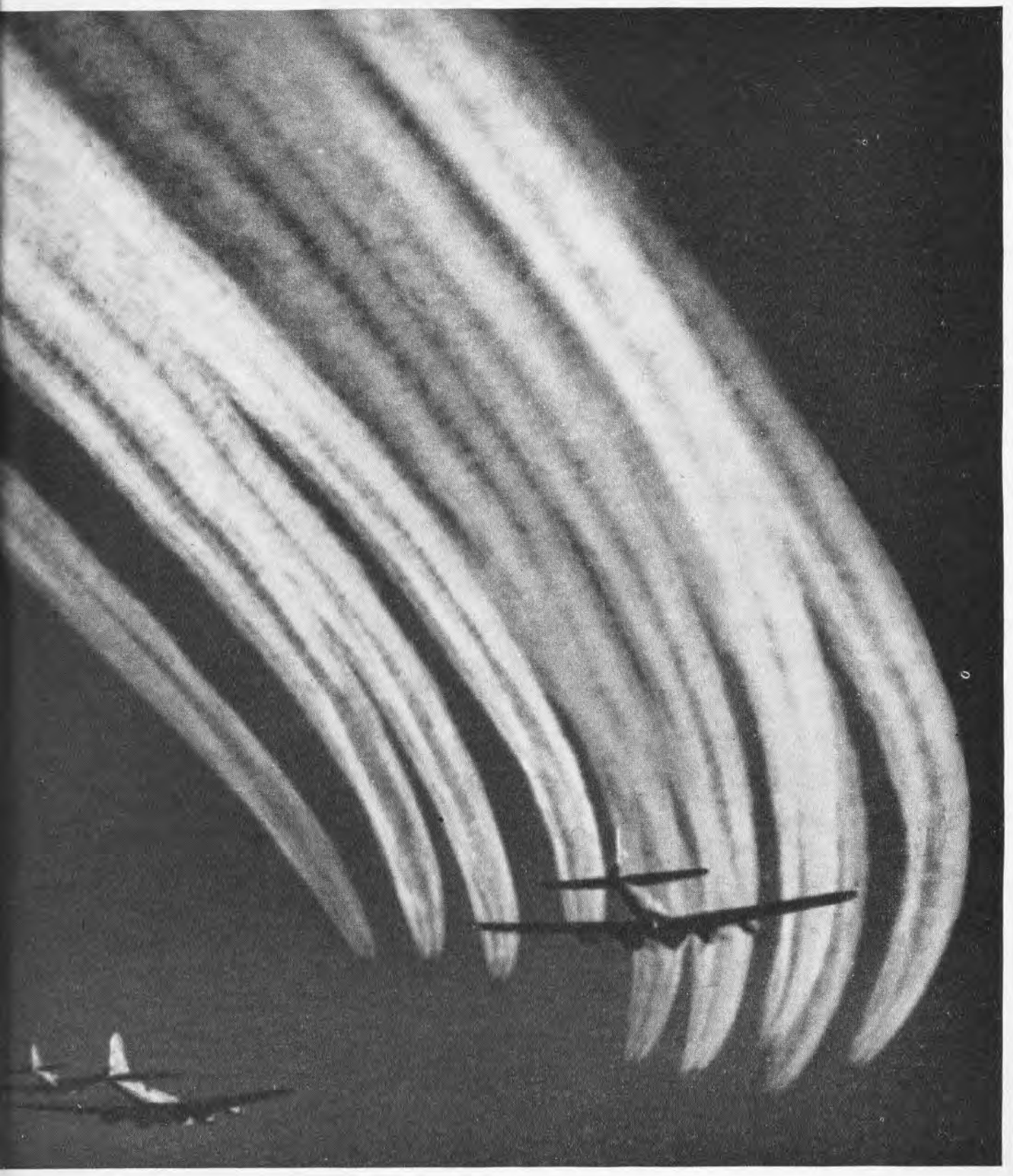
The equipment is the same as used in the Catalina flying boat and is mounted with necessary batteries and dynamotors. An AC voltage supply for the GO-type transmitter is also provided so that students may be thoroughly checked out in all equipment on the ground prior to actual flight training.

Each student is given a radioman's notebook with copies of photographs of all radio equipment and radio panels, with explanatory notes. Intimate knowledge of the equipment is not required, the procedure outlined being adequate.

Vapor Trails



This flight of B–17's reveals the military importance of vapor or condensation trails often resulting from high-altitude flying. Although dazzling to behold, they are a clear give-away to the enemy of the position and course of flights; they may indicate the number of aircraft and provide cover for pursuing planes. The trails in this picture probably are the exhaust type—by far the most common and the most important for tactical purposes. They are formed by condensation of water vapor from the engine exhaust. There are two other types of trails:



1. Wing trails (aerodynamic), which flow off the wings and other parts of the plane. They are formed by condensation of atmospheric water vapor as a result of the adiabatic temperature drop associated with air flow past the aircraft. These trails are thin and dissipate quickly. *2.* Convective condensation trails, which are formed under certain atmospheric conditions as a result of the air being warmed by passage of the aircraft. This causes convective currents and raises the air to its condensation point. One outstanding fact should be borne in *(Continued on page 18)*

mind about condensation trails. Owing to the fact that trails form behind the plane and often at a great distance, the pilot frequently may not know that his plane is leaving a trail—even when he is expecting one.

Exhaust trails result from a combination of low atmospheric temperatures; high atmospheric humidity (at very low temperatures, persistent trails may form with low humidity); high fuel consumption (large amount of power and high specific fuel consumption); low drag (less turbulence and narrow wake); low speed (smaller final diameter of wake because of lower turbulence).

Water-recovery apparatus is the only positive means of suppressing exhaust trails. Other means can be only partly effective. Fliers have been advised to throttle back and glide rapidly to lower levels; if no loss of altitude is permissible, make a shallow dive at a substantial increase of speed, and regain altitude by zooming; or, climb 1,500 feet or more into the stratosphere.

The factors which contribute to formation of wing trails are: high speed and high wing loading, very high humidity and high temperature. The trail may be more persistent if the temperature is not above freezing. Wing-tip trails, as a rule, will persist where ordinary wing trails will evaporate immediately.

Once wing trails are observed they may be eliminated by throttling engine and reducing speed, reducing altitude to below freezing levels, climbing or descending to get out of humid layers, or by avoiding flight altitudes where stratus-type clouds exist.

The most favorable conditions for formation of convective condensation trails are large power and fuel consumption, atmospheric lapse rate on the verge of "conditional instability," and high humidity. This type trail can be eliminated by climbing or descending to a new level (one to two thousand feet should suffice), or by avoiding a flight level where stratus or strato-cumulus clouds are present.

In general, both the wing trail and the convective condensation trail are sporadic and rather rare because they require relatively unusual combinations of conditions. The exhaust trail, on the other hand, nearly always will occur at certain high altitudes and latitudes.

The trail formed may be dense and persistent, lasting for 20 minutes or more, and may spread out because of turbulence, taking the characteristic form of cirrus, cirro-cumulus, or alto-cumulus clouds.

Faint and less persistent trails sometimes are formed. These are due to the same causes as the dense trails, but the contributing factors then are of lesser degree, and they disappear rapidly.

Keeping in mind the factors necessary for formation of the various types of trails, any altitude in excess of 16,000 feet while in latitudes north of 35° N. should be considered as a possible zone of formation in January. In July these values rise to 23,000 feet and 55° N. For southern latitudes these figures should be 16,000 feet and 35° S. in July and 23,000 feet and 55° S. in January. [Photo from *Impact*.]

How Far Can You See?

Bomber pilots returning from raids aren't exaggerating when they say "we left fires visible for 200 miles." In fact, they can see an object as far as 194 miles while flying at 25,000 feet, and the glow of big fires is discernible at even greater distances. While a sailor at sea level can see only 2.9 miles in any direction, a pilot in an airplane can scan almost incredible areas.

From 1,000 feet you can see	39 miles.
From 2,000 feet " " "	55 miles.
From 3,000 feet " " "	62 miles
From 4,000 feet " " "	77 miles.
From 5,000 feet " " "	82 miles.
From 10,000 feet " " "	123 miles.
From 15,000 feet " " "	150 miles.
From 20,000 feet " " "	173 miles.
From 25,000 feet " " "	194 miles.

SHOW ME THE WAY TO GO HOME

RELATIVE SECTOR SEARCH

You are to depart from the USS *Terre Haute*, Lat. 33° − 10′ S., Long. 166° − 20′ E., at 1515 to scout a relative sector from 190°–220° for a distance of 115 miles and return to the ship. The *Terre Haute* is on a course 070° at speed 22 k. True airspeed is 115 k. Variation 13° E. Wind at flight level is 26 k. from 130°.

Required:

	1st leg	2d leg	3d leg
Magnetic Heading			
Speed of relative movement			
Course			
Ground speed			
Miles on course			
Time to turn			ETI

Position of Interception:

Lat. _____

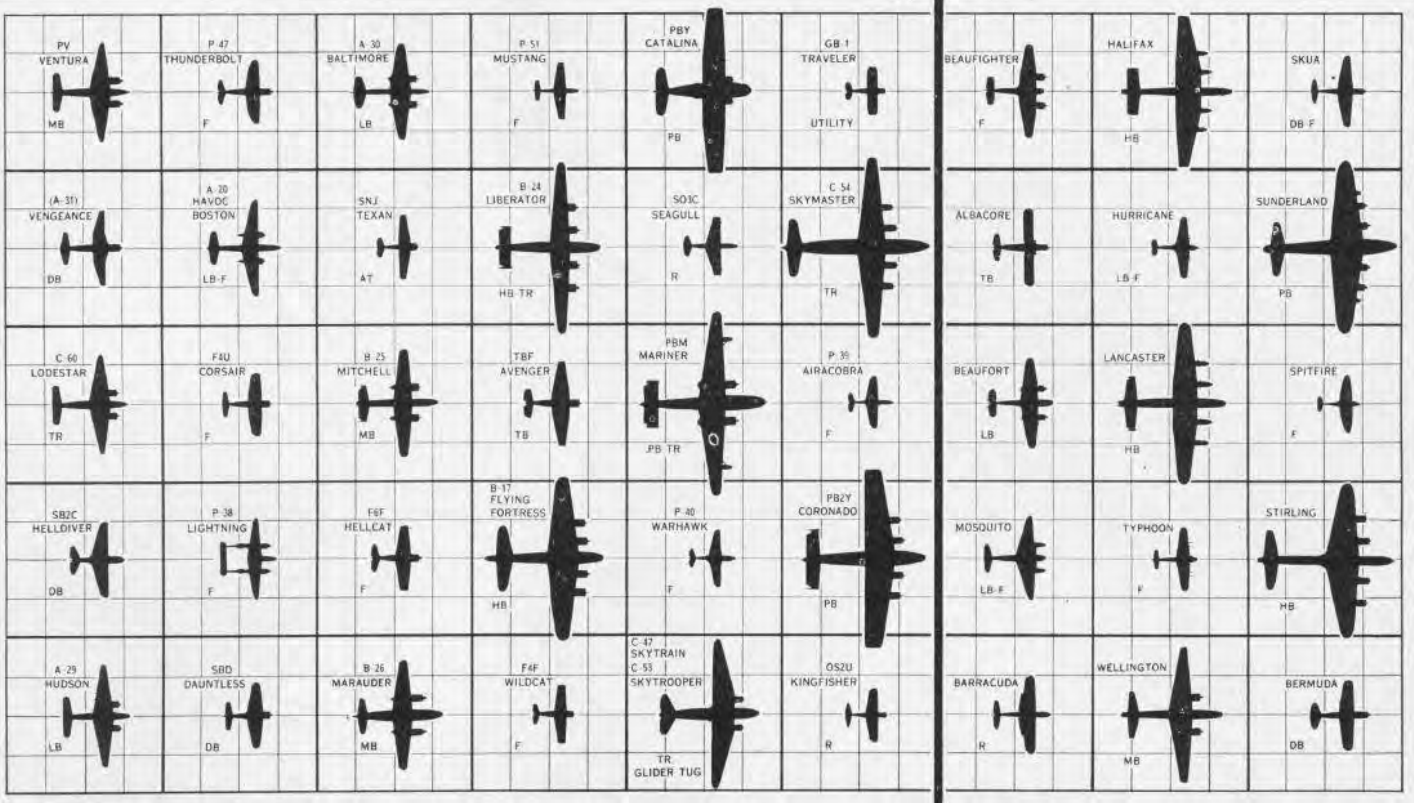
Long. _____

(Answers on page 29)

Scale Diagram of planes of friend and foe shows relative sizes of aircraft. This chart appears in *Recognition Pictorial Manual*, published by Army and Navy, to which British made valuable contributions.

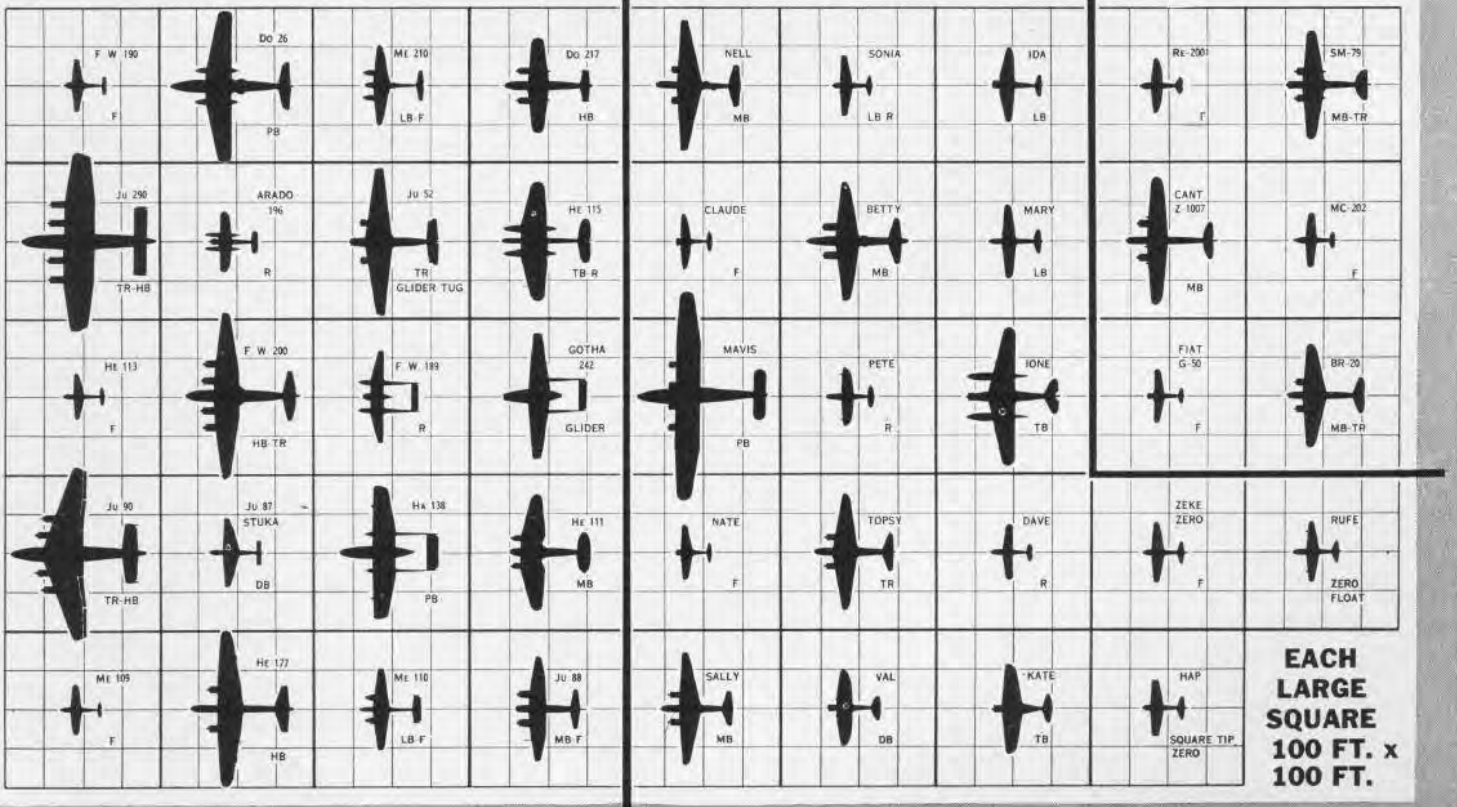
FRIEND

U.S.A. U.K.



FOE

REICH JAPAN ITALY



EACH LARGE SQUARE 100 FT. x 100 FT.

NAVIGATION TRAINING

Technique of Plotting a Course Challenges Naval Aviation As Its Air Power Fans Out Across the Seas

DEMAND for accurate navigation by pilots has increased as battle areas expand, and the Navy is giving its aviation cadets a thorough grounding in this important subject.

Under the continuous training program adopted by the Navy, cadets will have had about 72 weeks of navigation instruction. This will be lengthened later to 78 weeks.

Already about 4,000 cadets under the new program are well into the third stage of the training, which includes flight preparatory schools, CAA–WTS, pre-flight, primary, intermediate, and operational training.

When this group leaves the pre-flight schools it will have devoted more time to navigation, and it will be better qualified in the subject, than are the newly commissioned naval aviators currently arriving in the fleet. Nevertheless the group still will have 10 additional months of intensive navigation training ahead of it.

During approximately three months at primary training centers they will drill three days a week toward speed and proficiency in fundamentals of DR and celestial navigation already covered. At intermediate and operational training centers emphasis will be placed on the practical aspects of navigation as conducted by VP, VF, VSB, VTB, and VO–VCS squadrons, respectively.

Put Theories to Use

At these centers navigation training to a large extent will move from traditional ground school buildings to flying classrooms where theoretical concepts necessarily must be subordinated to practical application.

Indicative of the emphasis being placed on navigation in the revised training program is the naval air navigation school established at Hollywood, Florida, on February 20 of this year. This specialized school is an outgrowth of the Navy's first school for aerial navigators which was started in September 1942 at Coral Gables, Florida, and which was ultimately absorbed by NANS in May of this year. As of June 1, 1943, more than 1,300 trained navigators had matriculated at NANS.

Student navigators at NANS are in two principal categories, officers and cadets. The officers in turn fall into two groups, newly commissioned officers and navigation instructors assigned for refresher courses. The course for cadets, embracing navigation, seamanship, aerology, bombing, gunnery, air combat information, recognition, drill and physical, and indoctrination lasts 18 weeks. Cadets entering from pre-flight schools will be commissioned ensigns in the Navy or second lieutenants in the Marine Corps upon graduation. Many will go into NATS and Marine transport groups as nonpilot navigators.

Air Navigation Bulletin

Squadron and staff navigators of the fleet and training school navigation instructors will be able to keep abreast of new developments in their field through the newly-established *Air Navigation Bulletin*.

To be issued first in September, the *Bulletin* will contain information regarding present and contemplated plans for navigation training in various phases of the training program. It will contain typical navigation problems, records of interesting experiences or observations based on actual navigational records of operating aircraft, new equipment or aids for service or training use.

A section will be devoted to the Link celestial navigation trainer now being installed and used on various stations.

The *Bulletin* will be issued quarterly and units of naval aviation have been requested to send in material for publication. Especially desired are unusual experiences or problems, new "wrinkles," special methods devised for polar or equatorial regions, comment on equipment, and suggestions on training.

Training Is Thorough, Inclusive

Officer students receive thorough training as air navigation instructors, qualified for classroom work and work in aircraft. Each NANS student, officer and cadet, is given approximately 50 hours flying time. Flights are of four hours duration. Five are night flights. Navigation flights begin about the middle of the course and parallel classroom work. In addition to the ordinary practical problems presented by work in the plane, students are taught to read surface wind force and direction from white caps and wind streaks. They make ground speed checks and learn to swing ship on the ground and in the air. They take numerous celestial observations from the beach as well as in the air.

DR instruction includes sailings, chart construction, vector diagrams, DF corrections, calibration of air speed meters, compass corrections, no wind position, computer rate—time—distance problems, radius of action, interception, fictitious ship, square searches, geographic and relative sector searches, double drift, and wind between fixes. The DR check out examination is given during the seventh week of the course.

Time Studies Given

Celestial navigation is introduced by time—solar and sidereal, followed by nautical astronomy, plane of the celestial meridian, astronomical triangle, hour angles and meridian angles, star identification, latitude by Polaris, celestial fixes, HO 211, HO 214, HO 218, meridian altitude, single line of position approach, deviation by celestial azimuths, deviation graphs, compensation of magnetic compass, high altitude sights, star charts, etc.

It is contemplated that ultimately all navigation instructors participating in the cadet-training program will have been processed through NANS. The desired and expected result of this training will be standardized instruction under practical rather than theoretical navigators.

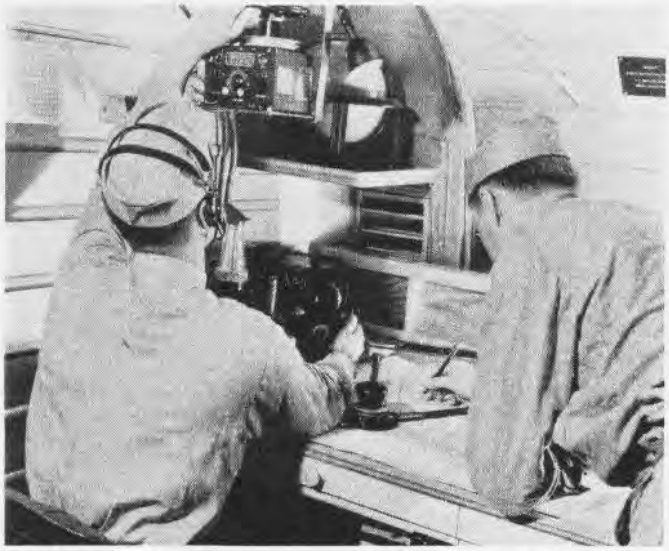
In the meantime, before cadets trained under the new program begin arriving in the fleet, multimotor plane

MAN THE BOARDS! Astronomical triangle is explained in class at Naval Air Navigation school, Hollywood, Fla.

ENLARGED PANEL board in Corpus Christi classroom, illustrates basic instruments used for navigation instruction

BENDIX CART, synthetic trainer device, can navigate 500 miles inside room, as wheels are geared to distance scale

STUDENT OFFICERS receive data before take-off in flying classroom at NANS, specializing in aerial navigation



PLOTTING a radio bearing in the Hagner Cart, mobile trainer used in celestial navigation, at NAS Corpus Christi

ACCURATE giant model of computer, made from blueprint on plywood base, is valuable aid in navigation class

pilots will receive 30 to 60 days advanced navigation training at NANS, subsequent to commissioning but prior to reporting to squadrons. On June 15 the first 350 newly commissioned naval aviators reported for this streamlined postgraduate navigational course.

Combat reports have demonstrated clearly the high calibre of navigational ability required in combat areas. The present navigation-training program will develop that ability.

Selection of Non-Pilot Navigators Considers Candidates' Ability, Judgment, Temperament, Aptitude

War-inspired emphasis on navigation is reflected in many activities associated with the Bureau's Training Division section to meet the demands for more men who can direct planes to their objects and return.

Step by step, the cadet is led through six stages of training from simple fundamentals to intricate operational navigation problems.

Standardized examinations and grading have been designed to funnel large numbers of students enrolled in this program from some 124 separate schools, into two intermediate centers and thence via operational training into the fleet.

NAVIGATOR'S TABLE IS CONSTANT SCENE OF ACTION FROM TIME PLANE LEAVES FIELD UNTIL RETURN

An eight months' navigation refresher course for flight instructors has been set up by the CNAPT at primary training centers to qualify present instructors for sea duty.

Home Study Given

As the initial phase of this program, a home study course in navigation fundamentals, with appropriate check out examinations, has been compiled by NavTraSec. After completing this primary flight instructors must complete an 11-week course of formal classroom work in practical navigation problems designed to qualify them for whatever fleet duty may be assigned.

Seventy-eight Link celestial navigation trainers have been allocated to naval air operational and naval air training stations and schools for basic and refresher instruction in celestial, DR and radio navigation. Approximately 20 LCNT units are at present in operation.

An additional 22 trainers are under procurement and will be allocated later. In addition to schools operated under CNATT for the training of maintenance personnel (officer and enlisted), special navigation instruction for officer instructors for present and contemplated LCNT installations is being conducted at NANS Hollywood and NAS Jacksonville.

Many Navigators Trained

By September 1943, about 650 nonpilot navigators will have been graduated from Hollywood and ordered to duty as aerial navigators on multi-engined transport and patrol squadrons. These aerial navigators, designated ensign A–V(S), entered the service through the V–5 aviation training program. Upon completion of the flight prep or pre-flight stages they were diverted from pilot training and ordered to NANS for specialized navigation training.

Selection of potential nonpilot navigators has been based upon outstanding academic ability, maturity of mental processes, judgment, temperament, reliability, and expressed desire of the applicant. The number of volunteers for this duty has been considerably in excess of the quota allowed.

Some Become Bombardiers

A portion of the NANS nonpilot navigators was ordered to NAS Jacksonville upon graduation for additional training as bombardiers. The balance were ordered directly to ComAirLant and ComAirWest Coast for further assignment. Requests from wing commanders for nonpilot navigators have exceeded the supply.

Training of V–5 cadets as nonpilot navigators has been discontinued pending further study of the merits and demerits of the nonpilot navigator idea. However, concurrently with training of navigation instructors at NANS Hollywood nonpilot navigators for NATS planes are being turned out from officer candidates.

The NANS quota for the NATS, about 30 a month, is in addition to the five nonpilot navigators supplied monthly by the American Export Lines school.

The Navy's revised program of training gives promise of pilots more highly skilled in the science of Navigation

TECHNICALLY SPEAKING

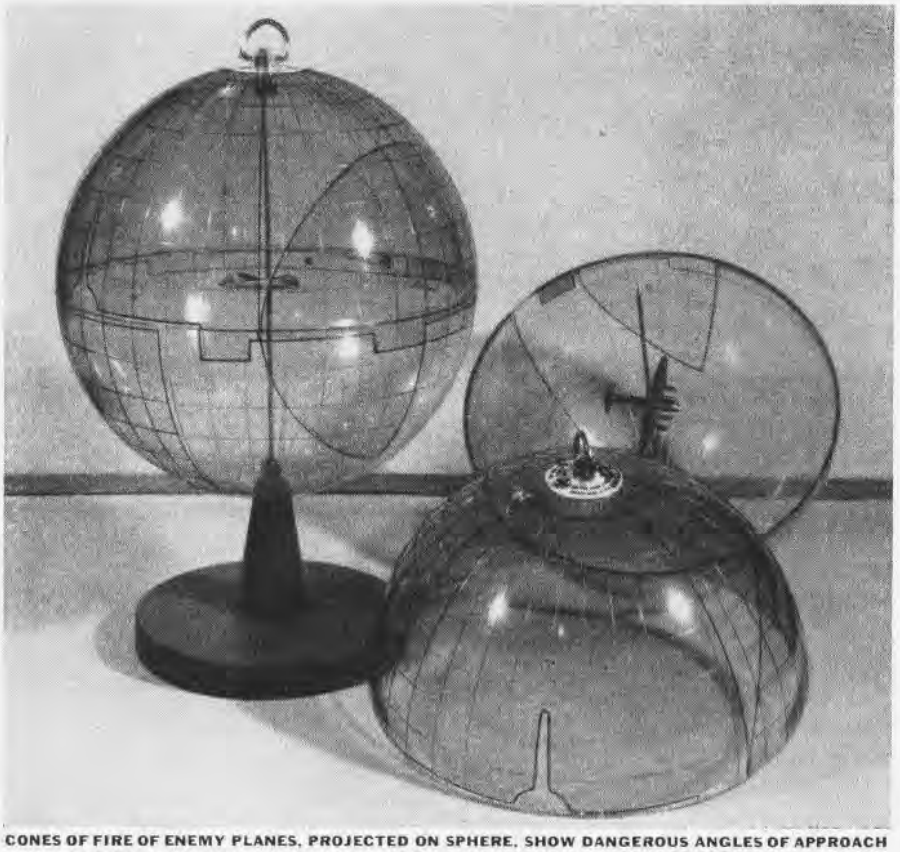
Studying Enemy Fire

Teach Angles of Approach

Fields of fire of operational enemy aircraft may be demonstrated with a new device utilizing model planes. It is an aid in teaching the student what angles of approach involve the greatest concentrations of fire from an enemy plane. Proper attack angles to be used so as to put the student's plane in such a position that it will receive the least amount of defensive fire coverage may also be shown with the device.

The device consists of a small metal airplane model which is suspended on a metal rod in the center of a 10" clear plastic sphere. On the surface of this sphere the various areas of coverage of each gun emplacement on an enemy plane are outlined in color. Gun locations are indicated on the model by a spot of color corresponding to that used to define each fire field on the globe. Where two or more fields of fire interlace, the colors are blended on the globe surface. Attention is called to them by the addition of colored dots indicating the actual number of guns concentrated on the particular area.

Identity of the airplane and the caliber of its guns are contained in a small disc at the top of each globe. The globe may be suspended from a ring at the top or may be fitted into a wooden base for table use.



CONES OF FIRE OF ENEMY PLANES, PROJECTED ON SPHERE, SHOW DANGEROUS ANGLES OF APPROACH

Cones of fire for the following enemy aircraft are included in the first set of demonstrational models:

1. Mitsubishi T96NHB, "Nell"
2. Mitsubishi T97AHB, "Sally"
3. Kawanishi T97NPB, "Mavis"
4. Nakajima T97 MK "Kate" IIINTB.
5. FW 200K.
6. DO 217.
7. He 111K.
8. JU-88 A-1.
9. JU-88 B-1.
10. JU-86K.
11. JU-88 A-4.
12. HE 115K.

Tape Discussed

Each Type Has Its Task

Tape material used to protect or mask off areas to be left unfinished, when surfaces are painted or plated, is purchased or released under Navy Aeronautical Specification 53-T-6 or subsequent revision. This specification covers the following five types of tape, the designation applying largely to the style paper and treatment used in the backing on which the adhesive is applied:

- MCP—Moisture proof, crepe paper backing.
- MFT—Moisture proof, thin crepe paper backing.
- CPH—Nonmoisture proof, heavy crepe paper backing.
- CPL—Nonmoisture proof, light crepe paper backing.
- FSP—Nonmoisture proof, flat paper backing.

All tapes will perform satisfactorily under normal conditions when covered with paint, dope varnish, and other materials used in finishing aircraft, and the adhesive will not affect undercoats of paint or metal with which it may be in contact.

Indicates Purpose

The type tape is an indication of the purpose for which it is best suited. Moisture-proof construction for example, should be used under conditions of high humidity and/or high temperatures. Under these high atmospheric conditions, the nonmoisture-proof constructions have a tendency to absorb moisture and become less efficient since they do not adhere as well as when humidity is low. The moisture-proof constructions are not affected by either high humidity or heat and have proven superior for masking, holding, and general use under all conditions.

Moisture-proof tapes are constructed of reclaimed rubber whereas a percentage of crude rubber is used in conjunction with reclaimed rubber in the nonmoisture-proof tape and should be used wherever possible.

The only real need for nonmoisture-proof construction is in plating work. When plating metal parts, it is often desirable to mask off or protect certain areas that are not to be plated. Nonmoisture-proof tape, due to the type of chemicals used for paper backing impregnation, tends to resist most plating baths, whereas the moisture-proof constructions deteriorate rapidly in these same solutions and cannot be considered satisfactory for this work.

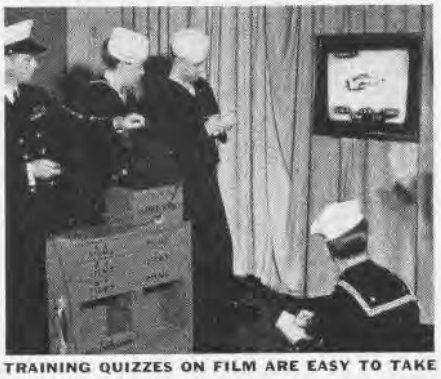
Crepe Paper

Crepe paper is used for masking curved or irregular areas and flat paper is used for straight-line masking. The thin crepe paper has only a very slight crepe and works equally as well as flat-back tape be-

cause of its thinness. The thin paper also uses less materials in the backing saturation which results in further savings of critical materials.

In order to conserve critical rubber for other purposes, tape should be used as sparingly and in the narrowest widths possible. The use of 1 inch in place of 1½-inch tape will result in a 50-percent saving. Instead of using wide tape to cover large areas, narrow tape and treated kraft paper should be used for masking. Dispensers, called apron tapers, which carry paper of different widths and a roll of masking tape which covers one edge of the paper and leaves a portion of the adhesive side of the tape exposed for adhering the assembly to the work, should be available at all stations. More extended use should be made of these apron tapers or they should be requisitioned in the widths desired if they are not available.

Visual Quizzer



TRAINING QUIZZES ON FILM ARE EASY TO TAKE

The Visual Quizzer is an automatic slide-film projector designed to aid on reviewing training course subjects. Its memory-refresher films cover the field from both the general and technical angle and include a wide range of subjects.

Because of its portability, the quizzer can be handled conveniently and set up for use on board ship or at a training station. It can be used by individual students or by groups of students for review purposes or competitive scoring. Its chief advantage is its "continuous showing" and repeating aspect.

Those who "take" a memory-refresher quiz are provided with score pads for individual scoring as the pictures are shown. Each picture has a superimposed question with alternate answers, one of which is correct. The time each picture remains on the screen can be regulated by means of a speed regulator. The quiz films can be shown in any semidark room.

Subjects of new memory-refresher quiz films planned or in preparation include:

- Aircraft Maneuver and Formation
- Landing Fields
- Range Estimating
- Theory of Flight
- Airplane Engines
- Lifesaving and First Aid
- Electricity
- Naval Aviation History
- U. S. Navy History
- Mechanical Comprehension
- Geography from the Air
- Aviation Technician-Metalsmith
- Aviation Technician-Machinist's Mate
- Aviation Technician-Ordnanceman
- Aviation Technician-Radioman
- Aerial Bombing
- Lighter-Than-Air
- Seaplanes
- Random Review (General I. Q. Test)
- Navigation

This picture of a Navy patrol squadron commander and aides illustrates the rigors of life in the South Pacific combat zones. Recumbent in a Navy issue hammock, with cigar drawing comfortably and with a coconut full of gin and water close at hand, he is filled with contemplation. The aides are wearing the native half-frock, or lava-lava; and one has on an old-fashioned dust cap.

BEST ANSWERS

III—Naval Customs

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

1. There is a difference between an order and a command.
A command—

- ☐ *a* allows you to use your own discretion in carrying it out
- ☐ *b* gives you the privilege of arguing its merits with your superior
- ☐ *c* may be delegated by you to someone else for execution
- ☐ *d* allows no discretion in its manner of execution
- ☐ *e* May only be given by officers with the rank of captain and above

2. You are executive officer of an aircraft squadron based in San Diego. While ashore on liberty you see two Marine sergeants driving recklessly across an intersection. It is your responsibility to report this to—

- ☐ *a* your squadron commander
- ☐ *b* the local police
- ☐ *c* the senior shore patrol officer
- ☐ *d* the commanding officer of the NAS San Diego
- ☐ *e* the senior Marine officer ashore

3. A Navy lieutenant of the line, a commander who is a flight surgeon, and a Marine lieutenant approach a corner on which are standing a colonel of the quartermaster corps and an ensign on shore patrol duty. A fight breaks out between two sailors nearby. Suppressing the disturbance is the responsibility of the—

- ☐ *a* Navy lieutenant
- ☐ *b* commander
- ☐ *c* Marine lieutenant
- ☐ *d* Army colonel
- ☐ *e* ensign

4. While home on leave you are attending a noon band concert in the park. When the Star Spangled Banner is played, you should—

- ☐ *a* come to attention
- ☐ *b* stand and salute, facing the music
- ☐ *c* uncover at attention with your uniform cap over your heart
- ☐ *d* stand and salute, facing the nearest flag
- ☐ *e* avoid being conspicuous by doing what the crowd does

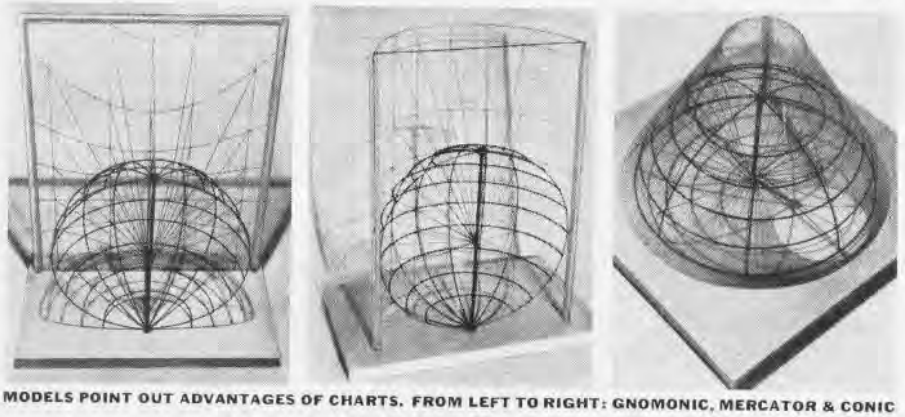
5. Navy Regulations permit officers to accept money from enlisted men only—

- ☐ *a* for safekeeping
- ☐ *b* with the approval of the commanding officer
- ☐ *c* provided no interest is charged
- ☐ *d* for deposit with the supply officer
- ☐ *e* when it is in payment of a personal debt

Map Projection Models Used for Flight Training

A series of four models which demonstrate in three dimensions the principles of the Mercator, Gnomonic, Conic, and Lambert-Conformal projections has been prepared by the Bureau.

These models, which will be used in flight-training courses, illustrate visually the function of each chart and point out why one chart may be of greater value for one purpose than the others, by virtue of their constructions.



MODELS POINT OUT ADVANTAGES OF CHARTS. FROM LEFT TO RIGHT: GNOMONIC, MERCATOR & CONIC

In each model the earth is shown as a skeleton hemisphere with red meridians of longtiude and blue parallels of latitude. The surfaces on which points on the world sphere are projected are sheets of transparent plastic. Lines running from the center of the world sphere to the points at which meridians and parallels meet are extended to the plastic sheets, and represent projection lines. They show the method used to locate, on a chart or map, points corresponding to those on the surface of the earth.

Show Small Area

To relate the plastic surfaces of projection to the charts and maps they represent, they may be imagined as developed or unrolled, and laid flat in one plane. It should be remembered that, except on very small scale maps such as those found in an atlas, only a small area of the surfaces shown on these models would appear on any single chart.

Actual charts are constructed from mathematical calculations and tables and they slightly modify the projections shown in the models, but in no way invalidate the basic principles underlying the four standard projections. Characteristics of the charts obtained are substantially correct.

In a Mercator projection, the surface on which the world sphere is projected is a cylindrical one tangent to the earth at its equator. Projections of the meridians appear on the plastic as straight lines.

Globe Shows Distortion

Distortion of this projection is at once apparent in the higher latitudes. On the skeleton globe the small circles of latitude diminish in size as they approach either pole, yet on the Mercator chart they become lines of equal length, measuring the same as the equator. Meridians, which converge on the skeleton globe, are projected as straight, parallel lines on the plastic sheet.

In a Mercator projection, because of its rectangular grid, the coordinates of any point can be readily plotted, and a rhumb line can always be drawn straight.

In the Gnomonic model the world sphere is projected on a flat plane tangent to the earth at its equator. Projections of the meridians appear on the plastic as straight lines.

A Gnomonic chart is a projection on a plane tangent to the earth at one point. This point is not required to be on the equator and can be anywhere on the surface of the earth. In Gnomonic charts of the polar regions the pole itself is the point of tangency.

The third and general case of Gnomonic projection is that in which the point of tangency is taken somewhere between the equator and pole. The seemingly variable and curious appearance of a Gnomonic chart is subordinated to its prime feature, namely, that any great-circle course or bearing can be plotted on it as a straight line.

Conic Projection Described

The Conic projection is made on a conical surface tangent to the world sphere at some parallel of latitude. The axis of this cone coincides with the axis of the earth, and the planes of the meridians contain the common axis and intersect the surface of the cone in straight lines. Projections of longitude circles thus appear as converging straight lines. Parallels are projected as circles. The distance between parallels increases with the higher latitudes, and compensates for the elongation of the parallels.

In practice, several conic projections are employed in constructing one map, called polyconic projection. In joining the strips of each cone, the central meridian remains a straight line, but the others will be slightly bowed by connecting the projection points with a smooth curve. Distortion in the high latitudes is eliminated, and a constant scale obtains in every portion of the map.

Two Are Dissimilar

At first sight the Lambert-Conformal resembles the Conic projection, but the plastic sheet intersects the world sphere instead of being tangent to it. The axis of the cone coincides with the axis of the earth, and the intersections are two parallels of latitude. The meridians, as in the Conic projection, are converging straight lines, and the parallels are circles.

The unrolled map would be fan-shaped, and have the same grid of converging lines and concentric circular arcs that would be found on the Conic, but with less distortion. For East-West strip maps, such as standard aeronautical charts of the United States, the Lambert-Conformal projection is particularly practical.

Apparently the Navy will never run short of men named John Paul Jones. The name of the naval hero of the Revolution and the first American Commodore is borne in this war by 7 officers and 28 enlisted men.

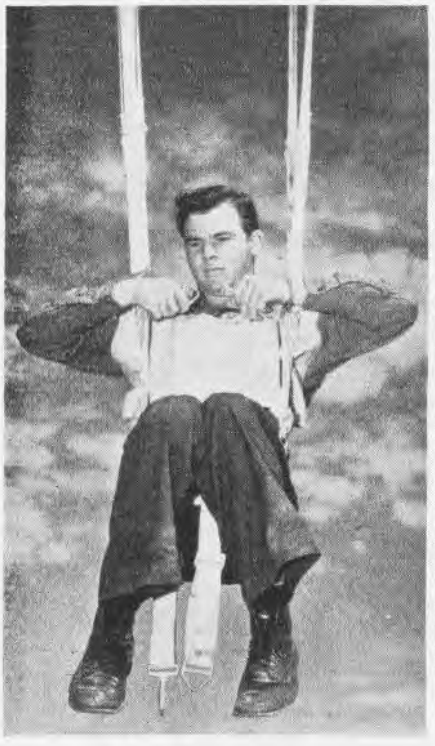
Knowledge of plane's whereabouts is responsibility of navigator

PROPER METHOD OF MAKING WATER LANDINGS

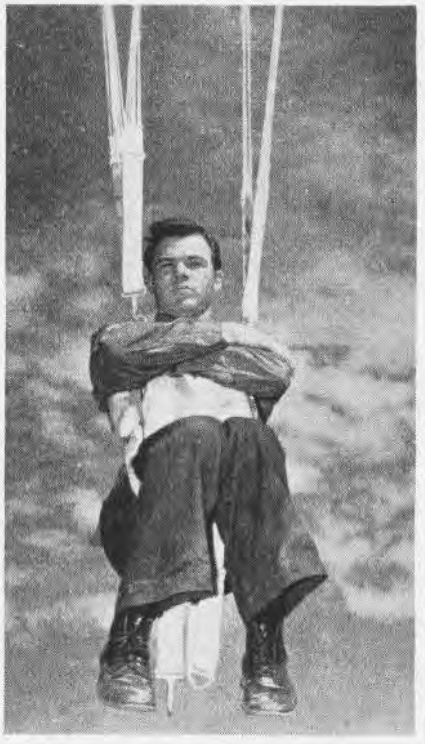
1. This is normal descending position in a Q.A.C. type harness.

2. Move back into harness sling until weight is off leg straps.

3. Unfasten leg straps at approximately 100 feet from water.



4. When the leg straps are free, unfasten the chest straps.



5. Fold arms at chest. Inflate life jacket when free of chute.

6. Slide out of harness at 10 feet. Let go risers on touching water.

Quick Attachable Chest Type Parachutes

Permit Greater Freedom of Movement

The quick-attachable chest type parachute is intended for the use of gunners, observers, mechanics, photographers, and other personnel, whose duties require greater freedom of movement than obtained when the standard seat pack parachute is worn. The harness is worn constantly during flight and the packed parachute is stowed in a convenient place, preferably near a point of exit where it is readily accessible in case of emergency. The pack is also intended for use as the reserve chute (omitting the pilot chute) on training type parachutes.

POINTS TO NOTE

There's a right way and a wrong way to use parachutes! To start with, users should check constantly on general condition of the equipment. Obviously, the proper time to make sure that the parachute is in reliable working order is before leaving the ground—not after.

LANDING

Landings should be made with jumper facing direction of drift. With the four points of suspension of a standard parachute, two forward and two aft of the body, jumper has full control of his position relative to drift. Body may be turned in the direction desired by pulling on two diagonally opposite lift webs. *Instructions:* Grasp the right forward lift web overhead with the left hand and the left after lift web with the right hand, then with a circular motion pull webs together toward the center.

Degree of rotation is directly proportional to force applied and will be determined by relation of jumper's position to drift. Position obtained must be held until landing is made. Contact with ground should be made while in an erect position with knees bent slightly. No attempt should be made to stand erect on landing, and the body should offer no resistance to the tendency to fall or tumble.

LANDING IN HIGH WIND

Landing in a wind involves danger of being dragged along ground by parachute. To prevent this, jumper should either collapse canopy or release himself from harness immediately upon touching ground. Canopy may be collapsed by pulling bottom group of shroudlines that are in contact with the earth. To prepare for release from harness, jumper should be seated well back in sling of harness. *Instructions:* Unfasten snap hooks of leg straps, then chest strap; but do not remove arms from shoulder straps. Grasp after risers with both hands and at instant feet touch the ground—but not before—raise arms up and back over head, sliding off seat formed by the sling.

LANDING IN THE WATER

If landing is to be made in water, procedure is the same as that for landing in high wind. *Instructions:* Cast loose from harness just at instant of contact with water. Do not attempt to swim until the breeze has carried lightened parachute off to one side, avoiding danger of becoming entangled.

TREE LANDING

In making tree landings it is found that by carrying out a few precautions and rules, landing can be comparatively safe. It is advisable to make as small a target of the body as possible. *Instructions:* Do not sit fully back in harness. Body should be upright, feet tight together and knees bent slightly. Place arms about face as protection; at no time grasp limbs. Instead, allow canopy and shroudlines to catch on branches of tree and support jumper.

Illustration No. 1 shows the man's body at an angle with the lift webs. This is due to point of suspension of the Q. A. C. parachute. It differs from service seat or service back types, where point of suspension is closer to top of shoulders and man's body is vertical in sling.

After the man is in the sling, as shown in illustration No. 2, the position is same for all types of chutes.

Some wearers of the Q. A. C. parachute fear cross strap will strike the face or chin in a water landing. This is needless, for the man can easily slide his head underneath the cross strap as shown in the last illustration.

ANSWERS TO RELATIVE SECTOR SEARCH

	1st leg	2d leg	3d leg
Magnetic heading	188	098	018
Speed of relative movement	128	74	109
Course	214	105	019
Ground speed	109	90	122
Miles on course	98	73	128
Time to turn	1609	1658	ETI 1801

Position of Interception:
Lat. 32°50′ S.
Long. 167°28′ E.

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

(See page 18)

Aching Ears Follow Descent

The annoying business of aching and ringing ears that one experiences when descending from higher to lower altitudes is often accompanied by a partial loss of hearing acuity, according to the Medical Research Section.

Recent investigations at the NATC, Pensacola, have shown that such deafness may present a serious hazard to pilots and radiomen who might need to depend on the beam or the voice radio for orientation.

Descent from 5,000 to 3,000 feet reduces hearing ability by 25 to 30 decibels, from 2,000 to 1,000 feet by 15 to 20 decibels, if the pressure has not been equalized on each side of the ear drums. The intensity of the conversational voice at 12 feet is 50 decibels which would represent the functioning of the radio and beam apparatus at ground level.

However, with the addition of static and other interferences, sometimes no more than 15 decibels of sound would reach the earphones. Therefore, in the case of a loss of 20 decibels from the ear of the pilot or radioman, reception of the signals would be prevented.

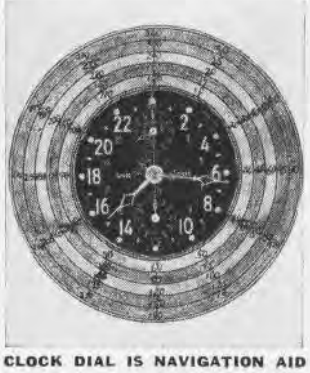
Returning the hearing to normal and relieving the pain may be accomplished by making the air pressure the same on the inside of the ear as it is on the outside. Yawning, swallowing, or holding the nose and trying to breathe out will generally be successful. But if these maneuvers fail to bring relief, the plane should be taken up and brought down again more gradually. In case of a cold, the Eustachian tube may be blocked by swollen tissues, and if so it may be cleared by shrinking these tissues with a nasal spray, benzedrine inhaler or other suitable medication.

TECHNICALLY SPEAKING INDEX

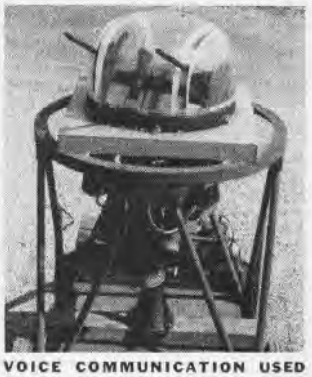
January 1 through July 1, 1943

X-VENT ANTI-FOGGING GOGGLES

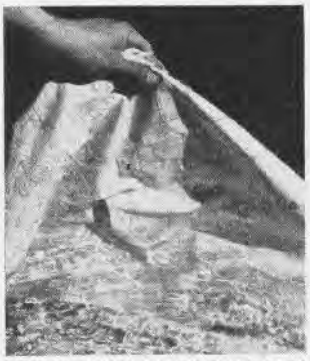
CLEANING STAND FOR ENGINES



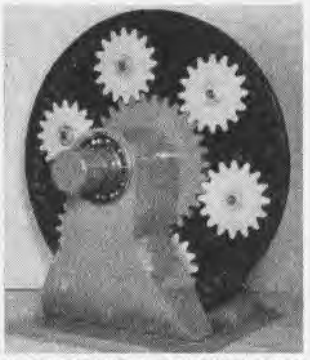
CLOCK DIAL IS NAVIGATION AID



VOICE COMMUNICATION USED



WATER-PROOF CHART FOR RAFTS



A PROPELLER REDUCTION GEAR

BUREAU SPECIFIES ESSENTIAL EQUIPMENT FOR EVERY LIFE RAFT

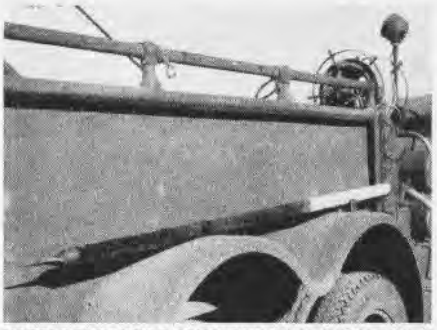
Spear Nozzle Extinguisher

Fights Fires at Close Range

MCAS, EL TORO, CALIF.—A spear nozzle attachment which enables fire fighters to squirt carbon dioxide on flames with less danger of being burned has been devised here.

By thrusting nozzle into the fuselage of a burning plane, it is possible to place the gas directly on the fire.

It also can be thrust through a door, floor, or ordinary wooden sheet

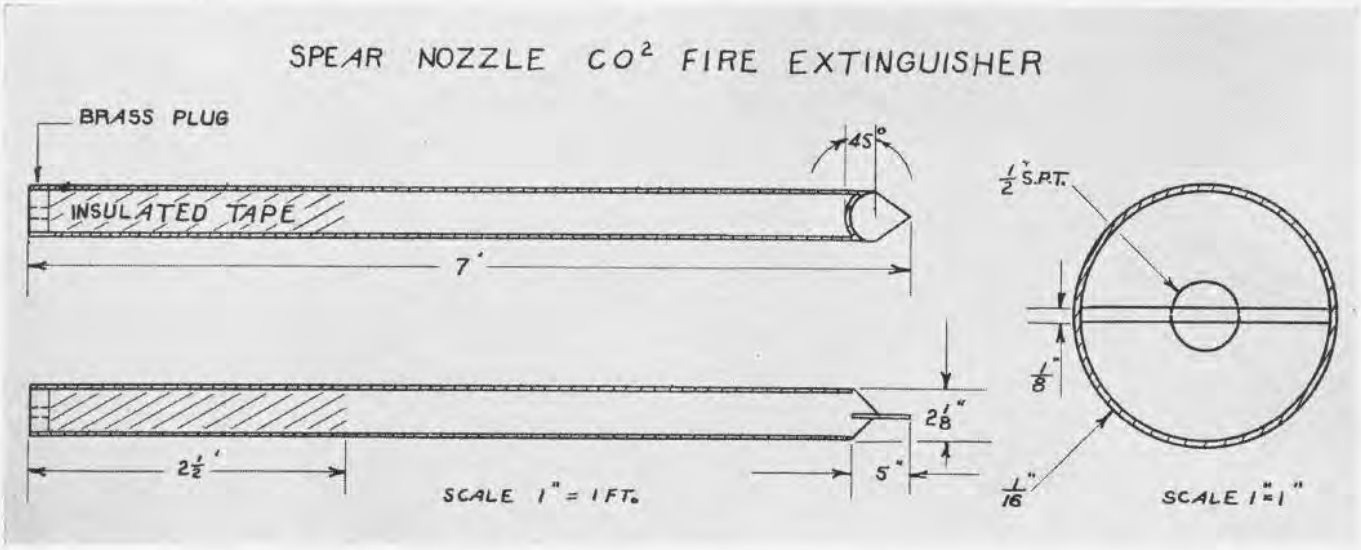


NOZZLE CUTS THROUGH WOOD, HITS FIRE'S HEART

inclosure to fight the fire without admitting more air to feed the flames.

The spear nozzle, which works better in the open than the cone-type unit, is made of 7 feet of aircraft sheet tubing 2⅛ inches in diameter with 1/16-inch wall thickness. The point is of steel plate 5 inches long with an opening 2 inches by ⅛ inch. Diameter of the tube is found to be the minimum to prevent freezing and to allow the gases to slow up.

[DES. BY MT. SGT. LARRY L. CULBERT]



Dolly Handles Flat Tires

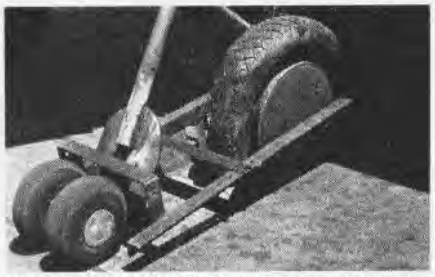
Device Still in Experimental Stage

NAS, ALAMEDA.—Removing aircraft with flat tires and damaged wheels from the flying field was quite a problem here until Machinist G. P. Dupree designed a three dual-wheel dolly to perform the task.

The dolly's outstanding points are: *1.* Requires no jack to lift plane wheel into dolly; *2.* Is adaptable for any lightweight plane; *3.* Dual wheels prevent sinking into soft runways; and *4.* Is constructed of nonessential materials.

As the dolly is in the experimental stage, improvements can be made. Detachable set of wheels in front can be arranged to fit in position without the use of bolts. This would expedite removal of planes by 4 or 5 minutes. The dolly was constructed of angle iron, scrap metal, and salvaged SOC tail wheels. If constructed of chrome molybdenum steel, much larger planes could be handled.

DOLLY SPEEDS HANDLING OF DAMAGED PLANES



JOB OF HANDLING FLAT TIRES IS SIMPLIFIED

BUREAU COMMENT—**This is an ingenious device suited for F4F's and other planes in that weight classification. The question is raised, however, as to the dolly's ability to handle heavier planes such as TBF's, SB2C's, etc. If it will handle all weight classes of single-engined aircraft, it will be one solution to the awkward problem of removing planes from the field after a tire or wheel has been damaged. The Bureau will investigate further the value of this device, and if it proves to be a desired item, will procure and distribute it to all stations.**

BEST ANSWERS
To questions on page 25
1. d 2. a 3. a 4. b 5. d

Charger Being Developed

Interim Procedure Suggested

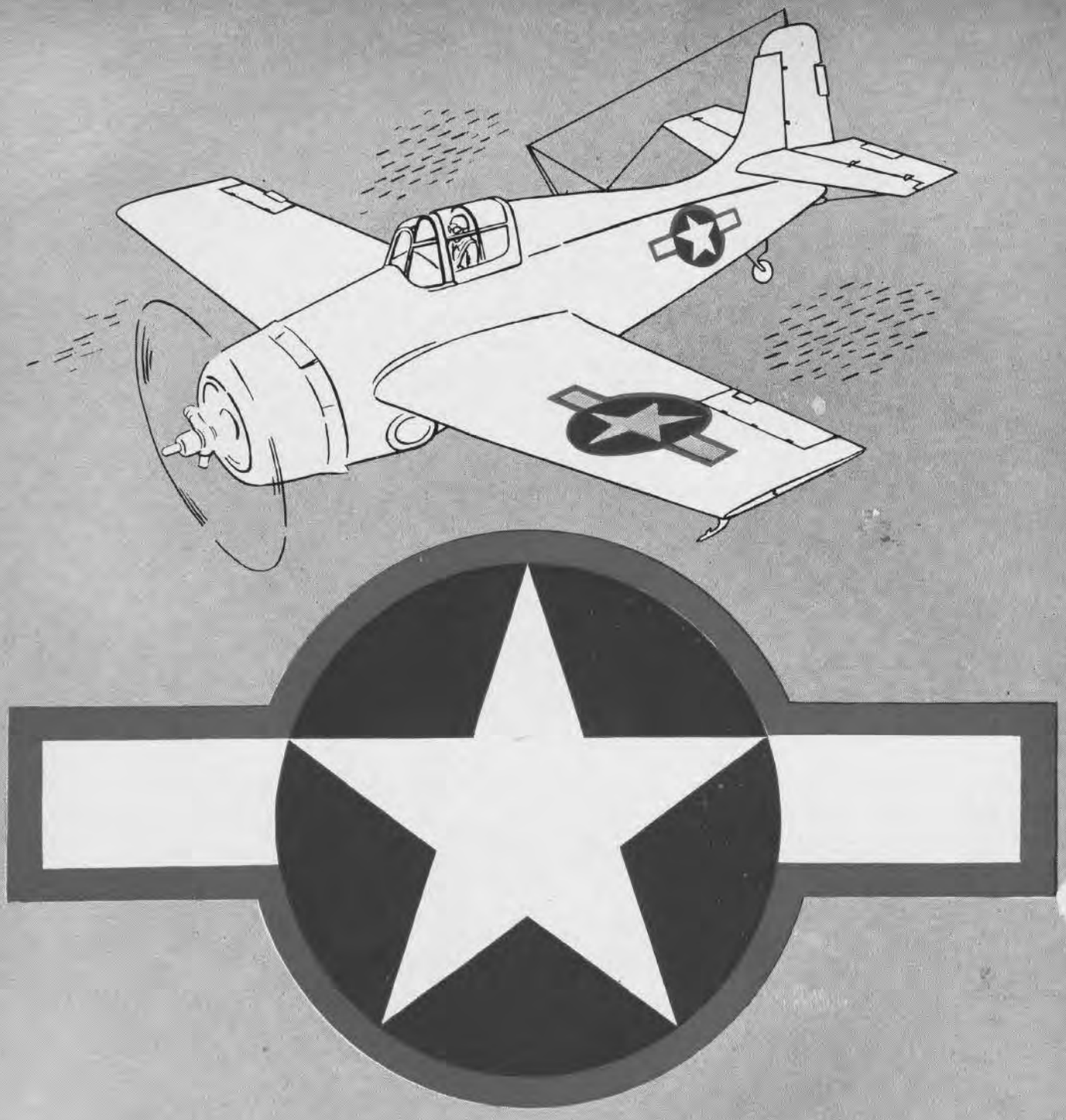
SB2C–1 airplanes are being delivered with manual charging control (slide, retracting assembly BuOrd Stock list No. 1–S–9428) installed. The contractor is developing a more satisfactory manual charger as the present one is difficult to operate when the gun is depressed.

Pending this development, units can obtain satisfactory operation by removing the handle of the present retracting slide and making up and installing the cable and toggle arrangement shown in the accompanying illustration.

The rollers and securing plates can be made by squadron metalsmiths and attached to the gun by screws in existing threaded holes.

Aviation, deadliest weapon of war, has dictated urgent need for Navigation as part of the pilot's necessary equipment

(Navigation Training)



The New National Insignia

THE national insignia for Army and Navy planes has been modified to meet demands from fighting fronts for additional recognition markings on U. S. aircraft. Consulting with Army representatives, BuAer's camouflage officers had pointed out that all circular or star insignia—including German Cross and Japanese bull's eye—at a distance look like a dot, that is, are eventually resolved by the eye to that form. The suggestion then was made that appendages be added to the white-star-blue-circle insignia to make the whole design resolve to a linear form or bar at extended ranges, rather than to a dot. Army and Navy tests were made and the design was adopted. Insignia Red appears as a border, completing the national colors, but is so distributed as not to be confused with the Japanese insignia. On the top side of its wings (painted Semi-Gloss Sea Blue), the Navy uses Gray in place of Insignia White. Insignia White is retained on the bottom side, as well as on the fuselage of the airplane.