NAVAL AVIATION NEWS

Research and Inventions
Ground Controlled Approach
Evaluation of Air Strips

May, 1946
Restricted

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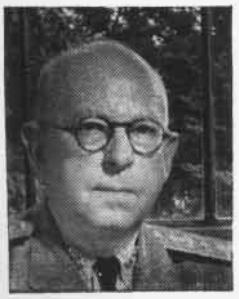
YOU CAN FIGURE THIS ONE OUT IN YOUR HEAD!

SAVE THAT computer for the navigation quiz on page 16; this problem is easy. One report submitted by NAAS CECIL FIELD outlining an inverted flight procedure for breaking landing gear jams on SBD's, plus editorial checking in BUAER added up to one story in NAVAL AVIATION NEWS. Told in 30,000 copies, the story was read by an estimated 300,000 people (10 to a magazine) in all branches of the aeronautical service. Among the readers were pilots of a scouting squadron based in the Pacific. In an emergency a few days later one of them relayed the Cecil Field procedure to another pilot enabling him to unlock the jammed landing gear on his SBD and land safely. That's the answer, and that's how one good idea submitted to and circulated by NAVAL AVIATION NEWS saved a plane and perhaps a life.

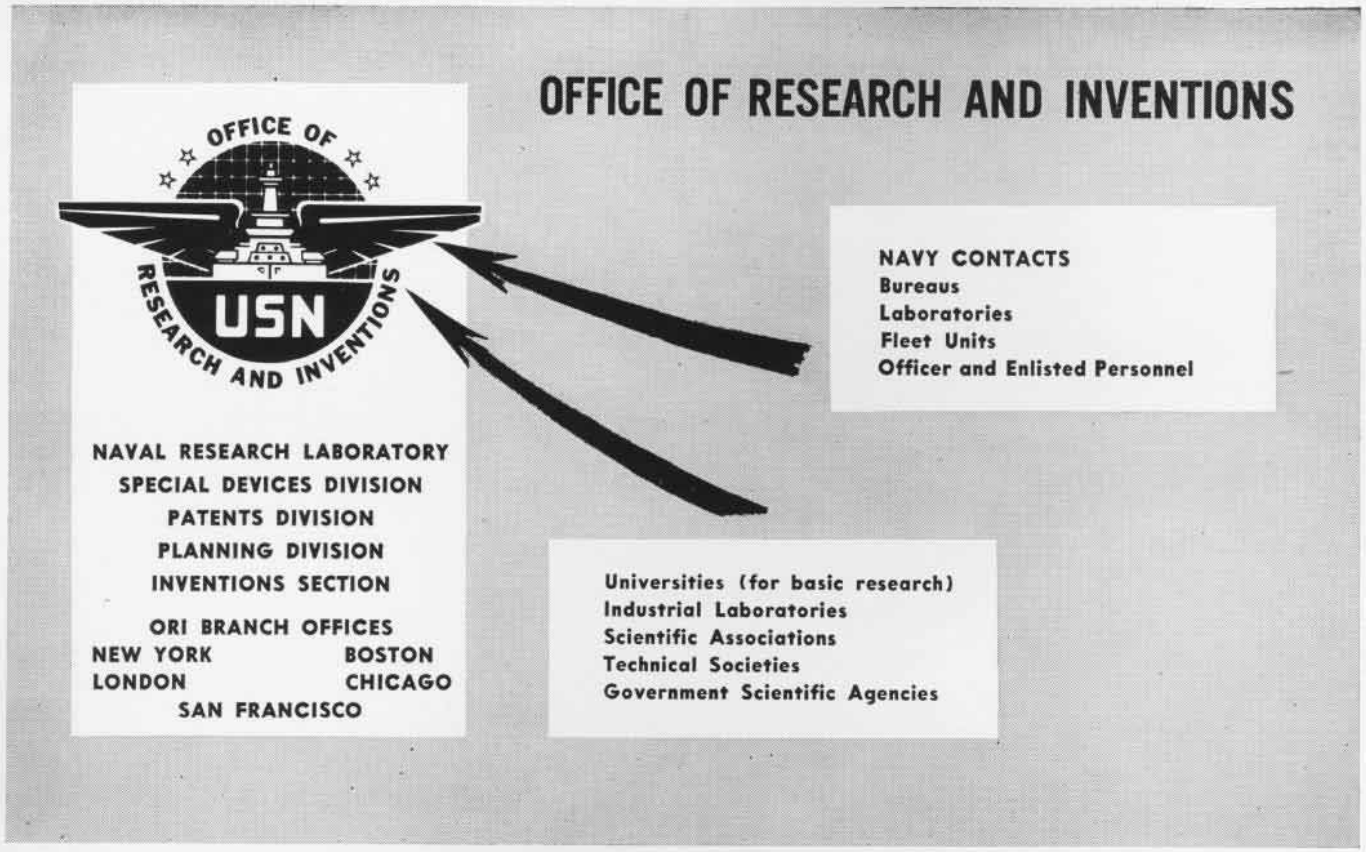
The real problem is getting adequate material for stories and technical articles. That's why commanding officers of all ships, stations and units concerned with Naval Aviation have been directed in Aviation Circular Letter No. 128-45 to submit monthly News Reports for publication in NAVAL AVIATION NEWS. While more and more carriers, seaplane tenders, air stations, training commands, FairWings, Marine aviation activities, squadrons and facilities are reporting regularly, many still have not been heard from. Remember: the benefits from NAVAL AVIATION NEWS are in direct proportion to the amount of interest and cooperation shown by operating units in their monthly News Reports. Share the 'word' with others.



REAR ADMIRAL BOWEN

Job of the New Office of Research and Inventions Is to Keep the United States Navy Out in Front by Stimulating Ideas for National Security in the Future

On the banks of the Potomac in the nation's capital, is a large but inconspicuous group of buildings. They look like any group of industrial buildings on any river shore. Their stacks stream leisurely plumes of smoke. They might be turning out nylon hose or breakfast food. But they're not. Closer observation reveals strange structures atop the buildings. Antennae for radio and electronic gear you've never dreamed about; launching and testing platforms for machines you've never imagined could be conceived. This group of buildings is, indeed, the spawning ground for tools with which man will conquer the elements in tomorrow's world. More properly, it is the maternity ward and nursery for birth and development of ideas that will keep the Navy what it is today—the world's best. This is the Naval Research Laboratory.



Far-Reaching Activities of O.R.I. Tap All Possible Sources for Inventions of Value

REAL beginning of O.R.I. stems back to the first World War. New fields of scientific warfare already had been born, and their potentialities were great. But they needed development. Submarines needed fool-proof guns that wouldn't succumb to salt water corrosion, methods for combating enemy submarines were needed sorely, and the submarine itself was far from perfect. Airplanes and radio promised untold power to the nation that could come out first with the most and best.

With these problems in mind, the Naval Consulting Board, headed by Thomas A. Edison, proposed to Congress creation of a U. S. Naval Research Laboratory. Congress approved it in 1916. Because of the war, however, the laboratory was not completed until 1923. And at that time it consisted of five tiny buildings with a total personnel complement of about 50. At the end of World War II, the complement of the Research Lab was more than 5,000 and its activities filled 70 buildings.

But the laboratory is only a part of the Navy's Office of Research and Inventions. Last May, O.R.I. was set up, headed by Rear Admiral Harold G. Bowen, USN, and his Deputy Chief, Rear Admiral Luis de Florez, USNR. It was organized through a merger of Naval Research Laboratory, the Special Devices Division of BuAer, the Office of Research and Development, now the planning Division, and the Office of Patents and Inventions, now separate Patents Division and Inventions Section.

A staff of scientists and research planning specialists in the planning division is assisting in launching for O.R.I. and the Navy the most extensive program of fundamental scientific research in history. O.R.I. contracts are being made with the nation's scientists in university and industrial laboratories to conduct research in such new and rapidly

AT STAFF CONFERENCES OF ORI, IDEAS ARE DISCUSSED FOR POSSIBLE DEVELOPMENT BY ONE OF THE ORI DIVISIONS, OR BY A BUREAU

expanding fields as nuclear physics and the possible ultimate development of atomic power, electronics with applications in radio, television, and radar, as well as in the fields of medicine, chemistry, mathematics, flight, guided missiles, and mechanics and materials. The Navy must definitely be linked with science in this atomic age. O.R.I. is forging this link.

THAT O.R.I.'s policy is paying dividends is evidenced through the number of patents filed by the Patents Division with the U. S. Patent Office. Currently, this division, which supervises and administers all activities with, or on behalf of the Navy Department relating to patents, inventions, trademarks, copyrights, and royalty payments, originates one of every 20 patent applications submitted to the U.S. Patent Office. This probably is the largest production of patents by any single agency in the country. More than a dozen patent attorneys may have to be employed by O.R.I. to process requests from BuAer alone on inventions pertaining to aircraft and airborne electronic equipment under peacetime expansion plans.

One of the most natural sources of ideas is from the fleet itself, where equipment is used. Many of the Navy's needs for training and operational devices first were recognized by shrewd officers or men who saw a better way of doing something. One pilot noticed there was no escape hatch in his Liberator. He knew that several crash landings had caused the top turret in the B-24's to fall between the pilot and co-pilot, making it impossible for either to get out.

REAR ADM. DE FLOREZ

The pilot went to work. By securing the window - retaining panel with spring-loaded bolts, it was possible to release the whole window simply by pulling the safety wire, thus offering an escape. The emergency exit was noted by the pilot's commanding officer, who aided him in submitting drawings and specifications to BUAER. It sifted through channels, and later was installed on all B-24's at modification centers.

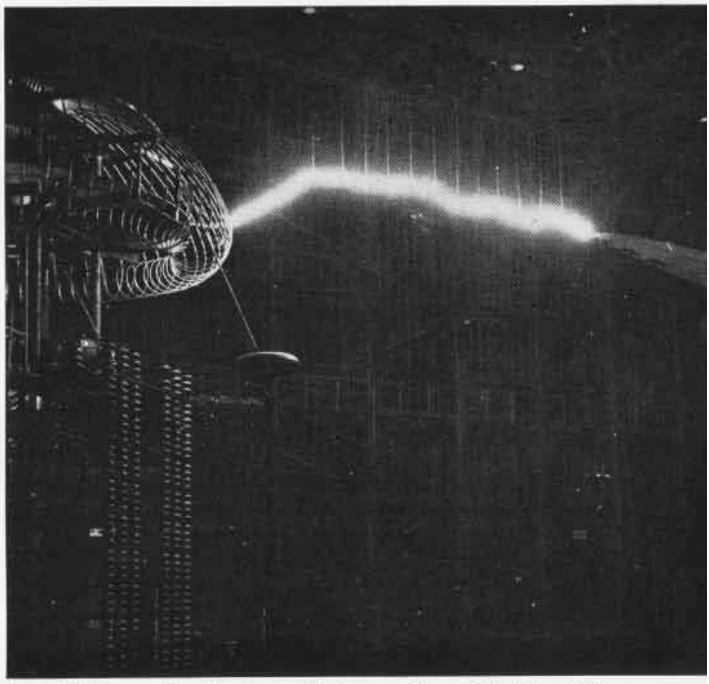
Another example is the communications monitoring system 8-K, originated and designed in the Command Training Office at NAOTC, JACKSONVILLE. It consists of three radio receivers covering all frequency bands. Attached to each is a sound scriber. A message from any plane within its radius is picked up automatically and sound scribed, so that no record of any call is lost, despite the fact that an operator may not be at the set when it comes in. Plans for this equipment were sent through channels less than a year ago.

How does it work? If you have an idea, can you do something about it? Is your idea protected? The answer to the last two questions is "Yes," and here's how it works.

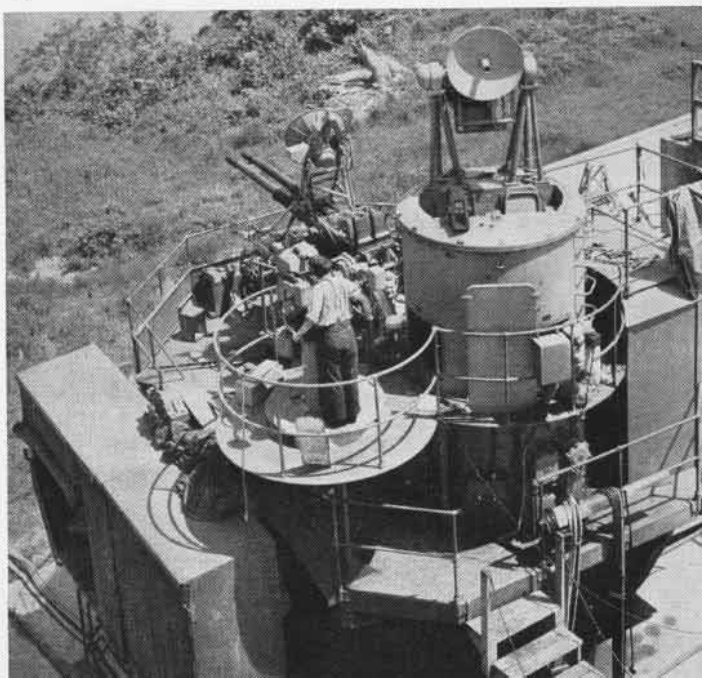
1. Examine your idea to see if it's practical.
2. Consult with shipmates who have special knowledge in the field. They may help you iron out bugs.
3. Make detailed drawings or a working model if necessary.
4. Through your skipper, send the plans to the Office of Research and Inventions, Navy Department in Washington. No comment from your skipper is necessary. Outline the problem, describe current procedure, explain your idea, and include drawings. If bureau experts approve it, it's in the works.

O.R.I. Patents Division prepares patent papers which are sent you for your signature. The Navy pays the filing and issue fees for you. And you own commercial rights to the patent. The Navy retains the right to use your idea, unless the whole thing was done on your own initiative and time, and with your own equipment. Then it is all in your hands.

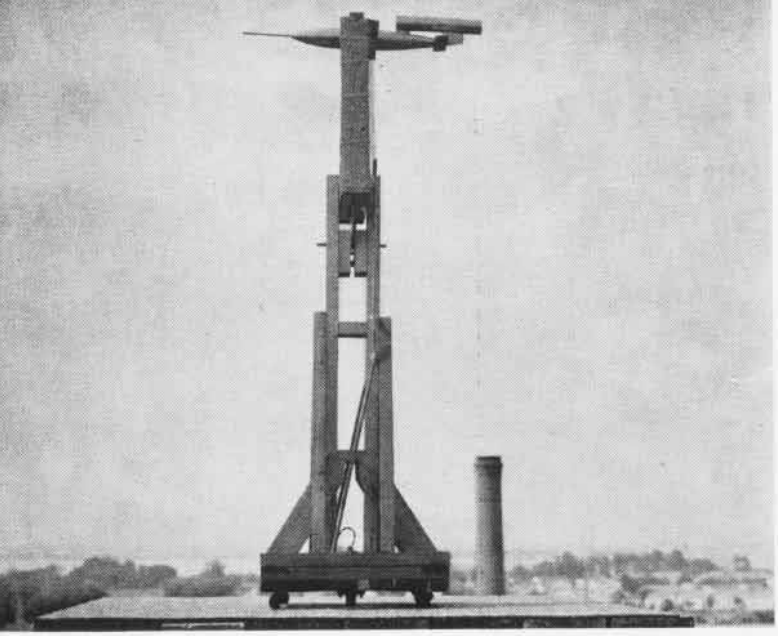
Testing devices simulate realism. This table tests equipment under roll of ship, motor vibration, concussion hammer 'explosion'



Some NRL experiments are made in special outside labs. This precipitation static work directed by Dr. Ross Gunn in Minneapolis



Tests are run until all bugs are out of equipment. Here Mk 61 and Mk 63 radar directors tested at Chesapeake Annex



Among the most recent projects undertaken by NRL is developing of jet and pilotless missiles. This is the JB-2 ready to launch

Reflection measurements of 'harp' indicate reflection coefficients at micro wave frequencies. This is radar 'window' test

Foundry tests casting techniques, armor plate and new alloys for Naval Research Lab

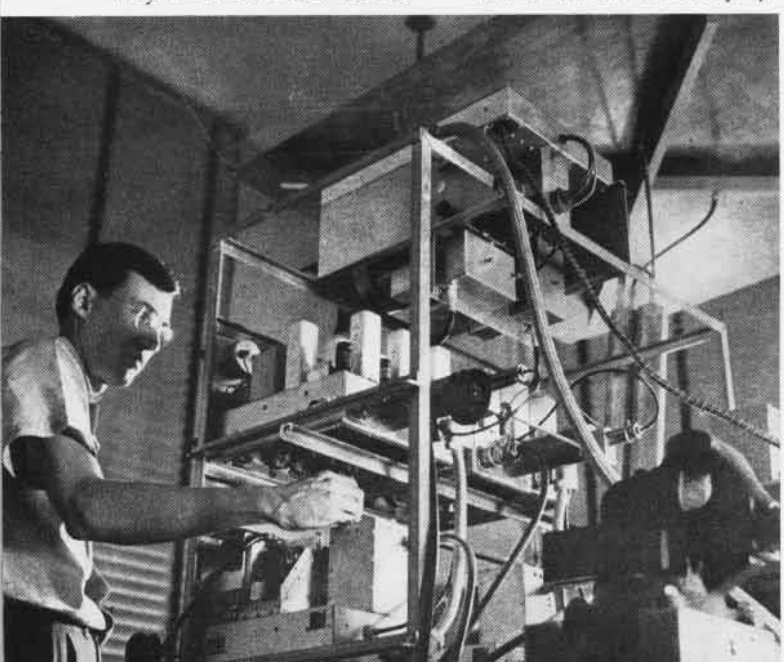
Engineer puts finishing touches on prototype model of direction finder at laboratory

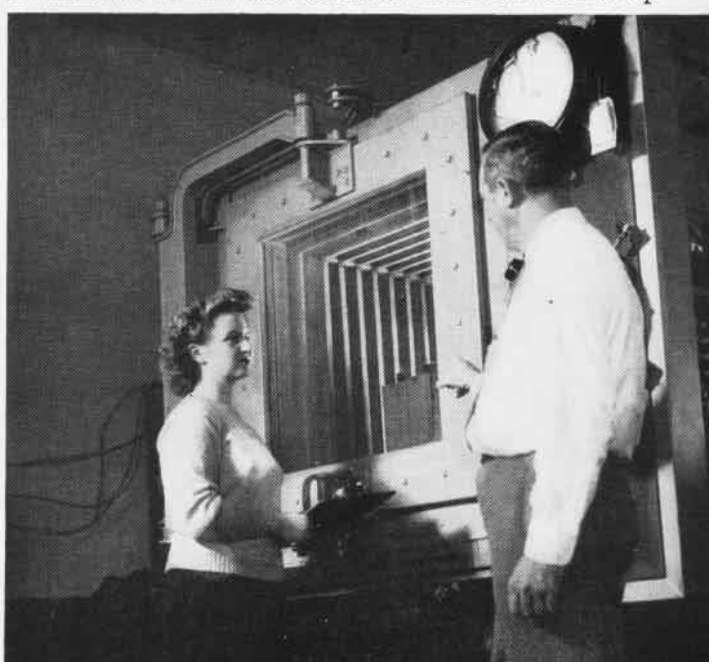
NAVAL RESEARCH LABORATORY

EYES and ears of the Navy, is the term applied to NRL. The mission of this vital division of O.R.I. is "to increase the safety, reliability and efficiency of the Fleet by application of scientific research and laboratory experimentation to naval problems."

To carry out this task during the war, the Laboratory reached a peak complement of more than 2,000 scientific, technical and clerical employes; almost 3,000 naval personnel involved in research. Nearly 3,000 more were enrolled as instructors and students in Radio Material School. N.R.L. was the hub of the O.R.I. science program.

Stratus chamber simulates conditions found at 70,000 feet and 70 degrees below zero. Radio equipment and other gear which will be used under extreme conditions tested to see how it stands up





In view of the basic research programs around which its organization was built, the Laboratory has been in the best position to conduct "evaluation testing" during the war. It now is necessary to cut down radically on such testing programs to assure healthy continuation of the research. As far back as 1939, NRL was leading the field in government research on atomic energy. The Navy's interest in splitting the atom was to produce a revolutionary method of propulsion for warships. Their pilot plant later became a model for one of the three big *Manhattan Project* plants at Oak Ridge, Tenn.

Special divisions of NRL deal with all phases of naval problems: radio, sound, mechanics and electricity, physical optics, chemistry, metallurgy, aircraft-electrical, interior communications, shock and vibration. To cover these fields for ideas, NRL scientists fly in planes, cruise in surface ships under all conditions of weather, dive in submarines and, during the war, they went out to observe equipment under combat conditions, to devise new and better equipment or improve on the old.

The work of these men is seldom known and has been done anonymously in cooperation with others. Importance of their work is not realized often by the public until years after its completion.

From 'A-S Baker' Radar to Pilotless Jets

By the war's end NRL had developed electronic listening devices for a multitude of purposes ashore, afloat and under water. But airborne electronics ran to the greatest and wildest number of ramifications of all.

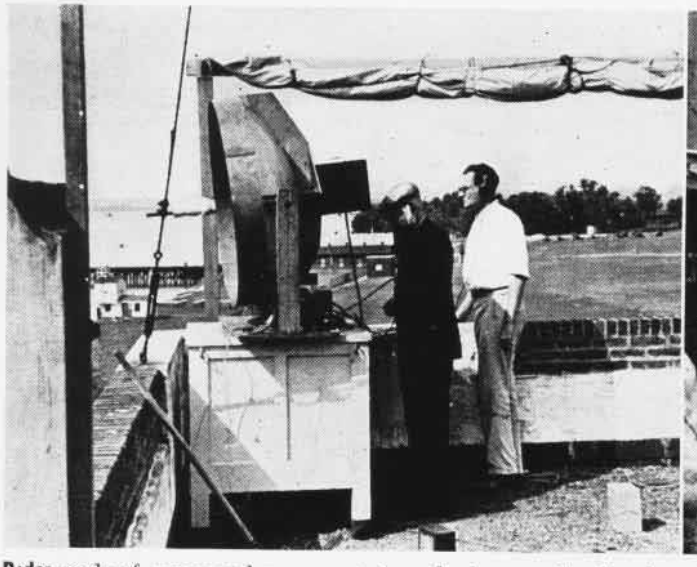
One device was a radar unit so designed that any enemy sub listening electronically for aircraft, would be convinced that the approaching Navy plane was *departing*.

By last year, all Navy combat planes carried radar gear for searching out targets, identifying them as friend or foe, bombing accurately in zero visibility, communicating reliably and navigating to home base in any weather. Today's patrol bomber carries 27 radar units.

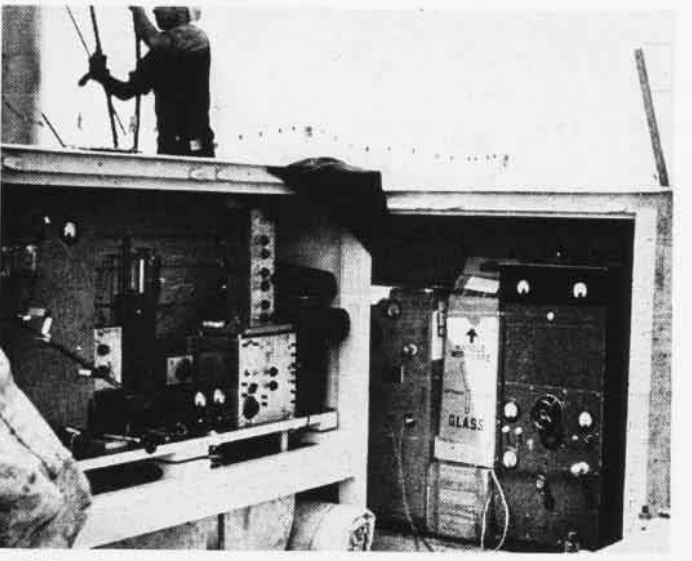
Naturally, the enemy had radar too during the war. NRL helped the Navy air arm in perfecting methods to use *window* and *rope* to counteract his search radar. Dropped from planes, the RCM jammed the scope patterns so presence of U.S. planes could not be plotted accurately.

NRL also contributed to:

First high and super-high frequency radios used by the Fleet (1925-30).



Radar made of scraps and spare parts in early day was developed by Dr. A. Holt Taylor (with cap), chief electronics consultant



First radar installation on board ship was this conglomeration of machinery, taken in 1937. From this beginning came Navy radar

During the war, fundamental research was curtailed somewhat because of the immediate need of the Navy for development of existing devices. Radar, a development begun by NRL in the 1920's as a by-product of radio propagation research, needed immediate development and production.

Underwater sound equipment, though already in service use, needed further perfection. New types of engines for air and marine craft needed to be developed to meet the pace of modern war. Vast strides made by aviation created an immense field of development. In short, the wartime job of NRL was to make practical all ideas and theories evolved during the years of peace. And the success of this development was well borne out by the excellent record made by the Navy during the war.

The most important airborne equipment in the early part of the war was the ASB radar. NRL had developed this first airborne radar long before the war. Some 30,000 sets were used by naval aircraft in the first year of fighting. Even at Guadalcanal, the "Tokyo Express" found things mighty insecure if a Navy plane passed within 50 miles.

Development of radio controlled craft, using target aircraft (drones) and target ships (1924-33).

Underwater echo-ranging device for detecting enemy subs. This one broke up the "wolf packs."

Sonic depth-finder—first successful acoustical means for measuring ocean depth from a ship underway.

Substitute metal for aluminum in aircraft—development of "sandwich" type materials (wood sheathed in metal).

Successful methods for eliminating precipitation static.

Mechanical foam that can extinguish 40,000 gallons of blazing gas and oil in eight to 14 minutes.

Important current work of NRL in naval aviation is in development of new fuels and controls for guided missiles. Resojet, ramjet, liquid jet—all are being studied.

Back in 1924, NRL staged successful demonstrations of drone control of aircraft. Laboratory interest and participation in this work has never ceased and it is expected that developments of this nature will form a most important part of the laboratory's future.

A substantial portion of Naval Research Laboratory's efforts will be devoted to airborne electronics in the future. Present scientific indications are that remote-controlled guided missiles may play an important part in the world of the future, using radar, television and radio for guidance.

SPECIAL DEVICES

THE BOMBARDIER groaned. "If only my training had included those little red baseballs coming up fast as hell."

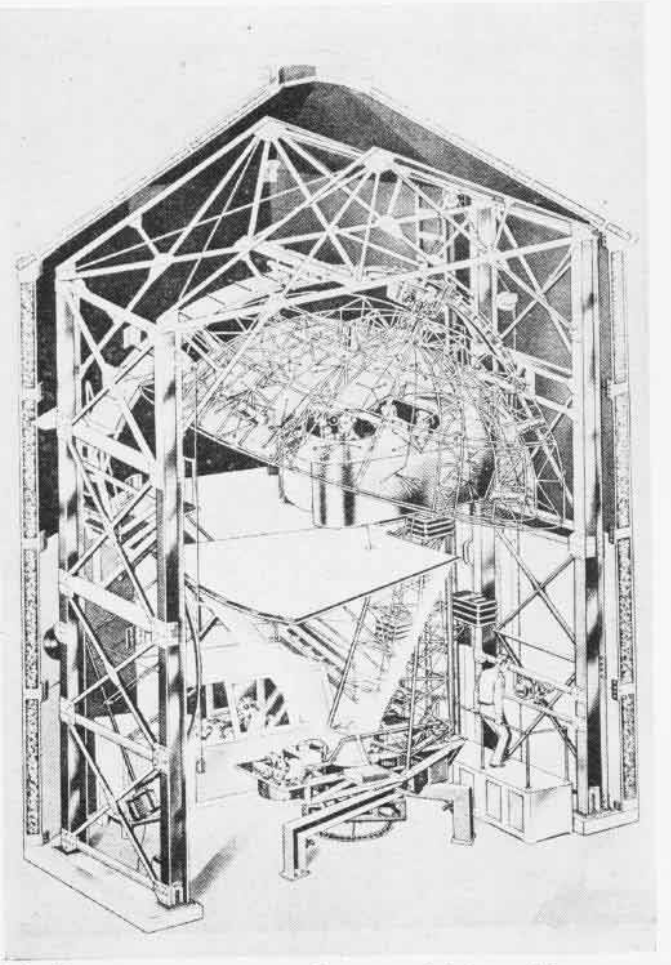
The gunner squirmed. "I'd never seen a Jap plane in the air before. It looked different."

Comments like these, early in the war, showed that hurriedly trained men weren't able to make the most of excellent equipment. In April 1941, ideas of Rear Admiral Luis de Florez (then Commander), began to take form in plans for training devices that could do everything the real thing could do, including visual and sound effects. Special Devices was born. By June, the activity was transferred to BuAer Training Division. Two years later it was a division itself, and last year it became an integral division of ORI, doing a stupendous job of "synthetic training" and "human engineering"—adjusting equipment to the individual rather than trying to fit the individual to the machine.

By the war's end, more than 500 different types of training devices, upon request, were delivered by the thousands to ground schools, ships and advanced bases. The AAF and our Allies used them. The devices ranged from ridiculously cheap recognition model aircraft to the $500,000 patrol bomber operational flight trainer. The latter is a replica of a PBM. All controls operate and produce reactions that occur in actual flight. It is "flown" by a pilot and co-pilot. Navigator, radioman, and flight engineer all man operative posts. The handling of all control registers in the instrument panel as it would on a regular mission. Path of flight is recorded on a table near the instructor. By working his own panel, he can change wind direction to fool the pilot. Icing and load factors can be imposed. Engine noise can be made to sputter, indicating trouble. Immediately the oil pressure drops off. The trainer does everything an airplane might do, with the advantage that "trouble" can be imposed without wrecking an engine or endangering crew or plane.

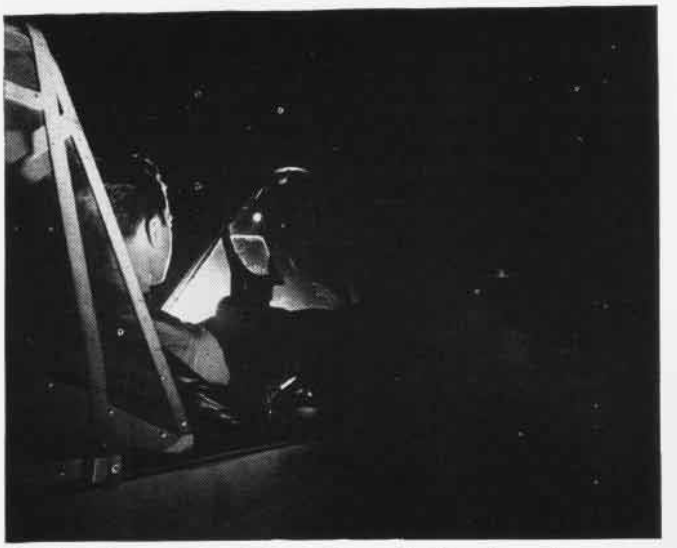
Similar devices include cockpit replicas for different type planes; arming replicas to give aircrewmen practice in loading bombs and ammunition. An advanced bomber trainer teaches dead reckoning, observation reconnaisance and high altitude bombing with an actual view through the bombsight of drifting countryside below, coordinated with path of plane, speed, etc. The bombardier hears the roar of motors, sees clouds and mist over his target, and flashes of light indicate his hits or misses.

One of the most elaborate devices is the Link Celestial Navigation Trainer, 50 feet high, with collimated stars in a domed sky. Landscapes are projected on a screen below to simulate altitudes up to 30,000 feet to aid in training.

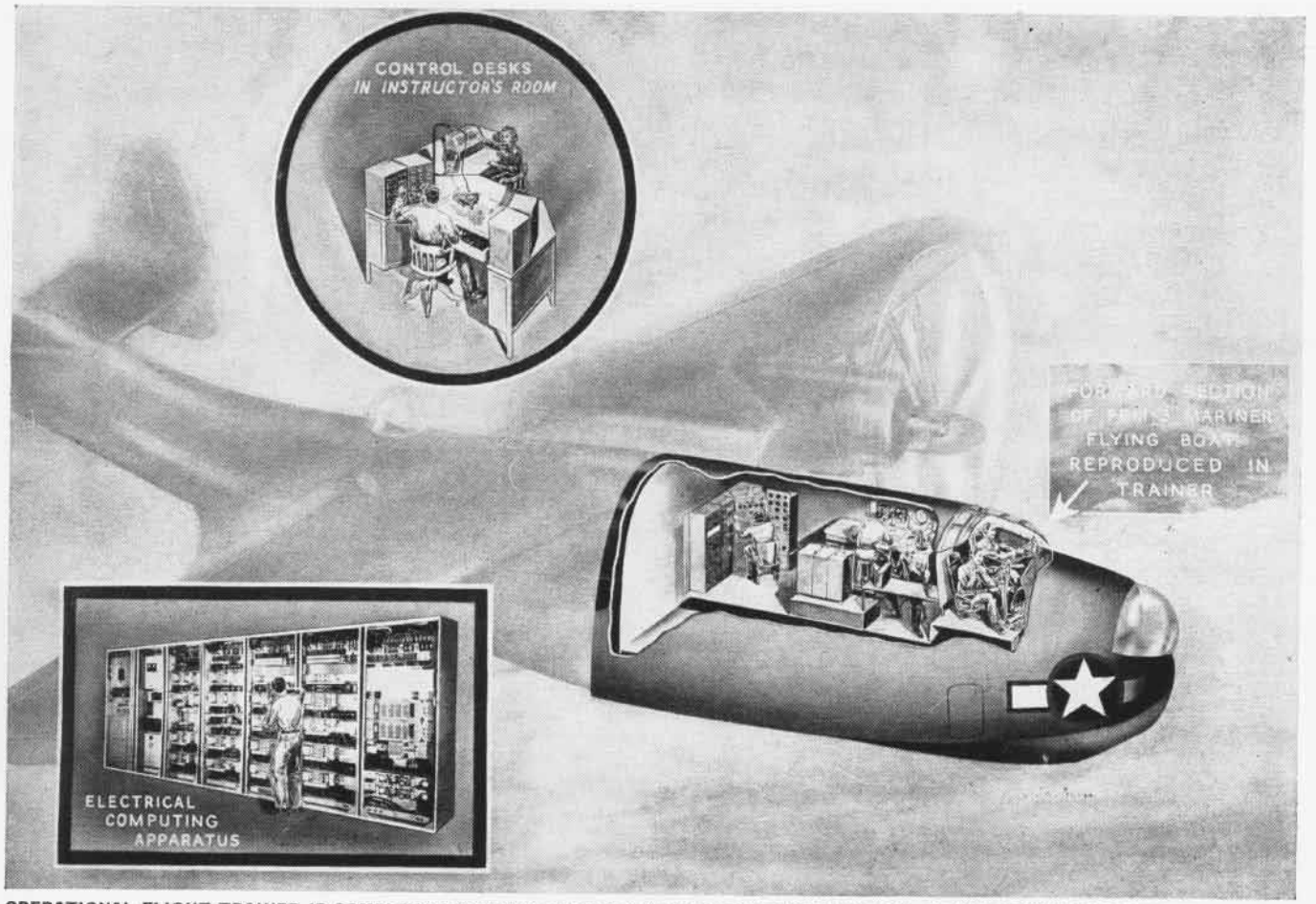


Celestial navigation trainer simulates actual flight problems, even to star-studded sky which clouds over at instructor's will

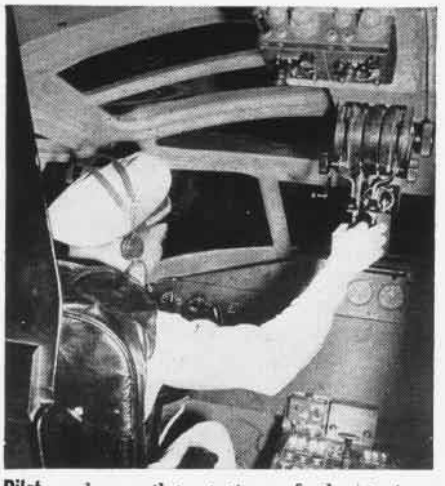
Bombing and dead reckoning trainer permits students to practice bombing with regular bombsight while terrain moves along below



Gunairstructor enables fighter pilot to fly his plane after enemy and shoot at him as sky, sea and land swirl by during the runs

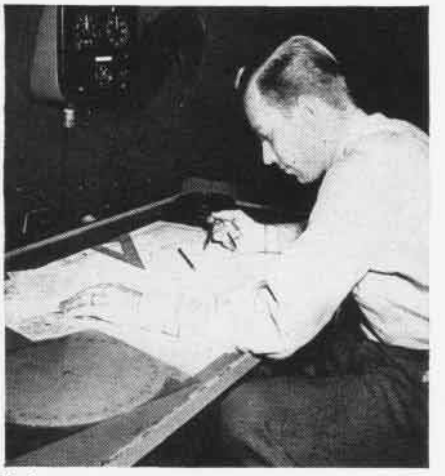


OPERATIONAL FLIGHT TRAINER IS COMPLETE ASSEMBLY OF PBM STATIONS FOR TAKING 'PLANE' ON 'MISSION' WITH SIMULATED HAZARDS



Pilot and co-pilot station of the trainer has all controls found in the real thing

Flight engineer station is perfect as to detail; starts engines, takes off, lands



Navigator has real problems. PBM actually goes some place — on instructor's table

A WHOLE series of devices teach free gunners to get the "feel" of combat. Flashes of light boresighted with guns in a maneuverable turret appear on a screen where an enemy plane is weaving through the sky ahead. Still another, by use of a projector and screen which provide a sky and enemy plane, teaches fighter pilots to "fly" their plane after the enemy. Clouds, sky, land, sea swirl in mad kaleidoscope.

To meet urgent anti-aircraft needs, hundreds of devices were made for use aboard ships. An aero-medical unit of Special Devices developed refrigerated altitude chambers, oxygen equipment, night vision and fatigue testing devices.

To insure that devices are used properly, Special Devices found they would have to send men into the field to indoctrinate device users. When a landing gear warning device known as a "howler" was developed and put on planes, one pilot came in with wheels up. The plane's howler went off and the control tower sent a string of violent warnings. Despite this, the pilot landed wheels up. After crunching to a halt, he was asked why he failed to heed the voice warnings. "How the hell could I hear what you were saying," he grumbled, "with that damn noise behind me!"

During the last part of the war, Special Devices trained almost 500 officers to qualify on all equipment as Special Devices field officers. These men then indoctrinated others.

GRAMPAW PETTIBONE

Letter to Grampaw Pettibone

"Dear Sir:

Of course, no one should rely on memory in lieu of a printed check-off list. However, the following is a bit of easily-memorized verse which includes a number of points not normally appearing on check-off lists. It is a good supplement to a printed list to be run over in one's mind while waiting for head temperature to come up or while waiting for that green light from the tower.

Take-Off Check-Off in Doggerel

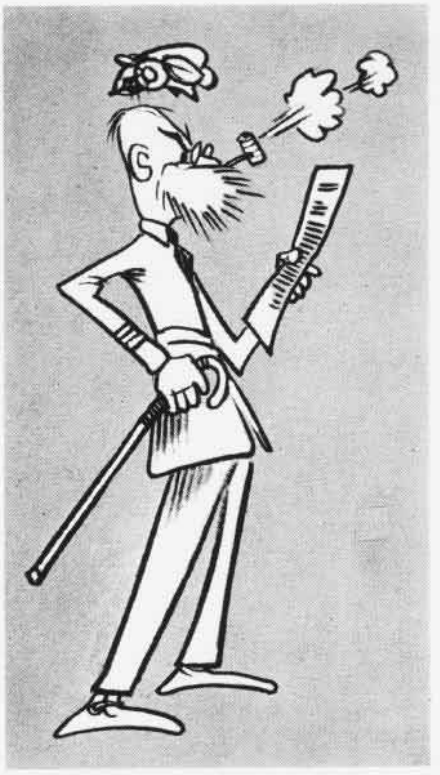
I'm in low pitch and my mixtures rich,
And my blower couldn't be lower.
My quadrant's tight and I've checked by sight
The selector crank, and the fuel in the tank.
The fuel pumps on, and the controls I've tested,
In volts and pressures I'm always interested.
My wings are locked and the pitot's unsocked,
I've set the tabs and set the flaps,
And tightened up on my shoulder straps.
My cowling's sealed and my eyes are peeled,
I'll lock my tail and leave the field."

Grampaw Pettibone says:

We greatly appreciate your rhyme and I, for one, am committing it to memory. I will use it only as you have suggested as a SUPPLEMENT to the *check-off list.* Do we have any other practical poets who will write a readily remembered "landing check-off verse?" I'll be looking for contributions!

Torpedo Squadron Doctrine

A torpedo squadron writes that according to their doctrine, bomb bay doors are not to be opened until planes are clear of the formation and in the bombing run. Two recent breaches of



this doctrine within their squadron show what can happen when this precaution is disregarded.

Case One. While conducting a high speed break-up from a nine-plane formation, one pilot opened his bomb bay doors prematurely, allowing a 100-pound GP bomb to fall through the formation, narrowly missing several planes. It was determined through investigation by the squadron ordnance officer that the bomb had sufficient air travel to become armed before clearing all planes in the flight, and therefore could have caused a very serious accident. The reason for the bomb's releasing when doors were opened was found to have been caused by defective wiring.

Case Two. After breaking formation to make a glide bombing run, the pilot opened his bomb bay doors before entering his dive. As in Case One, his bombs released due to defective wiring when bomb bay doors were opened, allowing the bombs to fall far short of the target. Fortunately no accident resulted and the bombs exploded harmlessly in the water, but the possibility of more serious consequences was quite evident.

Reversitis

The pilot of an SC lined up with the wind streaks and landed, his only miscalculation being in the wind direction, which was exactly 180° from that of his approach. Upon making contact with the water, the SC's float dug in and the plane flipped over on its back.

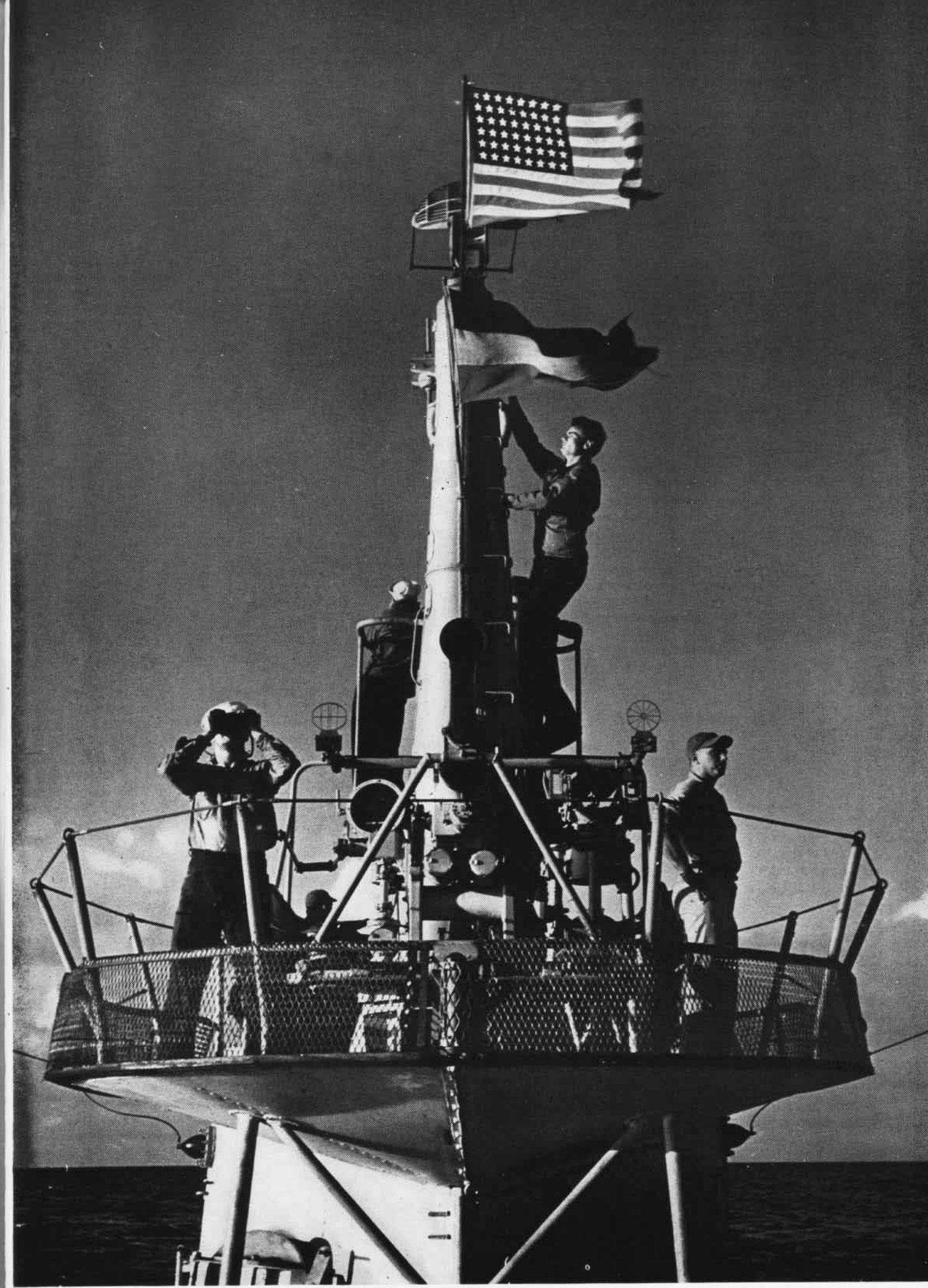
Immediately following this plane was another SC whose pilot also had doped off. Seeing the first SC crash, the second pilot landed (also downwind) to give aid. After assuring himself that rescue proceedings were well in hand, the second pilot began a take-off—downwind!!! Unable to get off the water, and while traveling at a high ground speed, his plane bounced heavily on several swells, causing severe damage. Wind socks and smoke were to be seen and could have been used as a check on wind direction by these pilots.

Grampaw Pettibone says:

Perseverance certainly is a desired trait in a naval aviator but only when it is tempered with inquisitiveness, caution and just plain good common sense. Wind shifts of 180° within short periods of time are not uncommon. When landing and taking off, pilots should use all means available in checking the wind. In seaplane operations it is axiomatic that before take-off a pilot should idle his engine thus permitting his plane to weathercock into the wind.

LIFEGUARD SUBS VITAL PART OF AIR/SEA RESCUE →

One of the pilot's best friends when he is in trouble in wartime is the lifeguard submarine standing offshore to pick up ditched fliers and their crews or posted along the flight path to watch for shot-up planes which might have had to ditch without being able to radio for help. Lookouts like these on the U.S.S. Sand Lance *helped locate and pick up 137 men during the war by official records, and probably many dozen more who never were entered in the books. Subs on guard duty usually monitored two distress frequencies—4475 KCS and VHF (voice) or 140.58 MCS—in rescue work. During the war the very existence of lifeguard subs was closely guarded so that the enemy would not know how closely they worked with fast carrier task forces or strikes from nearby islands, to insure that every possible Navy pilot or crewman was picked up as soon as possible.*



This is what happened when a flight leader led his group over a congested residential district at an altitude below that prescribed by paragraph 60.105 of C.A.R., which states:

"Except when necessary for taking off and landing, aircraft shall be flown:

"(*a*) when over the congested areas of cities, town, settlements, or open-air assemblies of persons, at altitudes sufficient to permit emergency landings outside such area and in no case less than 1,000 feet above such areas, and

"(*b*) when elsewhere than as specified in paragraph (a), at an altitude of not less than 500 feet, except over water or areas where flying at a lower altitude will not involve hazard to persons or property on the surface."

The engine of this plane suddenly failed, leaving the pilot with only two choices: bail out or land. He courageously attempted a forced landing in an unoccupied street, but telephone poles caused plane to swerve out of control and crash into this house. Fortunately no one was seriously injured.

Night Emergencies

At 2,000 feet during a night flight, the engine of an F6F began cutting out. Calling his station tower, 15 miles distant, the pilot said he was returning for an emergency landing. Four miles from the field, the engine failed completely. So much altitude had been lost by this time that the pilot apparently decided a safe bail-out impossible. In the ensuing forced landing attempt, the plane crashed and burned, killing the pilot.

Grampaw Pettibone says:

The pilot's initial decision to attempt a return to the base while he was still at safe altitude is not criticized. His desire to save the plane is both understandable and laudable. However, as a lesson to other aviators, it should be pointed out here that this pilot made a fatal mistake in not jumping before he had lost so much altitude that a successful jump was impossible.

Forced landings at night are extremely hazardous. When there is a choice, they should not be attempted on land unless exceptional circumstances exist, such as non-availability of parachutes in certain transports or a combination of unusual visibility and known favorable terrain conditions. If you have sufficient altitude, your best bet usually is to jump before you get too low. Forget about saving the plane; it's unimportant when your life is concerned.

Likewise, it is considered much safer to jump than to attempt a forced night landing at sea in a small landplane where all emergency equipment is carried in the pararaft. In large airplanes, however, the danger of such a landing usually will be offset by the advantages to be gained from retaining contact with the emergency equipment carried in the plane and from keeping personnel together for mutual assistance.

He Didn't Get the Word

At 4000 feet, the pilot of an F6F experienced complete engine failure. Upon checking his engine instruments, he noticed the fuel pressure had dropped almost to zero. He shifted from reserve to right main but observed no increase in fuel pressure so shifted back to reserve (empty). The engine quite naturally failed to restart and the pilot made a wheels down landing in an orchard. Shortly after the wheels contacted the ground, the plane overturned. The pilot struck his head on the windshield and received serious injuries to his right eye. He had unlocked his shoulder harness during the descent and had failed to relock it for the landing. It was apparent that the lowering of wheels for a landing on such terrain contributed to the seriousness of his crash.

The Accident Board was of the opinion that the pilot failed to shift tanks until after fuel pressure was lost and thereafter employed faulty procedure in attempting to regain suction.

Grampaw Pettibone says:

Damn! Same old story! I get a little fed up with talking about these three asinine errors, but I guess as long as some guys don't get the word, we have to keep trying to drum it into their thick skulls.

Surely no one needs further convincing of the life-saving value of the shoulder harness. Obviously it doesn't do any good unless it is tight and locked.

Never lower wheels for a forced landing on soft terrain. In fact, the only time you want to lower wheels for a forced landing is when the terrain is hard and it is apparent that an entirely successful landing can be made.

In regard to this pilot's failure to regain suction after shifting tanks, quote part of Flight Safety Bulletin 25-44 outlines six steps for regaining suction.

STEPS

"a. Shift to proper tank with positive, visual check of selector valve position.

"b. Switch on auxiliary fuel pump, or use hand wobble pump.

"c. Retard throttle to ¼ position.

"d. Place mixture control in IDLE CUT-OFF until adequate fuel pressure is built-up (6 p.s.i. for Injection Carburetors, 2 p.s.i. for Holley and float-type carburetors) then return to Auto Lean or Auto Rich.

"e. Nose over into steep glide.

"f. Use primer if necessary."

Better review this Flight Safety Bulletin unless you know all the "whys and wherefores".

GRAMPAW'S SAFETY QUIZ

1. On coming in to land what signals should the pilot give to the co-pilot to lower wheels?
2. Why should pitot static tubes be covered when airplanes are not in flight?
3. Who is responsible for promulgating the instructions to be observed in operating Naval aircraft?
4. Whose responsibility is it to see that pilots keep themselves informed as to the contents of Technical Orders and Technical Notes pertaining to the type of equipment with which they are concerned?
5. What piloting experience is required for operating multi-engine light transport aircraft: (a) Under C.F.R.? (b) Under I.F.R.?

Answers on Page 40

Blown Out of His Area

While practicing acrobatics at about 5,000 feet for almost an hour, a primary student forgot about keeping a check on his position and was blown out of his squadron area. Being unfamiliar with surrounding territory and not having noticed the direction he had been drifting during his stunting practice, he was completely lost.

Shortly thereafter, he decided to make a forced landing. Poor emergency landing technique resulted in a crash—almost 40 miles west of the station field.

Grampaw Pettibone says:

This student apparently concentrated on his stunting practice to the point where he forgot about keeping a check on his position. But even after he realized he had been blown out of his area, he should have been able to locate himself had he previously taken the time to familiarize himself with the terrain and landmarks just outside his own squadron area.

Early in his flight training, a student must learn to divide his attention so that he can keep a constant running check on a great many items. He cannot afford to let his attention be concentrated on any one thing for more than a few seconds, or he is leaving himself open to trouble.

COMBAT AIR CREW SCHOOL REORGANIZED

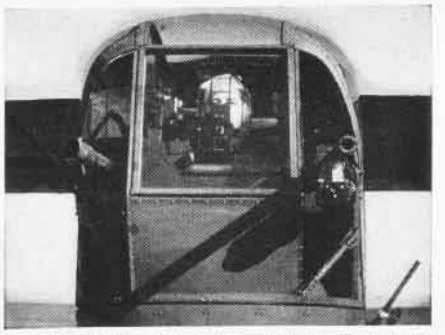
ENLISTED men with a yen to fly as combat aircrewmen on multi-engined aircraft will train on a competitive basis in winning their wings in the post-war Navy. Reorganization of combat crew gunnery training recently set up Aviation Fundamentals Schools under the Chief of Naval Air Technical Training, Jacksonville.

After preliminary training, recruits will attend Aviation Fundamentals School for approximately 14 weeks of training in every phase of naval aviation. Incorporated in the syllabus will be a two or three week course in basic aviation gunnery.

Men finishing these schools will be assigned to fleet units, filling billets in which they excelled in training. Outstanding recruits will go to Class A schools for training as radio or radar technicians, ordnancemen, or machinists and will emerge as seamen strikers. By the time they are ready for combat crew training, these men will earn ratings in their respective units according to their abilities and ambitions.

After proving themselves, recruits will be sent by their unit commanders to advanced fleet gunnery schools established by Commander Air Force, Pacific Fleet, and Commander Air Force, Atlantic Fleet.

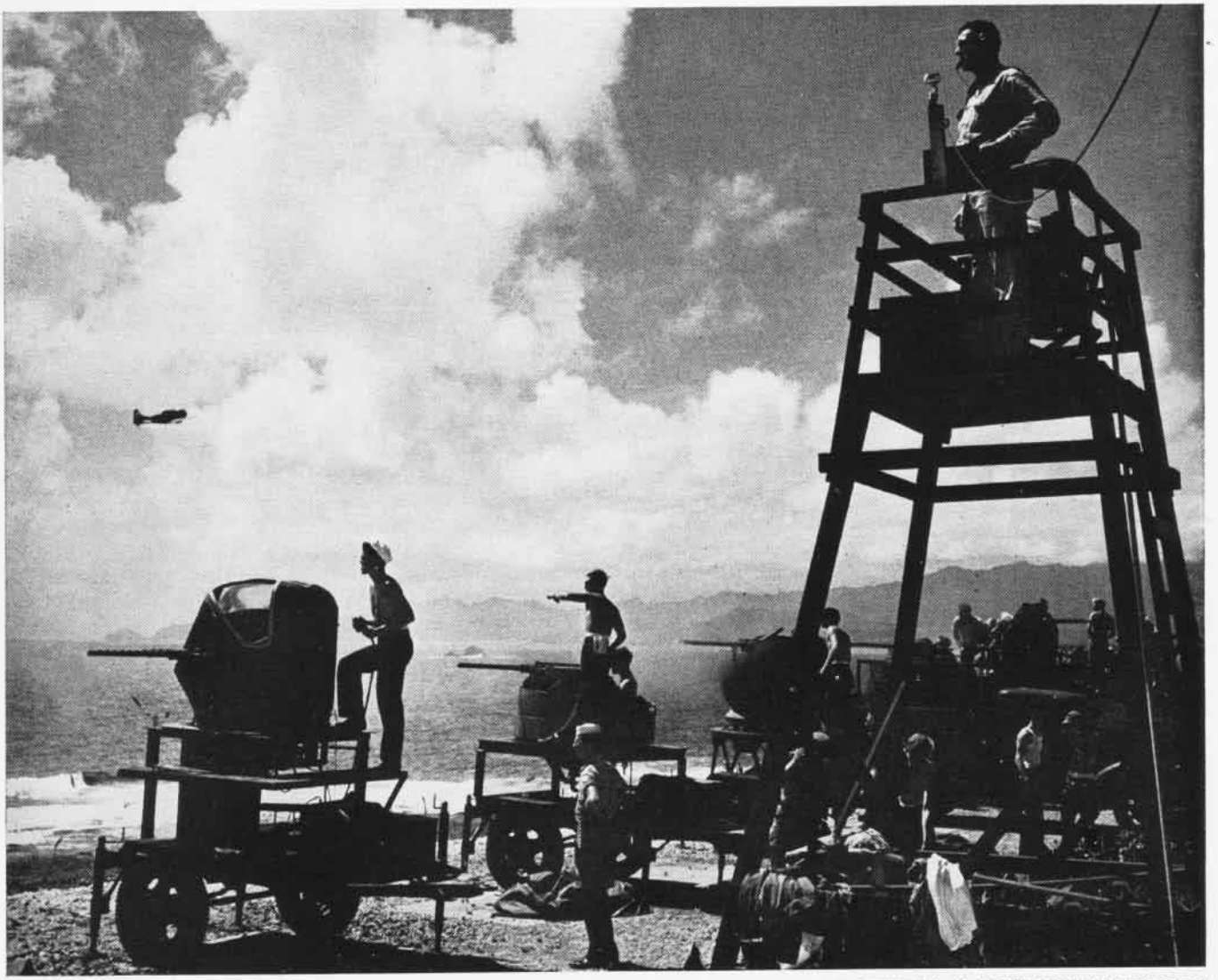
Air-to-air firing will be emphasized in fleet schools where prospective crewmen will take an intensive advanced gunnery course of about one month duration. High-speed targets towed by fast JD-1's, the Navy's new utility plane, will aid crewmen as they train with the latest ordnance equipment. Following this training they will form combat crews and fly with a PPC and two junior aviators, learning the latest electronic and technical data.



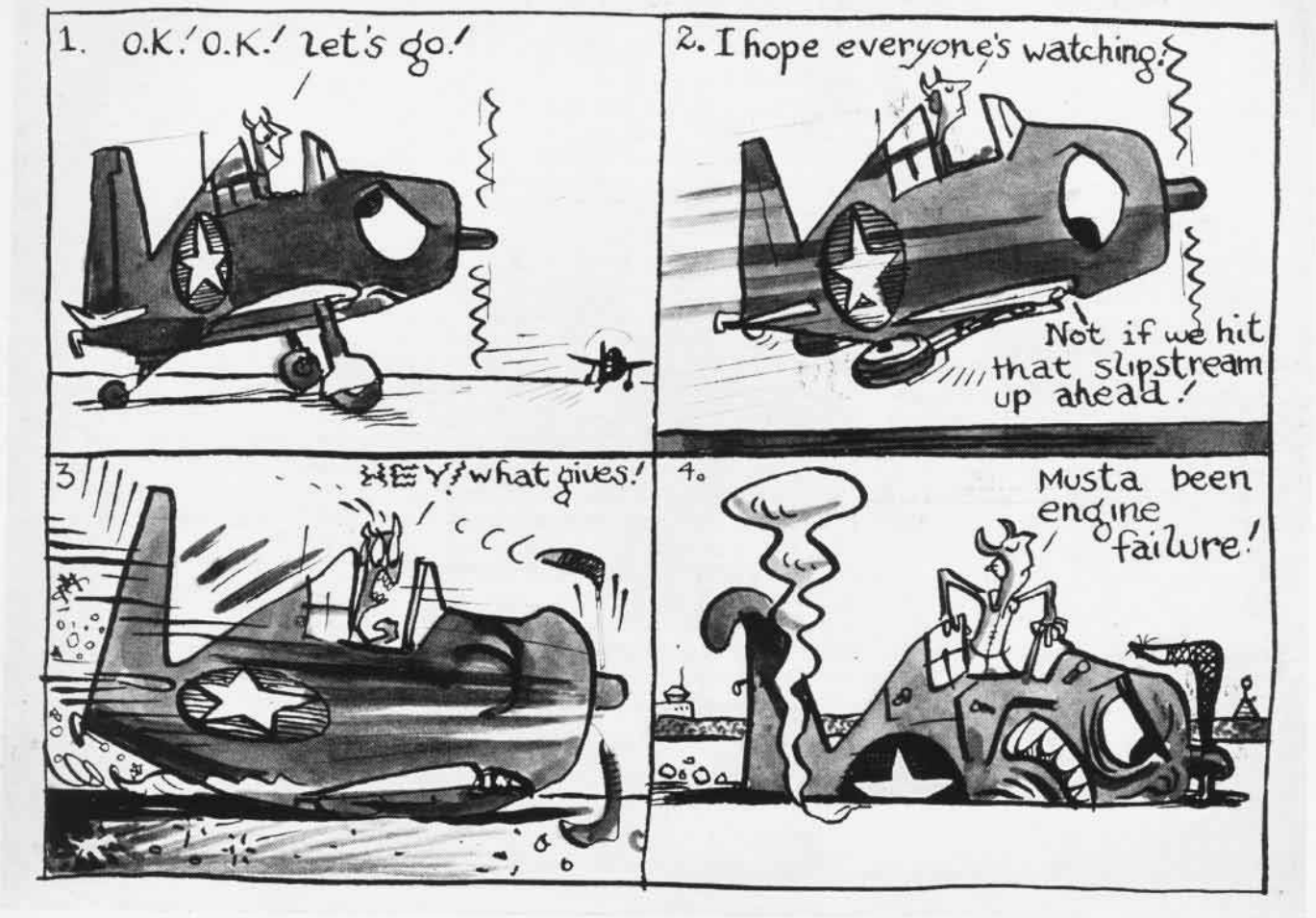
PILOTS WILL GET EXPERIENCED CREWMEN

As these crews are assigned to the fleet, other crews will be rotated at regular intervals. Pilots, under this system, will have the advantage of training with crewmen who already have a background of aviation knowledge.

By July of this year, the one remaining NAGS at Jacksonville will be disestablished and its facilities placed under the Aviation Fundamentals School which is to be set up on that base.



LATEST EQUIPMENT, SUCH AS USED AT NAS KANEOHE, WILL AID IN TRAINING OF COMBAT AIRCREWMEN IN FLEET GUNNERY SCHOOLS



Lt. (jg) Boymy Hott

Moral: Keep your wheels down until there is no possibility of landing safely on the runway.

THE LANDING gear of most modern planes operates hydraulically. In general, all that is necessary for the pilot to do to actuate the gear is to move the landing gear control to the desired position. This ease of gear operation is a great aid to the pilot, but the pilots that use this aid to raise the gear prematurely usually get in trouble. The parade of alibis explaining these embarrassing exhibitions includes everything from slipstreams and bumpy runways to misinterpretation of signals by the flight crews. Needless to say, none ever satisfactorily explained the necessity for such ultra-snappy raising of the landing gear.

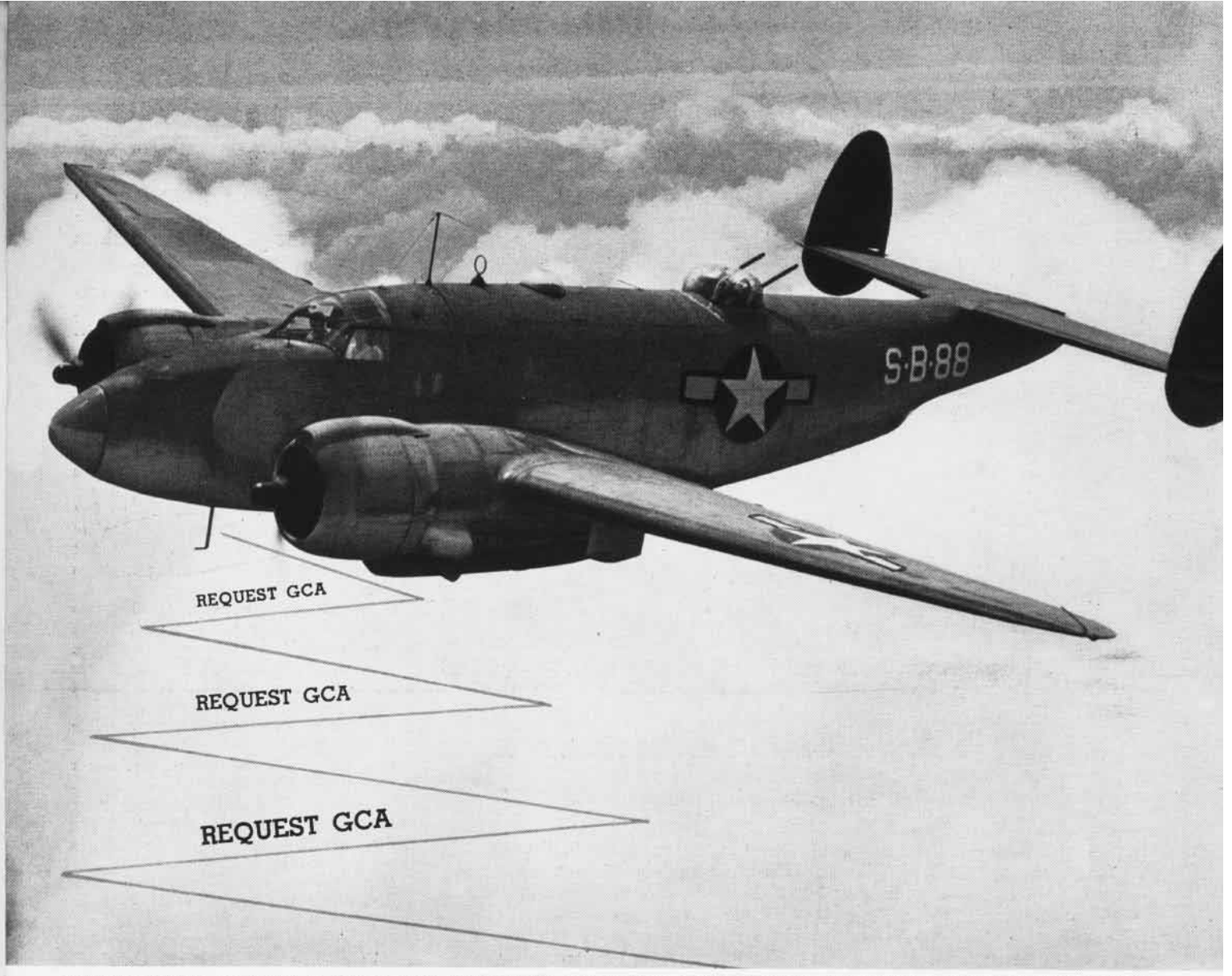
All pilots have been advised and instructed not to retract wheels until there is no possibility of landing safely on the runway. But in spite of this "advice and instruction" there still is a noticeable tendency among pilots to pull up wheels as soon as planes become airborne. The number of such accidents is legend—here are some typical examples of poor pilot technique, taken from accident reports:

CASE I. The pilot on takeoff raised his landing gear at the first indication of being airborne. The plane settled to the ground in a wheels-up position and skidded to halt on the belly. It is evident that the pilot raised his landing gear on the first indication of being airborne and did not check his airspeed or altitude before raising his wheels.

CASE II. As the plane became airborne, the landing gear was retracted. The plane settled back to the ground resulting in "strike" damage. Landing gear and hydraulic system was checked after the accident and was found to be in good operating condition. Due to the landing gear being in good operating condition, this accident was assessed as 100% pilot error in that the pilot misjudged as to when the aircraft was airborne and retracted his wheels too soon. A contributing factor in this accident was that the pilot apparently forgot he was taking off with a more heavily weighted model than he was accustomed to, and failed to take this added weight into consideration in his effort to get airborne. The accident board recommended that all pilots be again reminded that added weight in the form of belly tanks, bombs, special equipment, etc., results in longer take-off runs for all aircraft.

That's the way most case histories read—pilot retracted wheels too soon and settled to the ground in a wheels-up position causing major damage to the aircraft. Although this type accident is seldom fatal when the shoulder harness is used correctly, it rates high in the embarrassment it causes and in the difficulty of explaining the need of the ultra-snappy wheel retraction. As can be plainly seen it is an *inexcusable* accident that reflects disgracefully on your squadron record and Naval Aviation.

AVOID PREMATURE RETRACTION OF LANDING GEAR AND THIS TYPE ACCIDENT WILL CEASE.



GROUND CONTROL APPROACH IS THIS PLANE'S BEST CHANCE FOR LETTING DOWN THROUGH THE CLOUDS TO A SAFE LANDING BELOW

GCA

GROUND CONTROLLED APPROACH

REQUEST GCA! Just two short words, but what they mean to a pilot stranded up in the soup is a safe way down to that good brown stuff from which cows get grass—regardless of the weather! Impossible? Don't bet on it, because it is being done today—right now—with less than a 50-foot ceiling and ¼-mile visibility.

Believe it or not, GCA guarantees to break a plane out into the open, over the end of the runway, under those conditions. Furthermore, it's the proud boast of the well-trained GCA crews that they can do even better—regularly! Authenticated cases prove that they know what they're talking about.

How do they do it? By radar. What special equipment must there be in the plane? Not one oversized gee-gaw. Nothing in the planes is needed but an ordinary, standard radio set equipped with transmitter and receiver, and a guy with plain, everyday sense who can fly a little basic instruments and follow instructions that are relayed to him from competent ground crews.

Three crewmen concentrate on the landing of a fogbound plane. In the foreground may be seen the scale with built-in miniature plane which interprets variations

Most Simple of All Instrument Landing Procedures Found in GCA 5-Man Teamwork Directive System

GCA is the abbreviation for Ground Controlled Approach. It is the answer to a pilot's prayer—that prayer uttered at 5000 feet with 4950 feet of condensed atmosphere below and an urgent desire to reach terra firma that is provoked by a limited petrol supply.

Nothing is complicated about GCA. Briefly, here's how it works. The pilot's stuck in the middle of nothing—nothing, that is, besides solid masses of stratus and fog. He calls the tower nearest to where he thinks he is and requests a GCA approach. The tower checks to see what frequencies he can transmit and receive on, and tells him which to use. Following this, the pilot is cleared from the tower frequency to that of their GCA unit.

Immediately the pilot calls GCA. He is asked for his altitude, heading and approximate position, given the radio frequency of the nearest radio station, radar beacon station or range station, whichever may be closest, and told to report when over the station.

Upon reporting, the plane is spotted by the GCA on the radar scope and given a new heading to fly. When this new vector is executed, a check on the scope verifies the identification, and the plane is in 'contact.'

From here on in, it's easy. The PPI scope readers (plan position indicator men) steer the pilot over and into a downwind heading, then into the crosswind leg of the approach, dropping him down all the way. Five to eight miles out the final controller takes over at the turn into the final leg.

The final controller has two men helping him, using precision radar, tracking the plane in all the way on that approach. This radar can indicate the exact position of the plane within 15 feet in elevation and 30 feet in horizontal deviation. Furthermore, a mechanical set-up interprets what the radar shows, and a moving miniature of the plane indicates to the final controller any error in the last leg of the approaching aircraft. By constant reference to this plane, he can 'talk' down the oncoming pilot the same as if he were at the controls.

FOR ENLIGHTENMENT, just listen to the final controller as he takes over the circuit. The plane is turning on its final leg:

Come out of your turn on two nine zero and hold altitude. Over. (Acknowledged) Do not acknowledge further transmission. You are on final leg.

Steer left two eight five. Two eight five is your new heading.

You are six and one half miles from runway. Start losing altitude at five hundred feet per minute.

Steer right two nine zero. Two nine zero is your new heading.

Five miles from runway. Sixty feet above glide path—adjust your rate of descent and bring it down. Forty feet above—twenty feet above—bring it down slowly.

Four miles from runway. Coming into glide path—on glide path. Hold it. You are clear to land, wind northwest ten, check wheels down and locked. Three miles from end of runway. Your present heading is good, track very good.

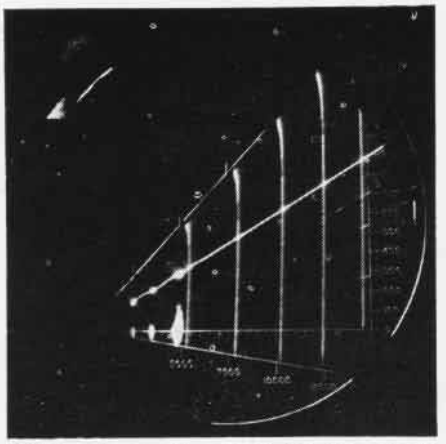
Two miles from end of runway, glide path very good.

One mile from end of runway. Steer right two nine five. Two nine five is your new heading. Hold it there. You're going slightly above the glide path. Twenty feet above—thirty feet above—forty feet—bring it down, bring it down, please.

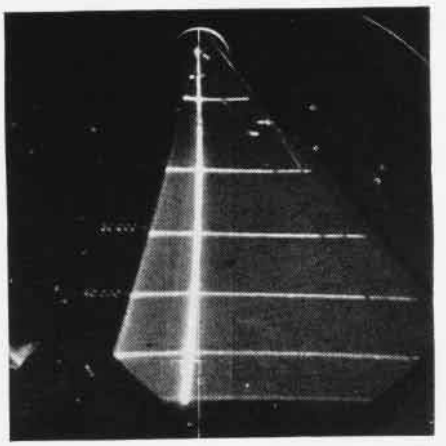
Coming down slowly—thirty feet above—twenty feet—ten feet above. OK. Hold it. One half mile from end of runway, on glide path. One quarter mile—center line of runway directly ahead. Over end of runway, on course, take over visually.

All the way down the final leg, the controller keeps up a constant chatter. There's no hesitation—no fumbling—and best of all—there's always a runway dead ahead at the breakthrough!

A good GCA crew can bring in a plane every three minutes. Using a successful stacking of aircraft as the



Glider path is determined by the steady travel of blip down bright center line of the elevation scope's three-mile scale



Plane's position in relation to runway is determined by known land echo return determined by pre-usage visual tests

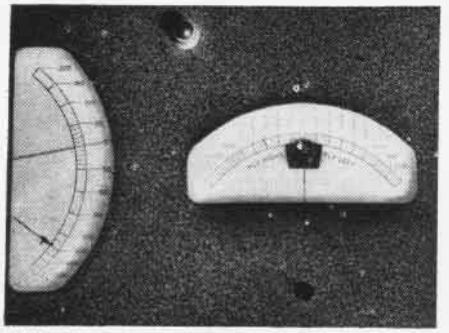
basis for the system, the Naval Air Technical Training Command's GCA training unit have so well perfected their students into a coordinated team that there is only the minimum of waiting when a plane calls for GCA assistance.

The system is to bring one in and drop the rest down one notch each. Ordinarily, the team work between the controllers is such that they can have at least three planes in the landing pattern and one on each of the legs at the same time.

Emergencies are just another airplane to the GCA crews. In case of a shortage of gas, engine failure or other trouble, the troubled craft can be drawn free of the stack at his altitude, let down to approach altitude when clear of the other planes, and brought in immediately. Of little consequence is the lack of instruments. Planes have been brought in with no instruments—just a stick and throttle. As long as a standard rate turn can be made, the controller can see where the plane is and stop the turn to line up the pilot on the proper approach heading. Likewise he can inform the pilot as to rate of descent. There is fast, positive control of each plane every minute.

In late 1941, radar was being used extensively in anti-aircraft, searchlight and other firing and directional functions, as well as to some extent helping aircraft to make a proper approach to a landing under adverse conditions. However, the type radar in effect then was not sufficiently accurate at low glide path angles. What was needed was a radar with precision enough to determine the exact position of the aircraft in relation to the runway, giving altitude and variation left or right of the landing strip.

The years 1942, 1943, and 1944 were years of building, testing, and rebuilding. In August, 1944, a Navy set was accepted by the Bureau of Ships and went into active operational training. During the early part of 1945 more than 10,000 approaches were made with GCA, mostly with some training activity. At the end of the war a sizeable number of GCA units were overseas bringing in aircraft under all conceivable weather conditions.



THIS SCALE INTERPRETS DATA OF RADAR

The present GCA unit consists of three parts; a prime mover, a trailer and another truck the size of the prime mover to carry spare parts and handle equipment maintenance. Within the body of the prime mover are diesel-powered motor generators, and other equipment used to power the radar gear. Within the trailer is the radar gear and the air conditioning system which ventilates the control room. The three parts of the unit are completely mobile, self-contained and may be moved quickly from spot to spot.

Breaking the sides of the smooth trailer are three radar antennae. Directly on top of the trailer is the PPI (plan position indicator) antenna, revolving at the rate of 30 times a minute, sweeping an area up to 30 miles.

On the left side of the trailer, facing out from the side, are the two precision radar antennae. Both are the same size, but one, the azimuth tracker, is mounted horizontally, while the elevation tracker is mounted vertically. Neither of these antennae revolves.

Beams from the two precision trackers are very narrow. The azimuth tracker beam scans 20°, covering 10° on each side of the runway. This is accomplished, despite the fact that the GCA set sits 200-300 feet from the edge of the runway, because the azimuth beam is actually being projected 5° to the right and 15° to the left of the runway. The elevation tracker scans 7°, six above the ground and one into the ground. Thus the elevation tracker can accurately follow a plane in on a glide path of from 0° to 6°. Position of the GCA set in relation to the runway is shown in the photograph on the next page.

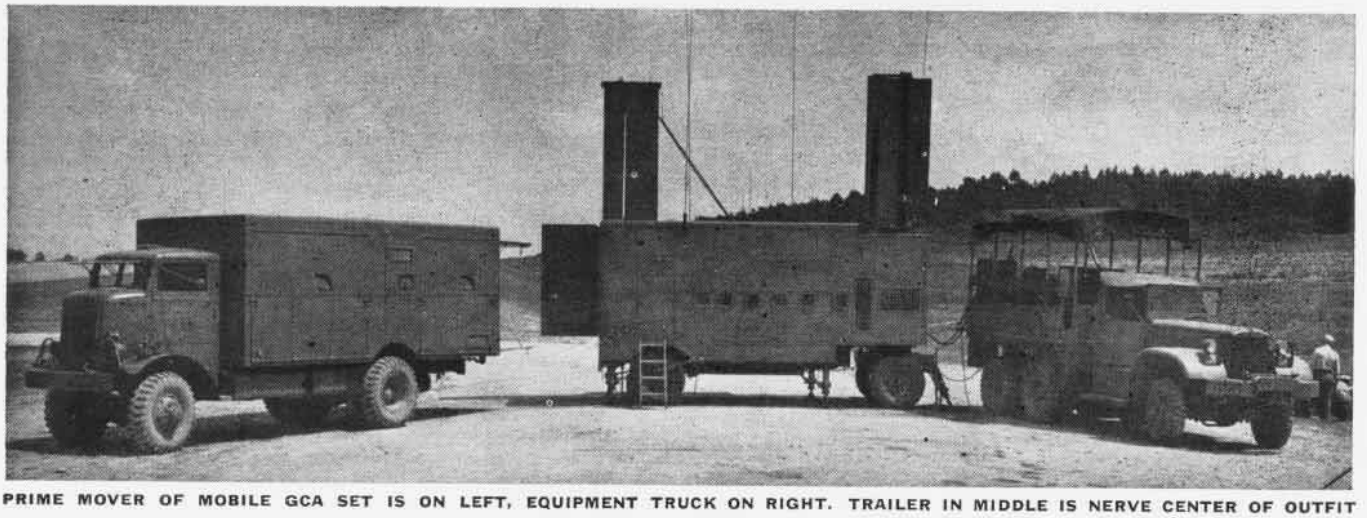
Actually, what these radar antennae represent are two separate radar sets. One, operating on the "S" band, is used for long range scanning. The second, operating on the "X" band, is used for close up screening during the final leg. Duplicate sets available for immediate operation are in each trailer as standbys.

Six radio transmitters and receivers are available within the trailer, three VHF and three HF. They are all push button type to facilitate immediate control of frequencies.

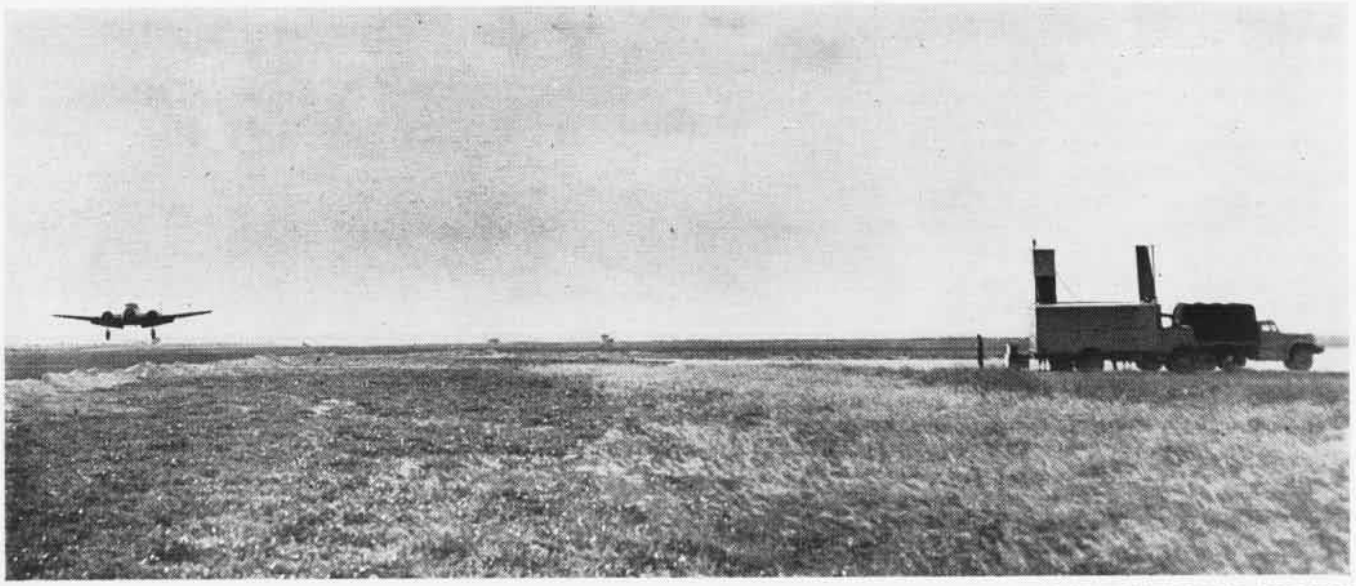
Of the crew, the first and second controllers and the azimuth and elevation trackers are enlisted radar technicians. The final controller is almost always a Naval Aviator—who has made any number of GCA landings and knows well the problems faced by the guy up there trying to get down.

In addition to the crew, including a relief for each spot as well as a floating relief, two electrician's mates and two electronic technicians, under a radar-trained maintenance officer, are present. Completing the unit is the officer-in-charge, who is always a Naval Aviator.

The crew's efficiency runs parallel to the teamwork, so congeniality and alertness are the watchwords of GCA.



PRIME MOVER OF MOBILE GCA SET IS ON LEFT, EQUIPMENT TRUCK ON RIGHT. TRAILER IN MIDDLE IS NERVE CENTER OF OUTFIT



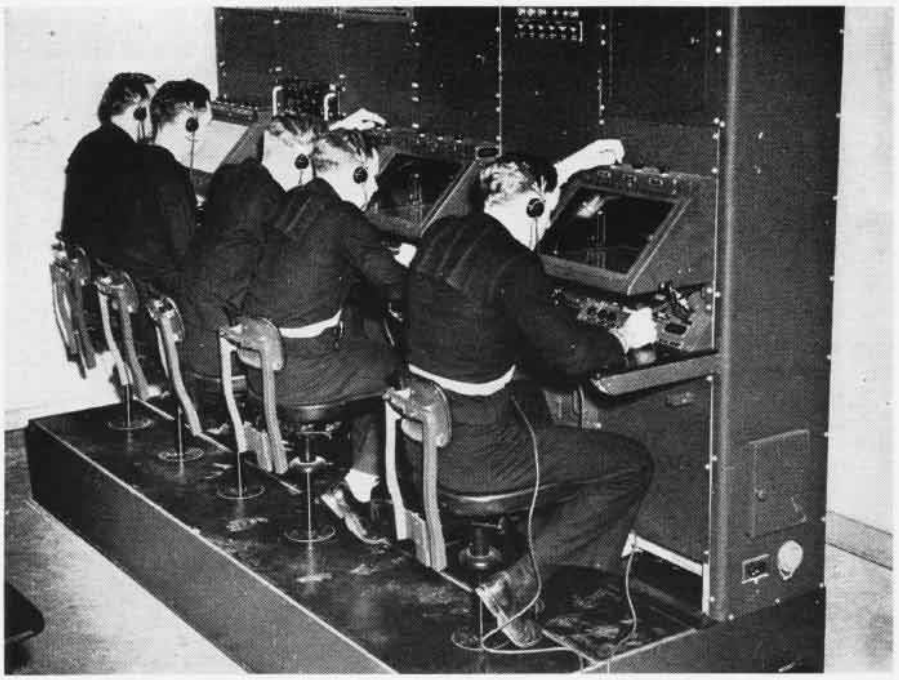
SNB LANDS AT BANANA RIVER, HAVING BROKEN THROUGH A 150-FOOT OVERCAST AT THE COMPLETION OF GCA CONTROLLED APPROACH

Economical Improvement on GCA Equipment Used During War Must Be Made Before Civil Use Possible

BLACKED out to better illuminate the scopes, the trailer houses the GCA crew of five, each of whom has his own important job in helping to get the plane down. Let's take an insight into the trailer in order to see just what goes on during a landing:

First Controller: The voice of the first controller is the first to be heard when the pilot first reports to GCA for instructions. The first controller establishes communications and identifies the plane on the PPI scope before him, by assigning the plane an altitude and magnetic heading to fly to start it on its landing circuit. He gives the pilot the necessary information concerning the altimeter reading, field elevation, length and width of runway and directs the pilot to make his cockpit check.

Second Controller: The second controller has a PPI scope identical to that used by the first controller. As soon as possible after identification has been made the second controller will take charge of the plane's directions, allowing the first controller to assume primary control of other planes. The second controller assigns the planes a new altitude and heading, so as to direct its flight on to the final leg as near as possible 'on course' and at the proper altitude.



Five man crew functions as one mind in lowering aircraft through fog and stratus to the deck. In order to communicate with each other, panels are placed together

Azimuth Tracker: When the plane has been turned on its final leg by the second controller, it will be within the precision system of the GCA in both azimuth and elevation. Each of the precision trackers has two scopes before him, one with a 10-mile range and the other covering three miles. The three-mile scope is magnified three times over the 10-mile scope and gives an enlarged presentation of the last three miles. This enlargement simplifies the work of the tracker so that the task of reading the scope is much easier. The 'on course' line is established by the use of known radar targets, and the tracker follows the plane manually, as its signal appears under the hairline. Any variance between the hairline and the known 'on course' line is shown by an indicator in front of the final controller.

Elevation tracker: The 7° scan of the elevation tracker is enlarged about nine times, making it easy to follow the plane along the glide path. Exactly as the azimuth tracker does, a hairline follows the plane. Any deviation of the hairline from the established glide path is transmitted mechanically to a miniature plane on a miniature glide path before the final controller, who transmits the information, via radio, to the pilot. The glide path may be adjusted to any desired value between 2° and 5°, and the touchdown point of the aircraft may be set from 2,500

to 5,000 feet from the equipment as required.

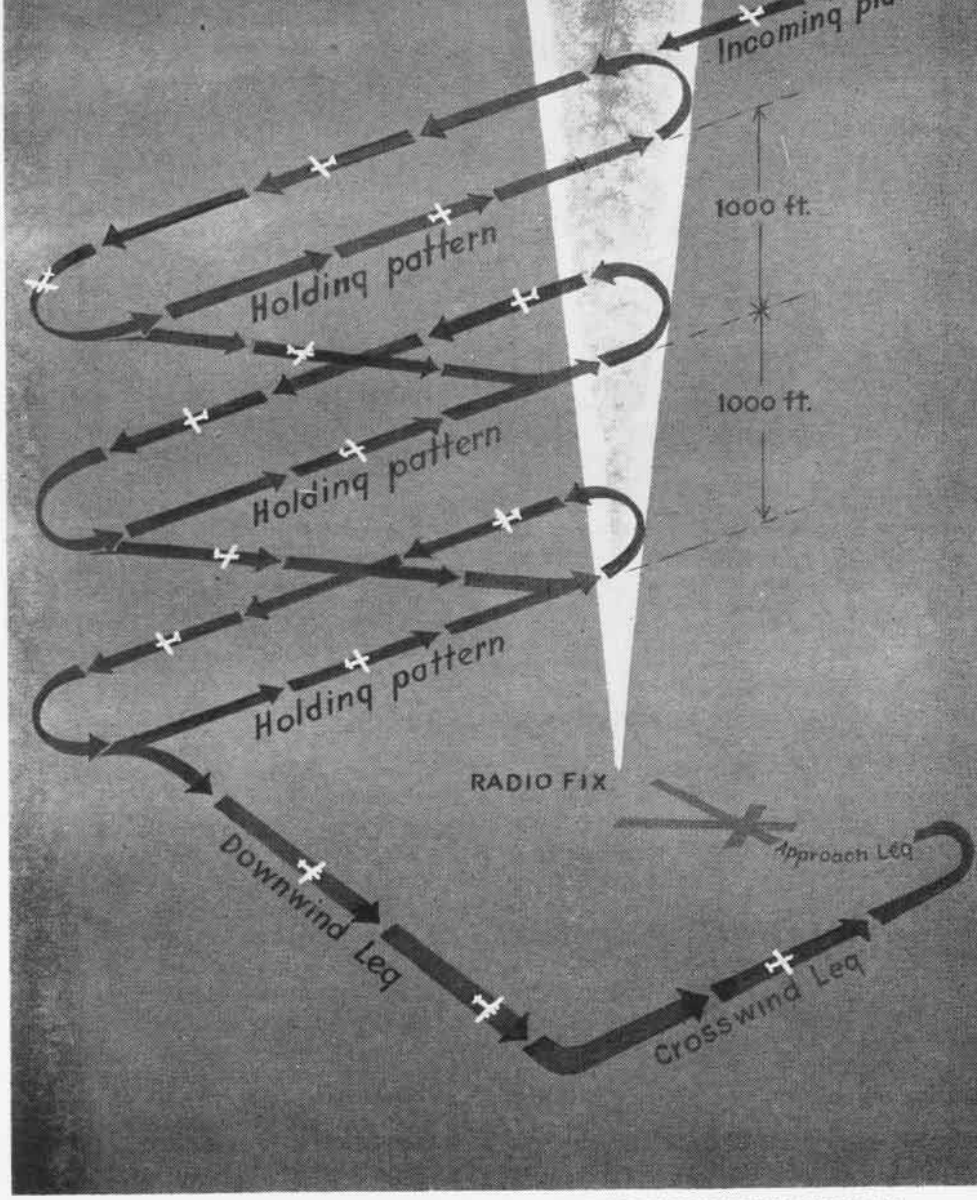
Final Controller: The final controller talks the plane down on the final leg, using the information supplied by the precision radar. By watching the miniature planes moving on the metered scales, he knows at all times exactly where the plane is in respect to 'on course' (center of runway), and with respect to the glide path. Using this information the final controller will tell the pilot to fly different headings and adjust his rate of descent to make a perfect approach. The final controller receives information verbally from the azimuth and elevation tracker operators as to the plane's distance from the runway, weather and clearance, and any other pertinent information regarding the safety of and any necessary instructions for the pilot.

First training of GCA crews in any number was done at the Technical Training Center at Gainesville, Georgia. Late in 1945 the entire Gainesville GCA school, lock stock and barrel, moved to the Naval Air Station at Banana River, Florida, where it is in operation today. By that time the enthusiasm of the GCA personnel had communicated itself throughout the Navy, and training began to be carried out at an accelerated tempo on an increased scale.

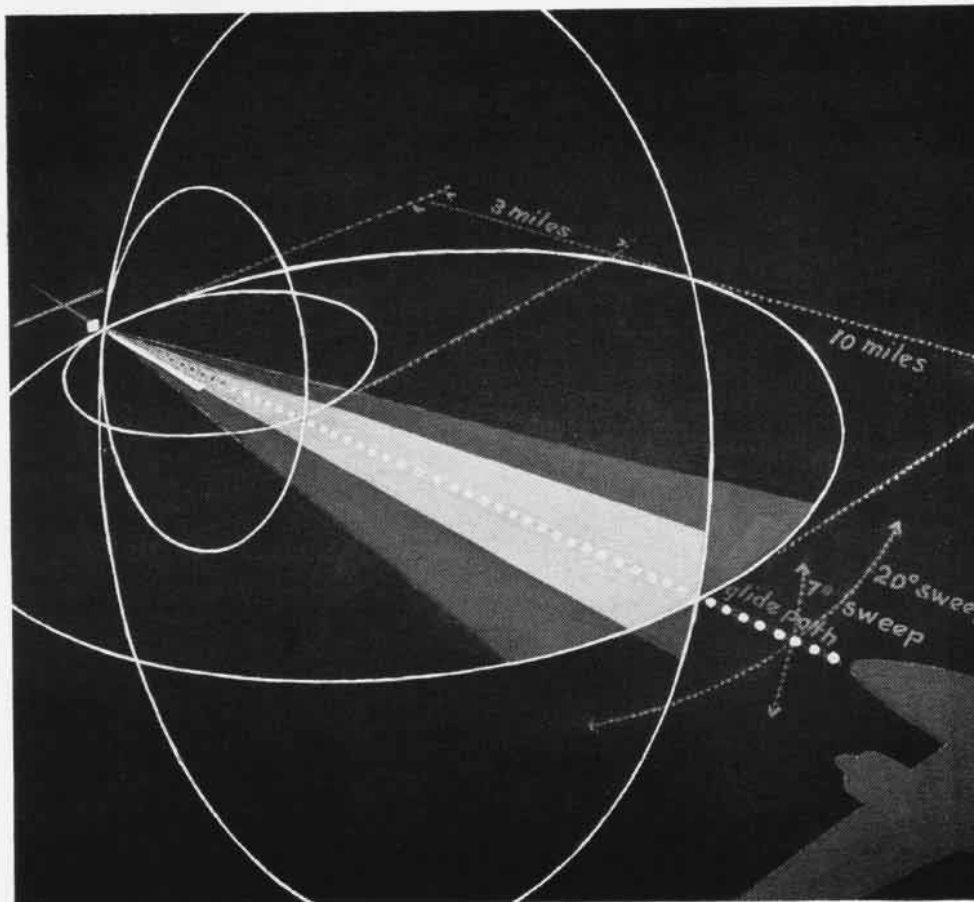
Under the present technical training command curriculum, officers and men spend about three weeks in class work, using a synthetic mock-up of the GCA unit which can be rigged for all types of problems. They then go into the field for four to six weeks, practicing on landing after landing.

In the last two weeks of training, units are formed and operate as such. Finally, when the unit has been judged perfect, it is ordered to the base where it will go into operation. And another GCA crew is ready to land any plane in any weather.

Unquestionably there is a great future for GCA equipment. Although not released yet for commercial use, most airlines have both seen and operated experimentally with GCA units. All are enthusiastic—all want some postwar version of GCA as standard airline equipment. However, GCA in its present form is most expensive to operate. New equipment and methods will undoubtedly be devised which will reduce cost. As new equipment is perfected and as expense becomes a secondary factor to all-out safety, it seems reasonable that GCA – today pioneering in the field—will tomorrow be found contributing to safe landings during low overcast at every airport.



PLANES MAY BE LANDED EVERY THREE MINUTES VIA CONTROLLED STACKING AND APPROACH



DID YOU KNOW?

Naval Air Activities Shut Down

Three V-5 Refresher Units On List

Naval aviation activities recently disestablished by order of the Secretary of the Navy include:

NAF Shemya, Semidi Islands, Alaska

NAF, Tanaga, Andreanof Islands, Aleutian Islands

U.S. Naval Academic Refresher Unit V-5, William Jewell College, Liberty, Mo.

U.S. Naval Academic Refresher Unit V-5, Northwestern State College of Louisiana, Natchitoches, La.

U.S. Naval Academic Refresher Unit V-5, St. Olaf College, Northfield, Minn.

NAF Amchitka, Aleutian Islands

U.S. Naval Training School (Aviation Ordnance Officers), Naval Air Technical Training Center, Jacksonville, Fla.

Jax Sets Up Two Safety Awards

Lauderdale Unit Wins Despite Disaster

NAS JACKSONVILLE—Two new aviation flight safety awards for single and multi-engine aircraft have been established by the Advanced Training Command for award annually to squadrons with the best safety records.

The single-engine trophy was awarded to Torpedo Bombing Squadron ATU-1, based at Fort Lauderdale, and the multi-engine award to Bombing Squadron ATU-2 from Lake City. The period covered was the last six months of 1945.

The safety achievement of the single engine unit at Fort Lauderdale was outstanding since it was this same group that lost five torpedo bombers in a still-unexplained disaster last December. Its safety record was good enough during the rest of the period to offset the loss.

During the war the Operational Training Command flew four and a quarter million hours with only 966 fatal accidents. During the period October 1943 to December 1945 34,383 pilots and 39,912 combat aircrewmen were trained in service-type aircraft.

MAG-31 Operates 'Feeder' Line

Group Flies Four 15 Mile Trips Daily

MAG-31 — Although Yokosuka Marine Air Base is located only 15 miles

R5C LOADING FOR FLIGHT TO KISARAZU

across Tokyo Bay from NATS terminal at Kisarazu Naval Air Base, this Group is now operating a feeder line service to the latter base. Transportation across the bay by boat takes two hours and travel by land necessitates circling Tokyo Bay, a trip better than 50 miles.

VMR-952, utilizing regular airline procedures to dispatch its passengers, uses R5C aircraft on four 15-minute hops daily. During an average month, 665 hours were netted in 423 flights carrying 1835 passengers. Occasionally the pilots and crews get a "breather" on trips to Omura, Japan, Okinawa, Iwo Jima and Guam.

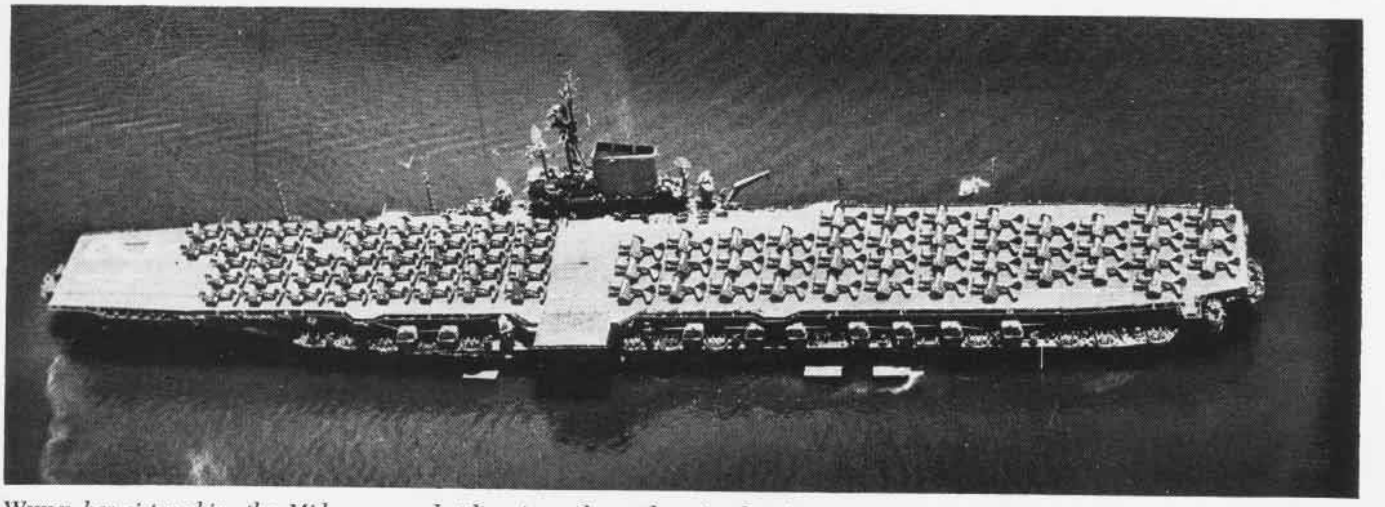
Academy Plans Aviation Courses

Midshipmen May Receive Pilot Training

Although any expansion of academy functions depends on Congress, aviation courses as separate studies are scheduled to begin July 6 at the Naval Academy, giving every midshipman an appreciation of and a respect for air power. Plans for a $12,000,000 academy air facility have been submitted to Congress.

The recently established aviation department will commence specialized courses in flight observation in the second class this summer. Lecture courses, using visual training aids developed during the war, will include organization, history and all phases of flying.

While the department's present curriculum provides for no actual pilot training, indoctrination will be continued on carrier cruises and participation in Army-Navy amphibious operations. Eventually, training may reach the piloting stage before a midshipman leaves the academy upon graduation.



WHILE *her sister ship, the Midway, was battling icy gales and snow-covered flight deck problems in the north Atlantic to study carrier operations under Arctic conditions, the new CVB Franklin D. Roosevelt sailed into South American waters. Her shakedown cruise took her to Rio de Janeiro where her crew took shore leave in that famous resort city. This aerial picture was taken as the F.D.R., her flight deck crowded with Helldivers and Corsairs, lay at anchor in Rio's picturesque harbor. With the Midway and four Essex-class carriers, the F.D.R. will be a part of the Eighth Fleet, the Navy's first fast carrier task force to operate in the Atlantic.*

The proposed airfield would be a first-class military airport with four runways and other macadamized mats for training purposes. One hangar is recommended for the field which, if approved, will be completed by the summer of 1948.

Bennington Lands 646 One Day

CV 20 Retires After 18,373rd Landing

An as yet unauthentic record was hung up by the CV 20, U.S.S. *Bennington*, in the heat of the Hawaiian sun on

SKIPPER WELCOMES 18,000TH MAN ABOARD

14 February when it landed 646 aircraft aboard in the time between sun-up and sun-down. The number of carrier landings exceeds by three the 643 made aboard the "Sara" last summer, which, for all common knowledge provides was the standing mark of landings.

One of the "landingest" carriers in the Navy, the *Bennington* is headed for inactive duty. So the 18,373 landings, the last of which was made at night on 13 March, will stand as an enviable record of performance for a fighting carrier.

Diego Man Carries On From Bed

Chalk Up Victory for 'Walkie-Talkie'

NAS San Diego — Taking his cue from the theatrical-aired "the show must go on," W. R. Ozmun, SAD2c, who handles the material section of the Training Devices Unit at North Island, overcame difficulties to maintain standard service in his department despite his physical absence. By use of the Device 8-D-3, Trans-receiver Kit, more commonly known as the celebrated "Walkie-Talkie," the efficiency of the unit continued during Ozmun's stay in the Base dispensary.

With one of the "Walkie-Talkies" in the material office and the other beside his hospital bed, Ozmun maintained communications and answered business problems by holding wireless discussions several times daily, at pre-arranged hours, with assistants in his office. Over a two-week period, many matters which otherwise would probably have been held up were cleared by this man's "bed-ridden" persistence.

CASU Six Improvises Log Book

Weight and Balance TO Is Carried Out

CASU 6—This activities engineering department, in order to comply with TO 82-45, temporarily used improvised weight and balance logs made up of photostatic copies of essential elements of standard weight and balance log books. The standard weight and balance logs had not been received with other records of newly assigned planes.

After receipt of these improvised logs the complete weight and balance data on more than 400 planes, computed from the basic weight of each type of aircraft as weighed, and the changes incorporated therein, were easily compiled.

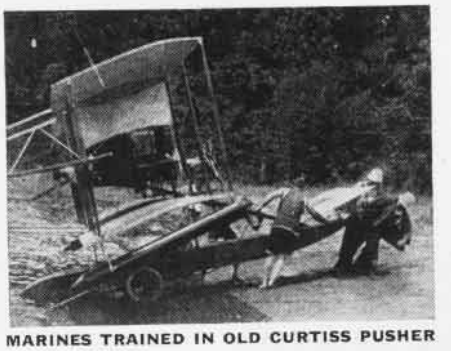
▶ ***BuAer Comment*—Orchids to CASU 6 for a good interim idea. Printed handbooks are available to all activities upon request.**

Marine Flyers Start 35th Year

First Leatherneck Soloed in May 1912

Just 34 years ago this month, Lt. A. A. Cunningham soloed after two and one-half hours of instruction and the Marine Corps had its first pilot. Although Cunningham had leased *Noisy Nan* during the preceding year, the heavy contraption refused to fly, and he was ordered to report for training to the aviation camp at Annapolis on 22 May 1912.

From these humble beginnings, Marine Corps Aviation developed planes and techniques over the western front in the first World War and later over the jungles and mountains of Central



MARINES TRAINED IN OLD CURTISS PUSHER

America and the Caribbean. The First Marine Aviation Squadron formed on 17 October 1917 was a far cry from the carrier and land-based Marine Air Groups which fought against the Japs.

Post-war Marine aviation will be concentrated on VMF and VMF(N) squadrons and air groups for combat duty. In addition, their transport and utility units will be retained. These latter units transported combat cargo to the front lines of the Pacific and one flight flew 1000 miles to Midway during the battle, transporting badly-needed ammunition and water carts.

BEST ANSWERS

FAMOUS FIRSTS

1. **On November 14, 1910, Eugene Ely made the first carrier take-off in a four cylinder Curtiss biplane from the**

☐ *a*—U.S.S. *Alabama*
☐ *b*—U.S.S. *Birmingham*
☐ *c*—U.S.S. *Langley*
☐ *d*—U.S.S. *Pennsylvania*

2. **The first student naval aviator entered flight training in 1910 at the Curtiss camp in San Diego, California. His name was**

☐ *a*—Lt. Theodore G. Ellyson, U.S.N.
☐ *b*—Ensign G. deC. Chevalier, U.S.N.
☐ *c*—Lt.(jg) P. N. L. Bellinger, U.S.N.
☐ *d*—Lt. John H. Towers, U.S.N.

3. **In the fall of 1911 the first U.S. Naval Air Station was established at**

☐ *a*—Pensacola, Florida
☐ *b*—San Diego, California
☐ *c*—Annapolis, Maryland
☐ *d*—Washington, D. C.

4. **At Vera Cruz, Mexico, in 1914 the distinction of engaging the enemy from a military airplane for the first time went to**

☐ *a*—Lt. P. N. L. Bellinger, U.S.N.
☐ *b*—Lt. Comdr. A. C. Read, U.S.N.
☐ *c*—Ensign W. D. Billingsley, U.S.N.
☐ *d*—First-Lt. A. A. Cunningham, U.S.M.C.

5. **The first ship designed and built from a keel up as a carrier for the U. S. Navy was the**

☐ *a*—U.S.S. *Lexington*
☐ *b*—U.S.S. *Saratoga*
☐ *c*—U.S.S. *Langley*
☐ *d*—U.S.S. *Ranger*

6. **The pilot of the first plane to fly over the North Pole was**

☐ *a*—Lt. Comdr. R. E. Byrd
☐ *b*—Colonel Bernt Balchen
☐ *c*—Chief Machinist Floyd Bennett
☐ *d*—Captain Roald Amundsen

7. **The first U. S. carrier was lost as a result of enemy action on May 8, 1942 when the Japanese sank the**

☐ *a*—U.S.S. *Hornet*
☐ *b*—U.S.S. *Yorktown*
☐ *c*—U.S.S. *Lexington*
☐ *d*—U.S.S. *Wasp*

(Answers on Page 40)

LINK INSTRUMENT TRAINING INSTRUCTORS SCHOOL

Whether You're a Student Starting in SNJ's, or a

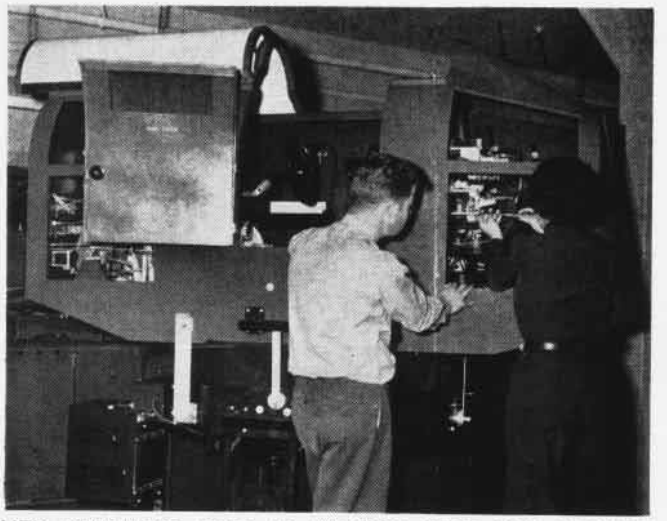
BASIC:

— Cadets get checked out on Links while they're still flying SNJ's. It's an integral part in training every man who wears Navy wings

ADVANCED:

— Whether they are training to fly multi-engine patrol planes, logging Link trainer helps fit them for opera

NAVAL AVIATORS are never too young nor too old to use a Link trainer. The longer a pilot has been in the Navy and higher his rank the better and more appreciative Link trainer student he becomes. One of the first synthetic devices to find wide usage in aviation, Links today are the accepted training device for simulating actual instrument flights while on the ground. In addition the Link trainer can be advantageously employed to indoctrinate pilots in standard radio voice procedure and for all types of navigational hops.



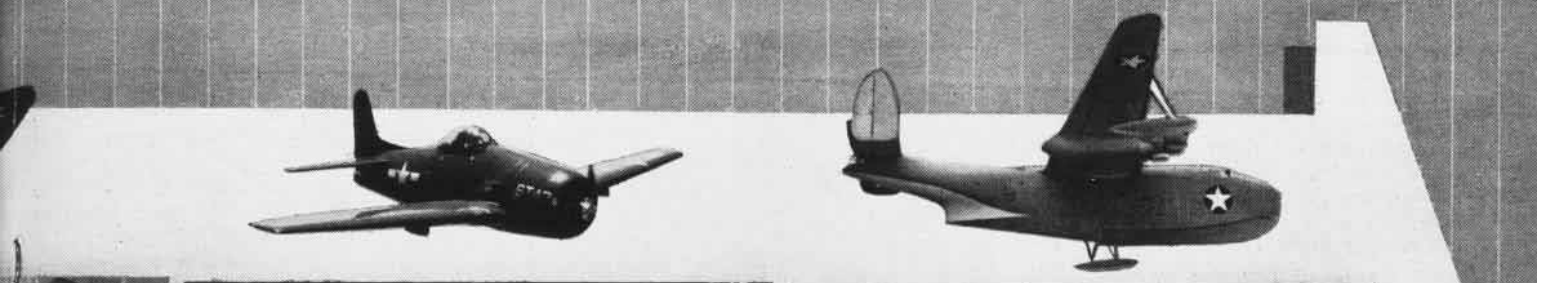
LITIS GRADUATES LEARN TO MAINTAIN THEIR LINK TRAINERS

In the expanded peacetime naval aeronautical organization Link training is destined to play as important a role as it did in wartime. Links, ranging from the basic ANT-18 to special adaptations that simulate fighters in combat will be employed throughout the Navy to train pilots in new techniques and to keep them polished up on old ones.

Supplying well-trained, competent operators to man the Navy's Link trainers is one of the more critical personnel problems facing the aeronautical organization. During the war years virtually all Link operators at continental naval and Marine Corps air stations were women. All were trained in Atlanta at the Link Instrument Training Instructors School (LITIS). Link operators were specially screened, originally two years of college was a minimum requirement. Most WAVES regarded LITIS as the top training billet an enlisted girl could draw.

FROM FEBRUARY 1943, when the first class of WAVES entered LITIS, until October 1945 when the last one was graduated, NAS Atlanta trained 1808 girls—WAVES, Marine WR's and Spars. Attrition during that period was less than two percent. LITIS trained operators have given

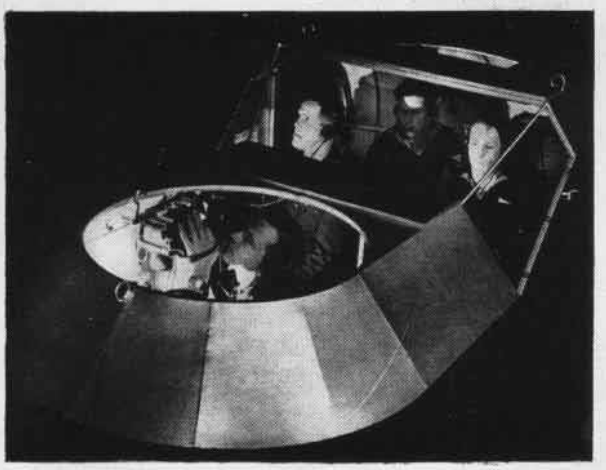
Fighter Pilot Flying F8F's, There's Always a Link Trainer in Your Life



fighters or
time in a
tional duty

SQUADRON:

— Regular work in a Link is a must for every officer with Navy wings, be he captain or ensign. Links now have service-wide acceptance



SPECIAL:

— Link trainers, specially rigged, provide training facilities for many purposes. This Link is used as a celestial navigation trainer

Link instruction to thousands of cadets in the training commands and to naval aviators at air stations throughout the United States and in Hawaii. LITIS is scheduled to move to NAS Corpus Christi during May.

To supply the Navy's peacetime needs, LITIS is now training Navy and Marine Corps enlisted men for duty as Link Operators. Men now reporting to LITIS are, for the most part, aviation ratings with seamen, screened from recent boot camp classes, making up the balance. Some combat aircrewmen are included among the aviation rates.

Only men from the Regular Navy or Marine Corps, or those with obligated service beyond the date of graduation are selected for the course. Classes enter semi-monthly and receive 10 weeks' training. Until an adequate number of replacements can be secured, instruction at LITIS will be carried on by Waves of the wartime staff still on duty.

Wartime training facilities that made it possible to simulate in a classroom all activities of a busy naval air station, including control tower, air traffic control room, radio communications room and aerology are still available.

Classes now entering LITIS work with the new Nav-BIT 1945 Link trainer. Nineteen of these trainers, the latest thing in Links, have been installed at the school. Equipped with an automatic range device for recording flights, these new trainers in every way more nearly simulate an airplane in instrument flight.

So that they can answer the questions that will one day be asked them by cadets or officer pilots, every LITIS graduate logs 72 hours in a Link trainer. In that time he completely familiarizes himself with the operational problems that his future students will face in Link trainers.

PILOTS RESPECT ADVICE GIVEN BY TRAINED LINK OPERATORS

AFLOAT AND ASHORE

MCAS EL TORO—A traffic control group, composed of an officer and 13 enlisted men of the guard detachment, has been organized at El Toro to enforce safety rules, uniform regulations and customs and courtesies of the service. In addition to maintaining traffic law and order on the base, the group patrols local area highways.

NAS HONOLULU—The Naval air radio station, WVTZ, started operating recently to serve the environs of the base. The station does not have an antenna but feeds its programs into the regular electric lines around the station, thus limiting its reception to the area. Besides "live" programs, the station has a large library of transcriptions from the Armed Forces Radio Service featuring big-name entertainers of radio.—*Air-News.*

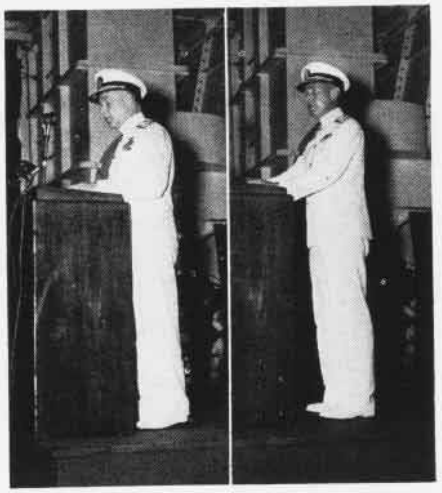
POINT BARROW—Special liberty means something different according to geography, but two NATS crewmen used theirs to take a 16-mile trip by dogsled in 39 degrees below zero. R. L. Trammel, AMM2C and H. Froman, AMM2C hitched up their sled and set out to see how the Will Rogers-Wiley Post monument looks in the middle of the long Arctic night. The trip was "without incident" if traveling barren, snow-covered, unmarked slopes in the desolate darkness of the Arctic can be called that.

NAS SEATTLE—NATS squadron VR-5 cooperated with San Francisco children and newspapers to help break the monotony of the four-months-long Arctic nights for Point Barrow Eskimo children. Dolls made by the Bay City children were flown by NATS for distribution to the slant-eyed little Alaskans. They were delighted with their toys, which are pretty scarce at that most northerly settlement.

NAS MIAMI—As if they didn't get enough flying during their working hours, model aircraft fans, all the way from seamen to lieutenant commanders, gather in open areas of the station to fly their miniature planes. The hobby is growing daily, with the bee-like hum of the tiny planes' motors mixing with the noise of Corsairs and Hellcats.—*Skywriter.*

VPB 22—Two PBM-5's have been added to the aircraft complement of this squadron to train personnel in electronic devices. These planes are now equipped with all electronic gear useful in Anti-Submarine Warfare work, and they will act as 'flying classrooms' in the future. Seats are being installed in the space which formerly was occupied by the bunks in order to accommodate more passengers per flight.

U.S.S. BENNINGTON—Change of command of the Pacific Fleet took place

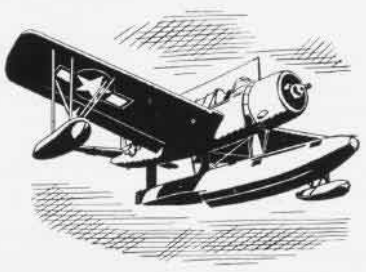


TOWERS (LEFT) ASSUMES CINCPAC DUTIES

aboard this vessel when Admiral John H. Towers, USN, relieved Admiral Raymond A. Spruance as the Navy's top man in the Pacific. The ceremony was attended by many high ranking Army, Navy and Marine Corps officers in the Hawaiian Areas.

NAS, PENSACOLA—Two equally strong components of the February graduating class of officer pilot candidates were Ensigns Clyde H. and Don McMasters of Sapulpa, Okla. The two McMasters are identical twins and have been stationed together since their entrance into the Navy in 1943. Graduates of Midshipmen's school where they were commissioned, the McMasters twins entered flight training and received their wings here.—*Gosport.*

SHOW ME THE WAY TO GO HOME



COURSE CORRECTION

Can you answer this one without plotting?

Desired track (course) from departure point to destination is 285° True. At a point 130 miles from your destination you find that you are 27 miles to the right of the original desired track line. What is course (Desired track) to destination?

This is one of a series of questions to test your knowledge of Navy publications.

(Answers on Page 40)

NAS QUONSET POINT—After three years at this station, ASDevLant, also known as Anti-Submarine Development Detachment, U.S. Atlantic Fleet, has departed for Miami where it will be reestablished at Master Field. The move is to enable the Detachment to work closer with other divisions and obtain better weather and sound conditions.—*Quonset Scout.*

VH-5—Planes of this squadron have recently been dispatched to Bikini atoll for the purpose of making aerial and ground photographs in preparation for the "Crossroads" operation. Other flights surveyed nearby atolls for a suitable island to which the Bikini natives may be evacuated. Buoys were laid at Bikini atoll for seaplane moorings, rafts were left with the natives to facilitate movement of passengers from plane to shore, and the entire atoll was swept for mines and other obstructions to shipping.

HEDRON 14-2—War-weary *Privateers,* returning at frequent intervals from the Pacific, have been handled by this unit since V-J Day. After necessary maintenance, many of them continue East to NAS CORPUS CHRISTI for final disposition. Between 1 October 1945 and 14 February 1946, 89 *Privateers* returned to Camp Kearney from forward areas.

Since last December Weather Reconnaissance Squadrons One and Two have been temporarily based at Camp Kearney pending completion of their flight syllabus. These VPW squadrons, equipped with specially-configurated *Privateers* for aerological work, will soon be stationed in the Western Pacific, keeping tab on the weather in that area.

NAS GLENVIEW—A group of 25 Naval Aviators of World War I recently made a tour of this station and voted to form an organization to be known as the Naval Airmen of America. Former Cdr. Carl G. Olson, USNR, is president of the group whose membership will be open to Naval Aviators of both World Wars. The organization has taken a leading role in the employment placement of discharged aviators.

▶ USS ANTIETAM, CV-36—Believe it or not, the F4U-4 is now in a class with the F8F. Here are the substantiating facts. An F4U-4 with no belly tank or ammunition, and carrying 180 gallons of gasoline, took off in 145 feet when the ring on the tension bar of the starboard catapult gave way on a catapult turn-up. The catapult was not fired and the *Corsair* started rolling under its own power (no JATO) and remained airborne with 30 to 40 feet of margin between it and the water. There was a 32-knot wind at the time it left the deck.

PAVEMENT ONLY AS GOOD AS ITS FOUNDATION LAYERS ALLOW. "GOPHERS" REMOVE SUBBASE SOIL FOR FIELD DENSITY TESTING

AIRFIELD EVALUATION PROGRAM

COUNT ten before you sound off too violently about trucks cluttering up the runway where you want to land and men with jack-hammers ripping chunks out of perfectly good air strip pavement. The chances are that you're watching part of the joint BUAER-BUDOCKS Airfield Evalution Program in operation.

And since five separate units are at work in different parts of the country with plans to evaluate about 40 strategically located naval airfields, their equipment will be a familiar sight on landing strips for several months.

This is a long-range, dual purpose program aimed both at preservation of existing runways and at planning for improved construction in the future. The prospects of increasing use of heavier-type aircraft, plus the fact that some runways are failing under excessive wheel loads, has prompted a thorough investigation.

Complete data being gathered at each field will show just how much punishment the pavement can take. When the load capacities of different fields have been determined, aircraft deployment by CNO and Fleet Commands can be made on a more sound basis, thus avoiding excessive overloads on landing strips proved adequate for lighter planes only. Lower maintenance costs as a result of this more economic use of existing facilities warrant the expenditure being made on the survey.

Each of the five testing units has a crew of about 20 men and is fully equipped to make a complete examination of the fields in its territory. Results of the tests are forwarded to Washington for final analysis and recommendations for future improvements.

WHERE air strips are concerned, it isn't a matter of "save the surface and you save all." On the contrary, the investigation is much more concerned with what lies underneath. The best possible paving job, whether of the flexible type or of rigid concrete construction, is only as good as its foundation allows it to be. Accelerated construction programs which failed to provide adequate subgrade stability, for example, during the time of preparation of the landing strips are now resulting in failures and excessive maintenance costs.

The Airfield Evaluation Program will reveal such weaknesses and show exactly what conditions of base course material, subbase, and subgrade soil can support the heaviest loads. The three major jobs in the evaluation procedure are soil survey, load testing, sampling and test of paving materials.

Undisturbed soil samples taken from site of plate loading tests are capped, taped, and paraffin sealed for accurate lab analysis

Soil survey crew make borings for samples every thousand feet on both sides of runways. Profile of airfield is plotted from data

Soil Survey of Airfields Gives Data for Determining Which Can Best Take Heavy Aircraft Loads

THE MOST important single factor in the bearing capacity of a flexible-type pavement is the subgrade soil. If the subgrade is stable enough, the only pavement required is an asphalt surfacing for resistance to scuffing. On the other hand, if the subgrade soil is plastic silt or clay and the terrain has a high water table, the permanently saturated condition of the subgrade will require pavement of considerable thickness to stand the weight of heavy planes.

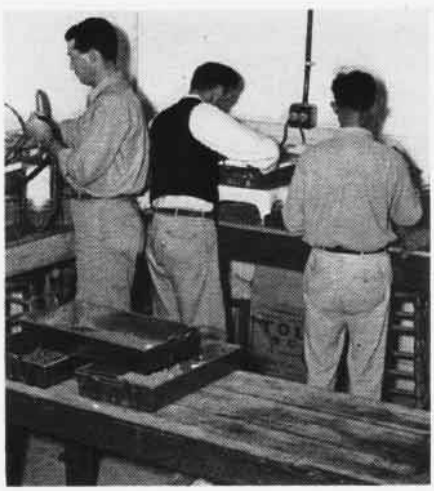
Consequently the two important points to determine are the type of subgrade soil and the level of the ground water. Ordinarily the top four feet of soil under the pavement decide the wheel load capacity of the pavement, and the top foot of this layer is of most importance. For this reason the top foot of soil is given special compaction before paving. Unstable soil often is removed and replaced by better material from a borrow pit. This borrow material is then compacted. The compacted top several inches of the natural soil or borrow material is called the subbase.

Soil survey of an air station determines the "soil profile" down to a depth of not less than four feet below the pavement. Information concerning the subgrade at greater depths is needed also. For example, the top four feet of soil may be borrow material used in a fill over peat or soft clay. The depth, extent, and properties of the underlying soft layer must be known in order to estimate future settlement of the pavement, since the soft layer tends to consolidate under the load of fill and pavement. Borings also must be taken to find the ground water elevation. If the water table does not come within 10 feet below the pavement, its exact elevation or depth is not important in making the airfield soil survey.

ON RUNWAYS with flexible pavements the soil survey crews are taking samples at 1000-foot intervals along two longitudinal lines parallel with the centerline and midway between centerline and pavement edge. Borings go to a depth of at least four feet with samples taken every foot down. Since the minimum sample is two pounds of soil, it's not surprising that tower operators have taken to warning pilots that "gophers" are operating on the airfield.

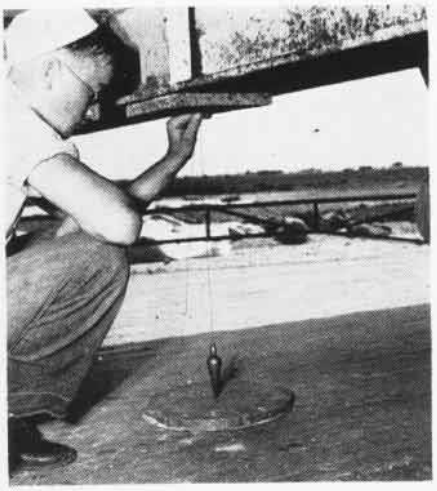
Examination of the soil samples is made right at the station. The soil is weighed and dried and weighed again until the loss in weight on successive dryings becomes less than one hundredth of a pound. Then the samples, still carefully segregated according to the location from which they were taken, are passed through different size sieves, separating gravel, sand, silt and clay. On the basis of this analysis the soil profile is plotted, showing in cross section the exact proportions of the different types of material.

Evaluation program includes well digging; ground water elevation found with auger

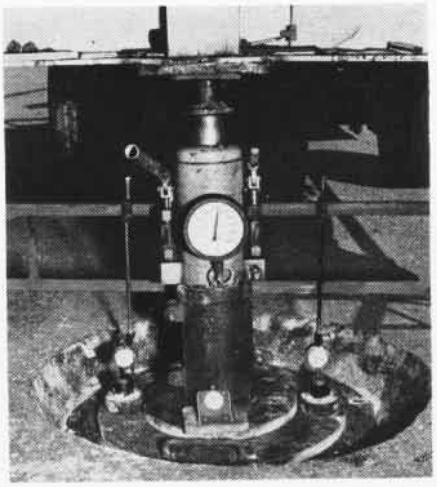


Like mud pie making on a scientific level, soil analysis uses sieves and baking pans

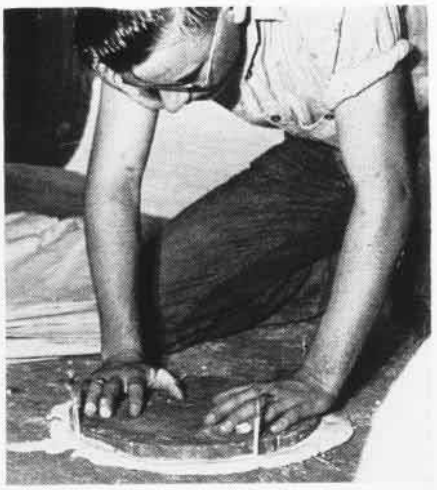
Material collected in tubes shows exact condition of subgrade after loading test



Centering plate for load. Areas showing surface cracks make good spots for tests



Loading test being made on subgrade soil; dial gauges measure amount of settlement



insures even bearing. Three sizes of plates are used for each test section

Settling of Pavement Measured As Loaded Trailer Weight Bears On Steel Plate in BuDocks Test

How much weight will a given section of pavement take before it begins to settle? How much will it settle under a given load? These are the questions being probed by the load testing crews. The large truck and trailer units used for these tests are loaded either with tanks of water or with metal bars. Applied through a hydraulic jack and using the truck load as reaction, the load is brought to bear on a steel plate placed on the pavement.

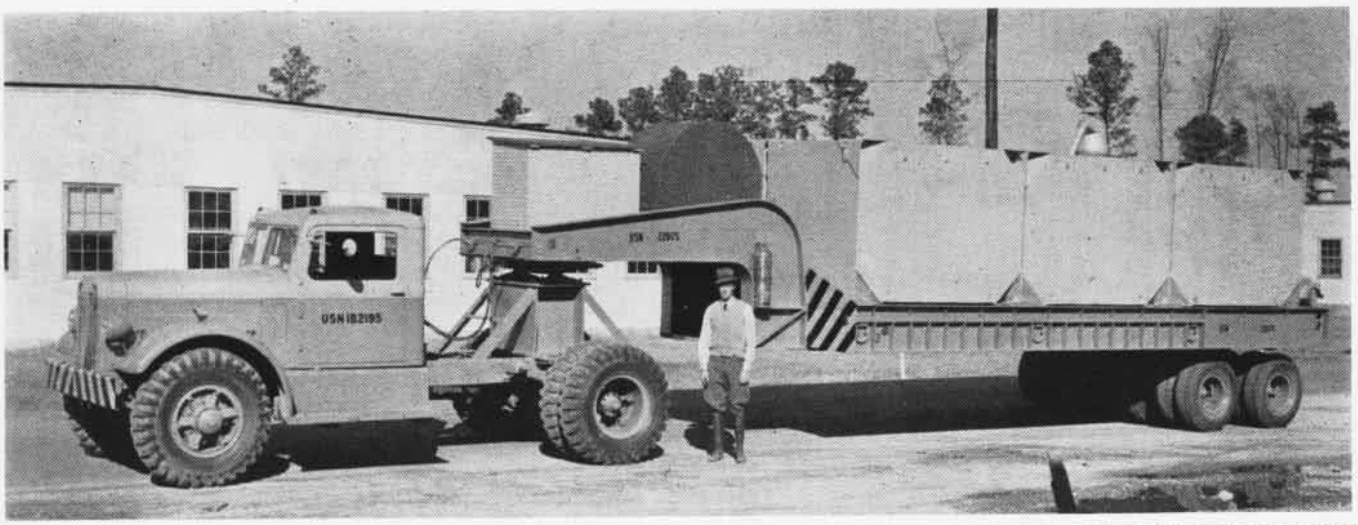
On a flexible pavement groups of plate loading tests are made with different sizes of plates, 15, 24, and 30 inches in diameter. All three tests in any one section are made within an area of from 25 to 45 feet. Following these, a loading test is made also on the subgrade at the spot where the pavement loading test was completed.

These tests are a painstaking process. Kibitzing "sidewalk superintendents" may be curious about the purpose of the thin layer of plaster of paris carefully spread over the area for the plate to rest on. Since the dial gauges measuring the rate of settlement are read to thousandths of an inch, evenness of bearing must be assured.

Accuracy in timing and in reading the dial indicators for rate of settlement as the load is increased calls for patience on the part of the testing personnel. Each increase in load is allowed to act until the rate of settlement is equal to or less than one thousandth of an inch per six minutes or until 30 minutes have elapsed, whichever occurs first. Loading is increased until either a settlement of 0.2 inch has been recorded or until the total load is 75,000 pounds. To complete the test the load is released and recovery measured for a period of 30 minutes. Crewmen suffering from sore elbows and crampled muscles in their under-the-axle watching positions have learned to use mattresses.

Concrete pavements get a different treatment. Loading tests are made only on the subgrade after a block of pavement has been removed. The square pavement samples are sawed into beams 20 inches or more in length. Flexure tests on these beams show the modulus of rupture of the concrete.

All of this adds up to a time-consuming, meticulous gathering of data. Density in place tests made on the base course, subbase, and subgrade at the loading sites and the taking of undisturbed soil samples from the tested area are also included in the extensive process. The casual observer may see only an interruption in traffic on an airstrip, but the engineers behind the Airfield Evaluation Program see a source of definite information leading to increased efficiency, economy, and safety in the development and use of naval airfields. Don't gripe at the "gophers"; their digging counts.



TANKS OF WATER ARE CONVENIENT METHOD FOR PROVIDING 75,000 POUND LOAD ON TRAILER USED FOR PLATE LOADING TESTS

SEPARATED PILOTS IN THE ANACOSTIA AREA ARE EAGER TO FLY LATE RESERVE MODELS

PILOTS SWELLING AIR RESERVE

SEPARATED Naval Aviators who feel the urge to become airborne again in the fast aircraft they flew back in the "good old days" are swelling the ranks of reservists now getting flight time at the 22 Air Reserve Stations throughout the nation.

NAS FLOYD BENNETT Field, with its huge population center, is leading the field with over 2400 registrants. Glenview, Los Alamitos, Livermore, Minneapolis, and Grosse Ile also report large turnouts. News that authorized flight time has been increased to six hours per month has brought numerous applications.

Recent developments include the appointing of Rear Admiral I. M. McQuiston, USNR, as Special Assistant to DCNO (Air) in connection with the administration and coordination of all phases of the Naval Air Reserve Program. He is principal advisor on Air Reserve matters and represents DCNO (Air) in matters involving relations with Naval, Army, and other agencies.

Air Reserve stations will be manned largely by Reserve personnel and at such time as Naval Reserve appropriations are approved, officers who possess the qualities and qualifications desired will fill allowances. Those who have continued on active duty and who have the interest of the program at heart will be accorded first consideration.

Opportunity to remain on active duty in the Naval Reserve and to serve at activities near their homes will soon be offered enlisted personnel. Those who are now or will soon be eligible for separation may be permitted to reenlist in the reserve for permanent active duty. This program, if adopted, would combine the advantages of both military and civilian life.

Besides the conveniences of living at home, the program would provide educational facilities, technical training, opportunities for advancement in rate, full time employment and economic security through retirement pay.

MEANWHILE, the interim program continues until 1 July when Congress will have had time to act upon appropriations covering the pay and maintenance of the Air Reserve. The long range program will use late model planes to maintain pilots at fleet proficiency and will include an annual two weeks training cruise.

The Marine Air Reserve program calls for 29 fighter-bomber squadrons, with a total of 1,100 pilots, 361 ground officers, and 4575 enlisted men. Two Marine squadrons are planned for Glenview where the Marine Air Reserve Command has established staff headquarters under the command of Brig. Gen. C. F. Schilt. The Naval Air Reserve Training program is commanded by Rear Admiral E. C. Ewen, USN.

Iowa Pre-Flight Closes Down

Other Aviation Activities See Changes

Recent redesignations, disestablishments and relocations of naval activities ordered by the Secretary of the Navy that are of particular interest to aviation personnel include the following.

The U.S. Naval Academic Refresher Unit V-5, located at Muhlenberg College, Allentown, Pa., was redesignated as a U.S. Navy V-12 unit.

The Photographic Interpretation school and Terrain Model Making school at the U.S. Naval Photographic Intelligence Center, Navy Yard, Washington, D. C., were disestablished by an order dated 21 January. Training functions performed by the two activities will henceforth be conducted by the U.S. Naval Photographic Intelligence Center, U.S. Naval Receiving Station, Washington, D. C.

The Naval Air Technical Training Center (Ground Control Approach School) previously located at Gainesville, Ga., was officially relocated at NAS BANANA RIVER.

The Aviation Engineering Officers school at NATECHTRACEN MEMPHIS has been relocated at NAS CORPUS CHRISTI under an officer in charge. The school is a subordinate unit of the Naval Air Station, Corpus Christi.

Effective 17 January the U.S. Navy Pre Flight School, University of Iowa, Iowa City, was officially disestablished.

The U.S. Naval Training School (Aviation Ordnancemen) class A at NATECHTRACEN NORMAN was relocated effective 1 January at NATECHTRACEN JACKSONVILLE. Under an officer in charge the school will be a subordinate activity of the Naval Air Technical Training Center, Jacksonville.

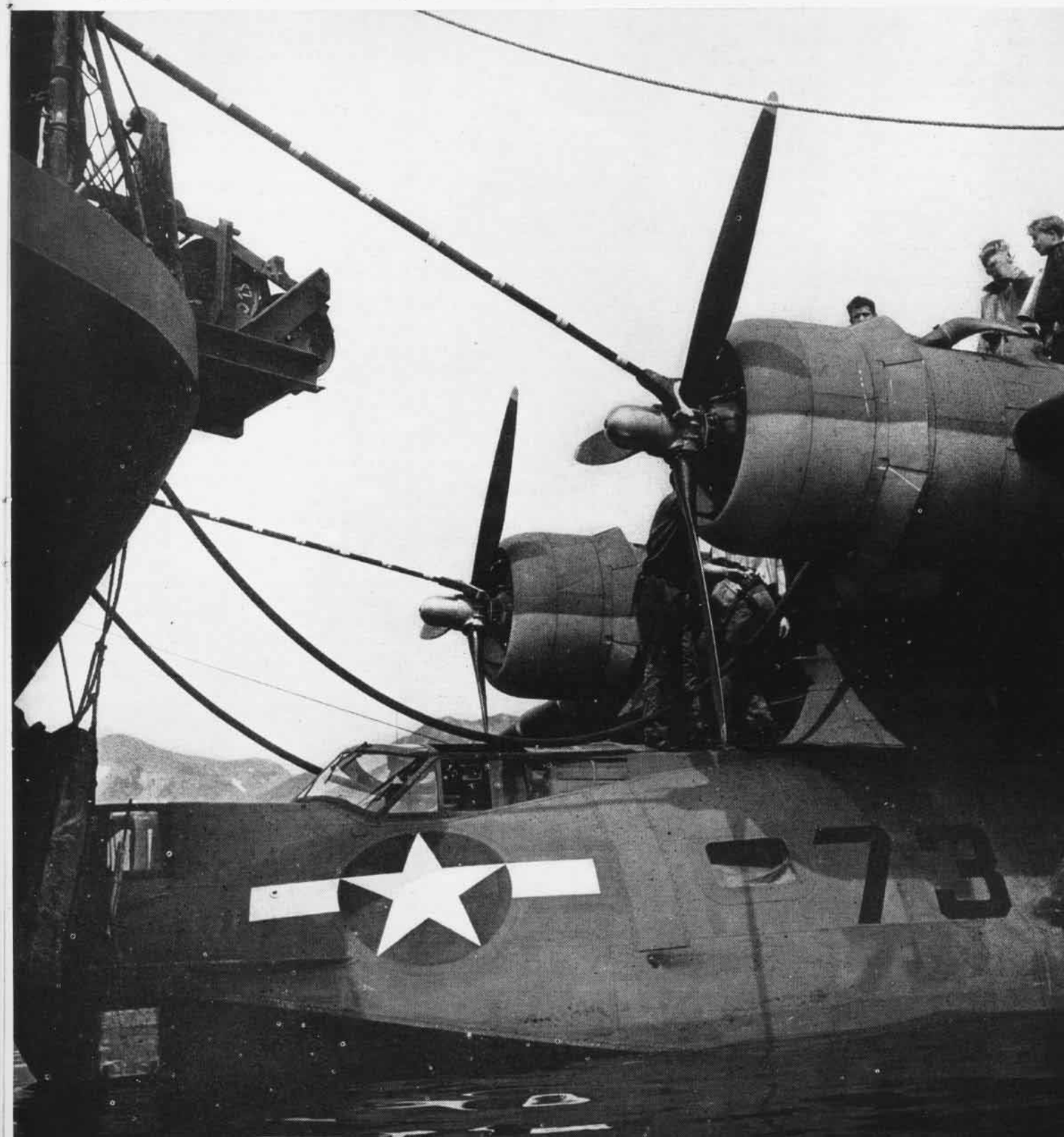
NANews For Reserves

Numerous requests for copies of NAVAL AVIATION NEWS have been received from members of the Naval Air Reserve, but Navy regulations prohibit sending the magazine to individuals. The NEWS is sending 4550 copies for use of reservists at the following stations:

NAS Squantum	350
NAS New York	500
NAS Willow Grove	400
NAS Atlanta	200
NAS New Orleans	200
NAS Memphis	200
NAS Olathe	300
NAS St. Louis	300
NAS Grosse Ile	300
NAS Glenview	400
NAS Minneapolis	300
NAS Livermore	200
NAS Dallas	400
NAS Los Alamitos	200
NAS Columbus	300

Maintenance

REFUELING AT SEA, EVEN IN CALM WATER, REQUIRES CAREFUL HANDLING TO KEEP PLANE FROM JAMMING INTO SIDES OF TENDER



Removing P&W Water Injection

When water injection equipment is disconnected or removed from P&W R-2800 engines, it is mandatory that the P&W R-2800 Engine Bulletin No. 120 be complied with.

Inspections have revealed that some activities have been negligent in complying with the above bulletin.

Bureau of Aeronautics cautions all activities when removing or disconnecting such equipment that precautionary methods be used to ascertain the installation of the proper plugs in the carburetor derichment valve cover and the supercharger regulator. The use of an improper plug may cause engine failure. (See paragraph 21, page 42, of P&W R-2800 Engine Bulletin No. 120 for instructions on above plugs.)

Simple Device Improves Timing

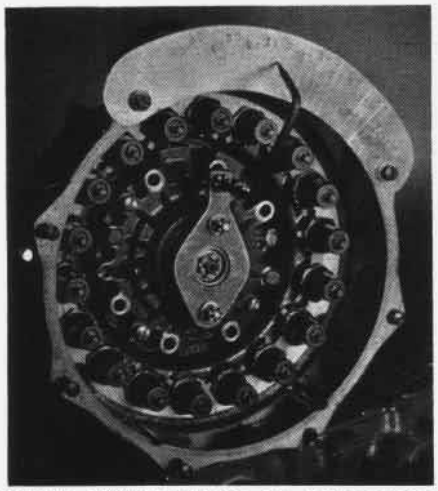
VPB-204—An improved distributor timing device that is not exposed to vibration and movement in a wind, and which cannot be knocked out of place during the timing process has been developed by this squadron. The equipment is mounted on the distributor housing of the P&W R-2800-22 or -34 engine, and affords greater accuracy than the nose section type timing device which used a wire pointer attached to the propeller.

The device can easily be made in any shop and does not require complicated calculations of gear ratios. It may also be modified for use on any engine employing the same type of ignition harness, regardless of propeller gear ratios.

The only material needed to construct the device is: one sheet of stainless steel 11" x 5"; one piece of ¼" aluminium, 1¾" x 3½"; and one piece of 3/16" welding rod 7½" long; one 3/16" stop nut and a 3/16" castellated nut.

[Designed by B. F. Denny, ACMMF]

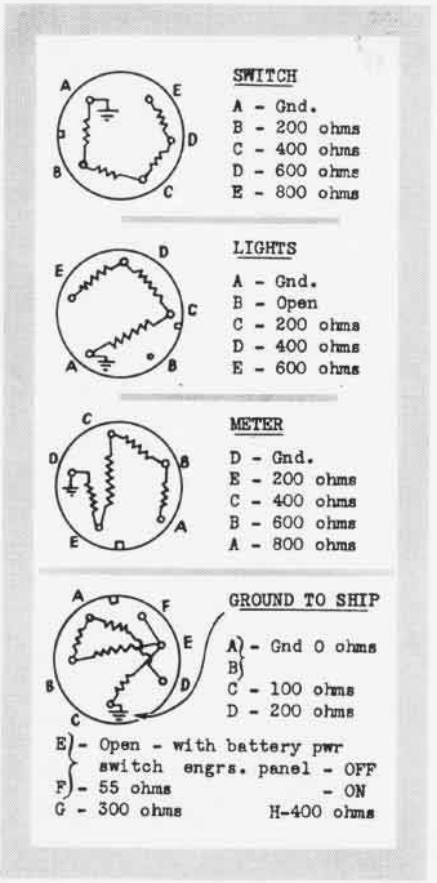
▸*BuAer Comment*—This system is satisfactory. The Bureau has, however, recently obtained a new tool called "Time Rite Indicator" which may be produced under stock #K-85-I-4050. This indicator is an extremely accurate device, and an improvement over all others so far developed. General Engine Bulletin #83 will shortly be published explaining its use.



TIMING DEVICE WORKS ON DISTRIBUTOR

Cable Tester Aids Inspection

Because of long lengths of cable interwinding throughout the plane, the PBM has always presented an inspection problem to maintenance personnel. Checking out a power circuit presented quite a problem especially when the inspectors could not see or hear each other when checking this circuit.



The Electronics Inspection department at NAS Norfolk has eliminated this trouble through the development of a simple "plug in system" used at one end of the cables and called the "APN-er." It is made up of 11-200 ohm ¼ watt resistors wired up on three female plugs mounted on a metal strip resembling the APN-1 radar altimeter gear. The APN-er is connected instead of the gear itself on the A.P.U. deck, in the aft part of plane.

In the accompanying illustrations the readings shown are taken at the pilot's instrument panel with an ohmmeter, thus eliminating an inspector at the opposite end of the cables, plus giving instantaneous and accurate results of the test.

The test system can be used on any plane using this type of equipment.

In addition the Electronics Inspection office has developed an "APX-er" which checks out the entire power circuit from APX-2-APN-4 dynamotor in the PBM galley, through the intricate connections of a junction box of 19 connections, and the results may be read on the flight deck by one inspector with an ohmeter. This circuit was previously impossible to check alone.

The "APX-er," shown in the bottom panel of accompanying illustration is made up of one female plug resembling the APX -APN 800-1-B dynamotor plug which is plugged directly into the cable instead of dynamotor, using 4-100 ohm ¼ watt resistors wired as shown.

It is quite necessary to have an accurate ohmmeter and positive ground connections when using these devices.

New Safety Lock for SNJ Gear

NAAS Cabiniss—Needed in this command more than any other due to the fact this is the first stage of training where a student is associated with a retractable landing gear, a landing gear control handle safety catch for SNJ model aircraft has been devised by a civilian employee.

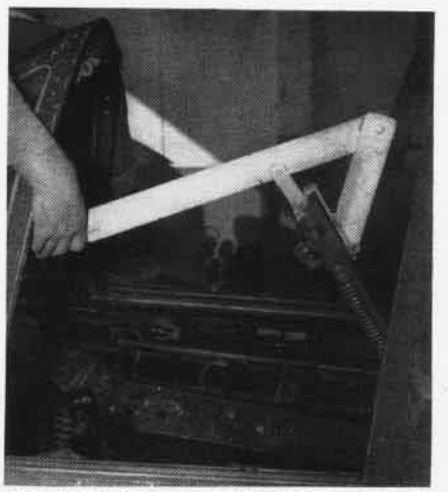
The catch consists of a spring loaded latch that attaches on the landing gear control handle. It locks the handle in the down position and has to be depressed before control handle can be moved into either the emergency down or up positions.

[Developed by Toy B. Skelton]

Corsair Seat Replace Rod Used

CASU 53—Using an instrument designed by an AETM of this unit, radiomen have found less difficulty in replacing the seat of F4U's following its excavation to allow room for repairmen to work on faulty radios.

The tool is used to simplify this

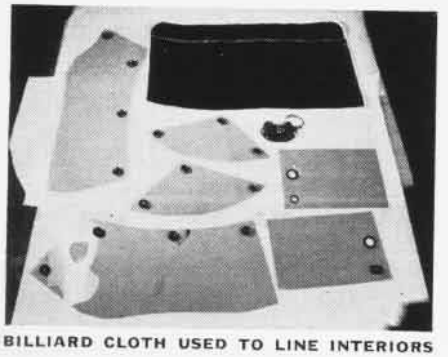


THIS TOOL IS BEST APPLICABLE IN PAIRS

former complex operation, and it is best used in pairs, one on each side, to pull up both seat springs. The rod material is 3/16″ steel strap, 2″ wide. Bolts are ⅜″ on main pivot and 3/16″ on small pivot.

Case Protects Lumarith Sheets

VPB-91 has devised a carrying case for lumarith sheets used in simulated instrument flying equipment that,



BILLIARD CLOTH USED TO LINE INTERIORS

though developed for PBY aircraft, can also be adapted for any type aircraft.

Exterior material of the case is non-specular sea-blue waterproof cotton duck, which is lined with green billiard cloth. Four compartments made of cotton duck are installed inside the case. Overall dimensions of the case, unrolled, measure 47″ by 23″. Dimensions of the case are aproximately 12″ in diameter by 23″. Caution should be taken not to roll the sheets into small pack due to danger of cracking them.

An outside pocket is included to provide space for instrument flying goggles.

NAMC Measures Cable Tensions

NAMC Philadelphia—A technique has been developed at Naval Air Experimental Station for recording time histories of the tensions developed in cables during arrested landings of naval aircraft. Loads in the cable are measured on both sides of the hook.

These measurements provide extremely valuable design data both with regard to loads applied to arrested airplanes and with regard to loads sustained by the arresting gear itself.

The technique employed is to insert special load measuring links on each end of the deck pendant (arresting cable). The links are instrumented with fine wire gages whose resistances change in a predeterminable manner when the link is stressed. A recording oscillograph to which each link is electrically connected records photographically a continuous tabulation of the load developed at each end of the cable.

This technique is one that is widely used at NAES for determining loads applied in testing of aircraft structures. A special difficulty encountered was the arrangement of electrical cables so that they would not rupture during landings.

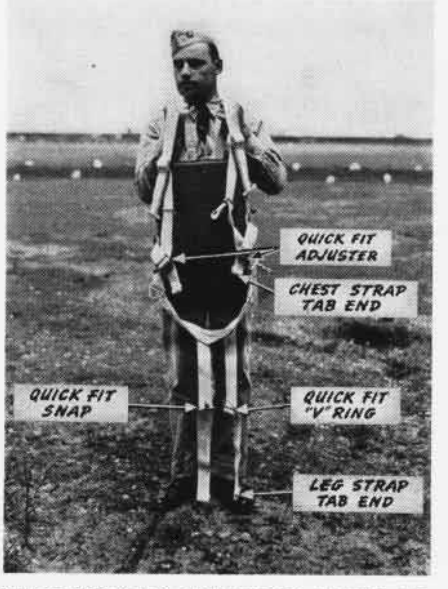
New Quick-Fit Harness On Way

Stressing ever more speed in adjusting and donning, a new quick-fit chest type parachute harness has been adopted and is now being produced by the Navy. Variations from the standard quick adjustable chest type harness are minor but of great importance in insuring fast alterations necessary in the transfer of the harness from one size aviator to another.

Four specific points of adjustment avail the flyer of adapting the harness to his body, one on each leg strap and one on each side of the body located approximately at the lower rib. All adjusting may be done by hand, and there are no tools required.

Investigation shows that the adapters have been deleted from the leg straps and that the snap and "V" ring have been equipped with quick-fit adapter, thus permitting speed in safe adjustments. One separate piece terminating at each end in a friction adapter through which chest straps are reeved acts as the back strap. The chest straps on the new model terminate at the side of the body just below the ribs. The locking device is a quick-fit hardware model which has been thoroughly tested and live-jumped and has successfully passed all requirements.

Due to the desire to have quick-fit chest type harness adjustable at all times, temporary tacking to the parachute harness which will hamper or restrict adjustments must not be used. One exception to this is the tacking of the chest snap and "V" ring six inches below the fixed shoulder adapters. Doing this will provide a position to fit properly all size personnel.



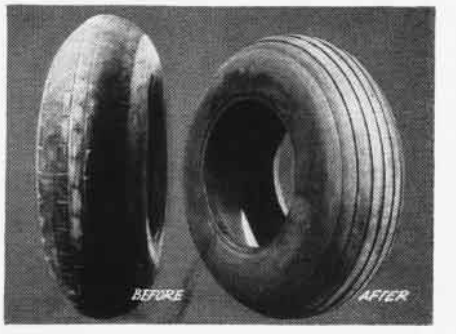
CHUTE PROVIDES 4 PLACES TO ADJUST FIT

Availability of the new harness depends upon the procurement of the quick-fit hardware. This action has been initiated but is not progressing rapidly due to shortage of materials. According to the Technical Order 7-46 concerning the construction and use of the harness, deliveries may be expected during the second quarter of 1946.

BuAer to Continue Tire Recaps

BuAer Maintenance division reports the Navy will continue its program of recapping and repair of aircraft tires and tubes which was launched during the war to save on rubber and speed maintenance of planes in fighting trim.

A casing in good condition can be recapped for about 25% of the original



RECAPPING TIRES SAVED NAVY THOUSANDS

cost of the tire and will give maximum service. Wartime experience proved the recapping both practical and economical. It is the intention of the Navy to use the contracted facilities of available local recappers for the program.

Figures on aircraft tires for 1944 show that out of 15,500 tires used monthly 7,000 were recaps and the rest new. In 1945 this was cut to 3,200 new, with 8,500 retreads a month being issued in the U. S. and Hawaii. The recapping was done by commercial outfits, except on Guam where the Navy set up its own plant late in the war. Monthly savings amounted to $100,000.

Control of the postwar recapping program will be vested under Aviation Supply Office, Philadelphia, which will award and administer all recapping and/or repair contracts in the interest of lower and more uniform prices, more consistent and satisfactory workmanship and centralized control.

NAS Kahului—The first of the many Quonset huts which Seabees constructed on this base early in the war to provide necessary housing for offices and quarters has been sold 'lock, stock, and barrel' and moved intact. A Maui physician, seeking quarters for an office, purchased the surplus building and had it moved into Wailuki to set up his practice.—*The Flyer.*

Field Service Spots Good Ideas

Among the services offered by Aircraft Maintenance Field Service Representatives is the observance of techniques and methods used in the field so that they may pass along the better ones to other activities, thus facilitating aircraft maintenance in all areas.

One representative, while visiting MCAS EL CENTRO, California, observed VMF(N)—534 maintenance personnel using a locally constructed portable tire bead breaking tool to remove a tire from an F7F wheel. This tool, simple to manufacture locally, yet effective in freeing both tire beads in one operation, was considered worthy of greater publicity than he was able to give it in his travels.

OPERATION LOOSENS BEAD ON BOTH SIDES

TIRE CHANGING IS SPEEDED WITH THIS RIG

The accompanying photos show the tool in use. Other service activities may wish to adapt the design to their special needs. The Aircraft Maintenance Field Representative in commenting on this bead breaking device stated that it was structurally strong enough except for the four locking pins which should be increased from ¼" to ⅜" in diameter.

This is not the first locally manufactured bead breaking tool. It may not even be the best, but VMF(N)—534 is to be commended for using their ingenuity and materials at hand to overcome the problems involved in the time-consuming and wrath-provoking job of changing some of the larger tires in use today.

Constant Wear Exposure Suits

In the November 1945 issue of NAVAL AVIATION NEWS, appeared a description and picture of the Mk 2 constant wear exposure suit, designed to be worn over other items of clothing to afford protection to men flying carrier type aircraft from cold water upon ditching or bailing out. The description and picture shows the exposure suit as having a zippered opening on the left hip for the anti-blackout suit air hose. This describes the latest type exposure suit now being procured, which has been designated Mk 2, Mod. 1.

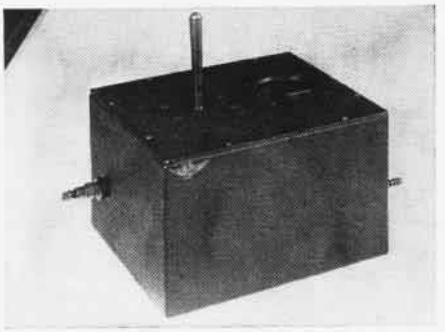
Bureau of Aeronautics initially procured 6000 each Mk 2 exposure suits which did not incorporate the opening on the left hip. This type of constant wear exposure suit had been designated Mk 2, Mod. 0. It is recommended that all squadrons in need of the Mk 2 exposure suit who do not utilize anti-G equipment use the type Mk 2, Mod. 0.

For those squadrons who use both the anti-G and the exposure suits, the designation Mk 2, Mod. 1 will describe the type of exposure suit suitable for their needs.

Since the quantity of both types of the Mk 2 suit is limited, it is important that those activities who are in urgent need of the exposure suits stipulate the quantity of both models which is desired. All future procurement of the constant wear exposure suits will be the type Mk 2, Mod. 1.

Life Raft Inflater and Tester

A combination inflater and tester for life rafts is being manufactured at NAS ALAMEDA for use by A&R Departments responsible for repair and reconditioning of pneumatic life rafts. The device has a compact arrangement whereby air is admitted to the raft and the pressure is measured without lost motion.



DEVICE INFLATES AND CHECKS LIFE RAFT

Unique feature of the inflater and tester is the arrangement of two spring loaded plunger type valves that are operated by a single toggle. Moved in one direction, the toggle admits air to the raft, while in the reverse direction the toggle admits raft pressure to a dial indicating pressure gauge. The pressure gauge is calibrated from minus six to plus six inches of mercury

Succeeds List of 1 March 1946 — *1 April 1946*

LIST OF NUMBER AND DATE OF LATEST ISSUE OF AIRCRAFT SERVICE CHANGES AND BULLETINS

Aircraft	Bulletin	Date	Change	Date
F6F	137	3–19–46	96	12–20–45
F4U–F3A–FG	275	3–6–46	240	2–15–46
F7F	30	3–21–46	33	3–1–46
F8F	12	3–20–46	10	2–14–46
FR	11	11–7–45	19	3–21–46
PV	187	3–18–46	191	3–20–46
PBM	166	2–11–46	181	12–29–45
PBY	142	2–15–46	187	10–19–45
PB2Y	74	10–19–45	157	3–28–46
PB4Y	224	2–15–46	192	2–7–46
R5C	74	3–7–46	157	12–18–45
R4D	56	3–7–46	48	10–3–45
R5D	86	2–11–46	141	2–18–46
RY	88	1–21–46	35	2–7–46
SB2C–SBF–SBW	236	3–12–46	159	2–12–46
SC	100	3–20–46	48	12–20–45
TBF–TBM	220	12–25–46	247	12–5–45
TBY	23	2–18–46	6	10–26–45

For complete list of Aircraft Service Changes and Bulletins, see Naval Aeronautics Publications Index NAVAER 00-500 and supplement 00-500A.

and is protected from excessive pressure by a relief valve.

A favorable report on the inflater and tester has been received from NAMC PHILADELPHIA, citing the following advantages: *1.* Easier to handle than a manometer; *2.* Inflating and checking pressure accomplished without reconnecting pressure or manometer lines; *3.* Greater accuracy is obtained as dial indicator pressure gauge is easier to read than manometer; *4.* Bursting tests with inflater at a distance from the raft can be made without hazard to personnel.

Maintenance activities wishing to manufacture one of these units locally should contact NAS ALAMEDA for a blue print of drawing 4945.

[DESIGNED BY C. S. BOONE AND W. F. HUNT]

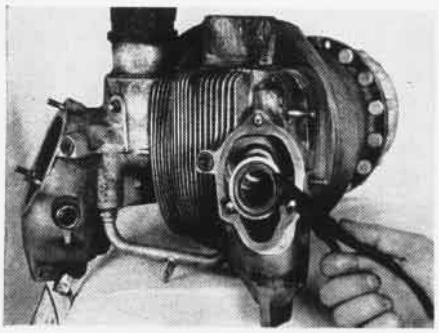
Pay Raise Catches Seattle Men

NAS SEATTLE—Many sad-but-wiser civilian employes in A&R learned too late of the 18 cents an hour raise in pay that recently was granted civil service employes.

Convinced that the proposed economy measures would lop their names off the payroll anyway, they terminated. A few days later, news of the raise in the two-inch headlines of local papers smacked them between the eyes. Many of them frantically attempted to cancel their termination requests, but they were too late.

Cleaning Eases Washer Removal

NAS SAN JUAN—A warrant machinist attached to this activity has suggested



VALVE SPRING WASHERS COME OUT EASILY

a simple yet certain method for eliminating difficulties encountered in the removal of valve spring inner washers on exhaust guides.

By leaving these washers on the engine until cleaning and degreasing has been completed the washer is easily removed. Prior to this time it was common practice to remove the washer before degreasing. This was extremely difficult because of excess carbon that coated this point.

The resultant time saving with the new idea developed under the Navy Employees' Suggestion Program.

[IDEA BY R. C. SKINNER, *WM, USN.*]

COMPLETE SAILING OUTFIT WORKS TO MOVE RAFT AT SPEED OF FOUR IN 10-12 KNOT WIND

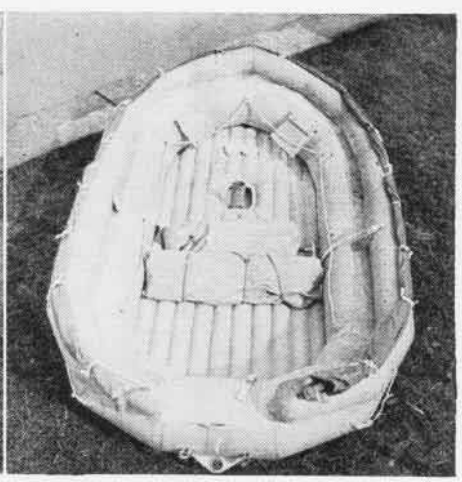
AR-4 LIFEBOATS FIT BOMB-BAYS OF SB2C AND TBF

CONSIDERED the most efficient and advanced design yet developed, the AR-4 is a pneumatic lifeboat suitable for dropping in flight to survivors. When packed and carried in the bomb-bay of a *Helldiver* or an *Avenger*, it measures 16″ by 41″ and weighs 105 pounds. It is dropped in its packed condition, the CO_2 cylinder being actuated by the survivors when they reach the pack. Inflated, the boat is 9′ long

The new rubber liferaft consists of two inflated tubes, one superimposed above the other to add freeboard and rigidity to the boat and to increase seaworthiness. In addition, the boat is equipped with an inflatable floor which stiffens the bottom and also insulates the floor from the cold of the water.

An innovation never before introduced in light rubber craft, the complete sailing outfit includes an 18″ keel, a lateen sailing rig and a collapsible rudder. A speed of four mph may be garnered from the usage of this gear in a 10-12 knot wind. There is also a shield around the top periphery of the boat, to keep out spray and provide warmth. Sun canopy is available.

Standard survival equipment goes with the AR-4 model, some being dropped with the boat and others separately to any survivors in the water.



Keel on AR-4 is safety device never before used on light rubber raft. It will greatly aid navigation and sailing boat

Upper separate inflatable tube allows a great deal more freeboard. It, like the other innovations, promotes safe rescue

NEW SOLAR STILLS GET FRESH WATER OUT OF THE OCEAN

THE NEW Mk 2 Mod. 0 solar still is a spherical-shaped vinyl plastic ball designed to provide a constant source of fresh drinking water to survivors adrift. The still comes packed in a rectangular case, complete with tie line, instruction book, and a small quantity of mending tape.

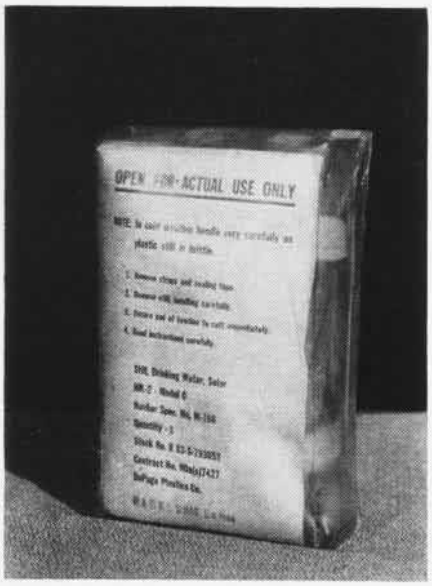
The mechanics of the new Mk 2 Mod 0. still are very simple. When the reservoir is filled with sea water, and the still placed in the sun, the salt water drips on the surface of the black evaporator cloth stretched in the center of the still, evaporates, and condenses on the inside of the plastic cover, running from there down to the fresh water trap in the bottom of the still, where it may be drawn off by means of the fresh water drain tube.

The reservoir must be kept filled for the still to operate, so it will become necessary about once every hour and a half to refill the reservoir. If the still loses air and becomes soft, the black evaporator cloth may touch the sides of the bag and contaminate the freshly evaporated water with salt. Therefore it should be inflated when in use.

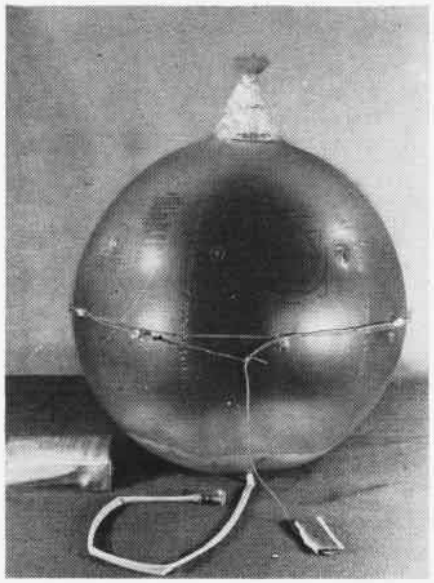
While the vinyl plastic is rugged and strong, care should be taken to prevent the still from coming in contact with sharp objects, since it may be easily punctured. If it becomes necessary to patch the still, the surface must be absolutely dry and clean before the patching tape will stick to the still surface.

Operation of the still is as follows:

1. Securely tie the still to the raft to avoid losing it if the raft overturns.
2. Wet the cloth drain on the bottom of the still.
3. Inflate the still by blowing through the inflated tube until the still is round and firm.
4. Place the still overboard and hold in an upright position.
5. Fill the reservoir full. When the ballast tube is full, the still will float upright without holding.
6. Keep the reservoir filled with sea water when the still is in operation, and keep the still fully inflated by blowing air in the tube as necessary.
7. Remove the fresh water from the fresh water drain tube three times a day.



NEW MODEL SOLAR STILL FITS SMALL KIT



INFLATED STILL READY TO PRODUCE WATER

8. Throw out the first two hours supply of water obtained when the still is used for the first time, since it will have a foreign taste because of the powder used on the inside of the still and tube.
9. Should the still lose its silvery appearance, which is caused by condensation of the fresh water on the inside of the bag, pull the string to clear the water feed of foreign matter.
10. To deflate the still, hold it in an inverted position until all the water has drained out, then open the tube, and squeeze the still until the air is exhausted.

It should be realized that the solar still is not intended to replace all other sources of fresh water. Rain water should always be collected and saved, and the chemical drinking kit should be used sparingly, and only when it is impossible to operate the solar still, as under overcast, or the sea is rough.

These solar stills are currently being delivered to aviation supply activities under stock number R83-S-793052.

Catalina Can Jettison Its Gas

VPB-73—Two fuel dumping tests were conducted to determine the flow characteristics of fluid from the dump valve exhaust duct. Water and dye marker solution was successfully used to indicate airplane surfaces contacted by the jettisoned fluid. Integral port side tank containing 450 gallons of fluid was dumped on both tests.

Test I. Port engine stopped. Propeller feathered. Airspeed 85 knots. Nose high attitude. Rate of descent: 100' a minute. Flow rate of fluid first minute: 150 gallons. Flow rate of fluid second minute: 80 gallons. Time required to exhaust fluid: 9 minutes. (50 gallons remained in tank)

Result: The only part of the plane contacted by the fluid was the bottom of the horizontal stabilizer. The fluid sprayed the area one foot from the tip to six feet from the tip.

Test II. Both engines running. Airspeed: 90 knots. Nose high attitude. Rate of climb: 200 feet per minute. Flow rate of fluid first minute: 190 gallons. Flow rate of fluid second minute: 100 gallons. Time required to exhaust fluid: 7 minutes. (50 gallons remained in tank)

Result: The fluid did not contact any part of the aircraft.

Aviators should bear in mind that the rate of fuel flow is in proportion to the amount of fuel in the tank.

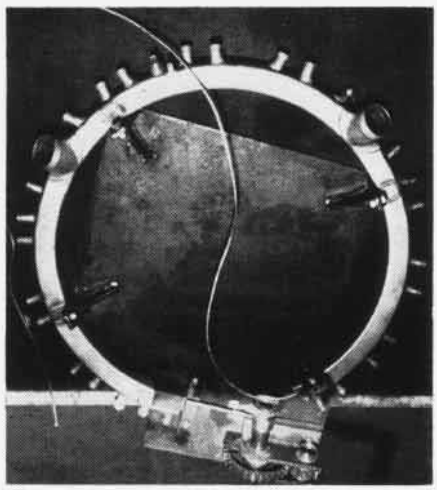
It seems reasonable to conclude from these tests that gasoline can be safely jettisoned from a PBY-5A equipped with a dump valve duct, although jettisoning should be dictated by existing circumstances.

Block Removes Manifold Dents

NAS KODIAK—A dent-removing jig for ignition manifolds, has been developed by two metalsmiths at this station.

A forming block was manufactured to conform to the contour of the ignition shielding with tapered ends. Brackets were made from surveyed material and a surveyed gear was obtained from engine overhaul.

To operate, the ignition shielding is



MANIFOLD DENTS REMOVED WITH NEW JIG

secured to the brackets, and the forming block is pulled through the shielding in a counter clockwise direction by turning the gear handle.

The ignition shielding contour returns to its original shape as the dolly is pulled through. A plastic hammer is used to straighten minor dents with the dolly serving as a bucking bar.

[Suggested by W. D. Wyatte, R. L. Schoettler]

Platform Holds Hedron Chutes

HEDRON 14-2—A standardized system of parachute stowage for the Privateer has been designed in this Hedron utilizing canvas straps and a stowage platform to provide accommodations for a total of 12 chutes. Bungee is used with the straps to secure the chutes along the inside fuselage bulkhead. The platform, located in the radio compartment between stations 3.2 and 3.3, holds five chutes.

PUBLICATIONS

The following Aviation Circular Letters, Technical Notes and Technical Orders have been issued since 1 March 1946. Copies are available on request to Publications Div. Bureau of Aeronautics.

AVIATION CIRCULAR LETTERS

33-46 *Damage to Private Property and Personal Injuries or Death Arising out of Naval Aircraft; report of.*
34-46 *Redistribution and Disposal of Excess Material and Equipment Resulting from Disestablishment of Naval Air Activities.*
35-46 *JRB Aircraft Model Designation: Assignment of. JRB-5 Aircraft Model Designation: Establishment of.*
36-46 *Accidents Involving Barriers or Arresting Gear, Reporting of.*
37-46 *Typhoon, Report of, by VJ-13 Detachment at Okinawa.*
38-46 *Post-War Policy for the initiation, prototyping and incorporation of aircraft service changes; The issuance of aircraft bulletins; and configurations of aircraft.*
39-46 *Mica insulated Aircraft Spark Plugs—Discontinuance of Overhaul of.*
40-46 *Aviation Electronic Crystals—Handling, Care, and Stowage of.*
41-46 *Aeronautical Allowance Lists—Use of.*
42-46 *Aircraft for Developmental Projects.*
43-46 *Type, Class and Model Designation of Naval Aircraft.*
44-46 *F2L-1K Aircraft Model Designation—Establishment of.*
45-46 *Aircraft Failures, Instructions for Reporting on in AARs and RUDMs, Form Nos. 339 and 4112.*
46-46 *(Confidential) Specifications, revised classification of.*
47-46 *Handbooks, Manuals, Catalogs and Equipment; revised classification of.*
48-46 *Aviation Electronic Equipment, Overhaul—Specifications for.*
49-46 *Inactive Status Vessels–Bureau of Aeronautics Material Readiness Requirements of.*
50-46 *Policies and Definition of Overhaul and Repair—Establishment of.*

TECHNICAL NOTES

1-46 *Index of Technical Orders and Technical Notes.*
7-46 *Treatment of AS-242/A Antenna to Prevent Corrosion.*
8-46 *General Information and Terminology Pertaining to Restrictions on Operation of Naval Airplanes.*

TECHNICAL ORDERS

8-46 *Simulated Emergency Operation of Multi-Engine Aircraft.*

46′ REMOTELY-CONTROLLED TARGET BOAT PERMITS UNRESTRICTED ATTACK TECHNIQUES

RADIO DRIVEN TARGET BOATS UNDERGO TESTS

TWO GENERAL types of radio remote-controlled bomb target boats have been designed to replace the now obsolete armored bomb target boats which require operating crews. Jointly developed by BuAer and BuShips at the request of DCNO(Air), the new drone targets have many advantages over previous gunnery practice equipment. Speed, for instance, has been greatly increased, and now more nearly simulates enemy military combat craft. Obviously, with no personnel aboard, the new craft permit completely unrestricted attack techniques.

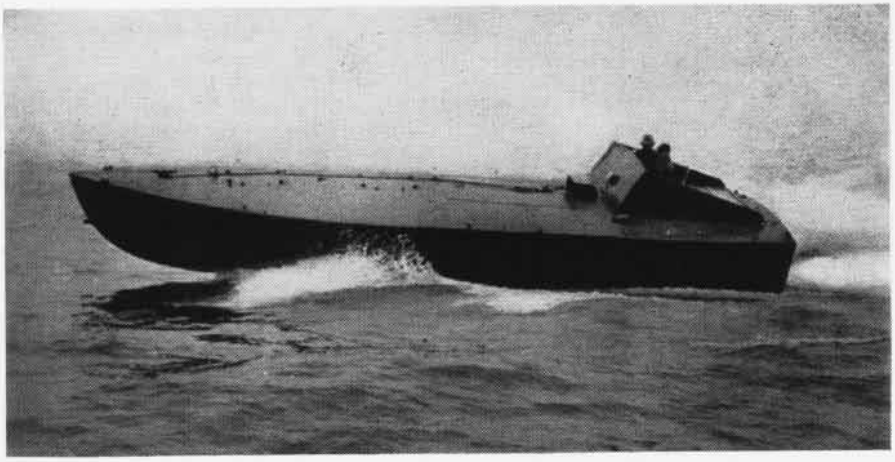
One of the targets is a 46′ air propelled craft with sea-sled type hull. It is powered by a 950 hp. Wright Cyclone aircraft engine with 3-bladed air prop, and is capable of 25 knots.

The other type is a 36′ conventional V-bottom speedboat powered by a 250 hp. Hall-Scott Invader Marine engine with single screw, and is capable of about 29 knots.

Although no armor plate has been used, the hulls of both targets are highly compartmented to prevent sinking in case of bomb damage, and simple plywood construction enables them to be easily patched and restored to service after sustaining many hits. They are classified as semi-expendable.

Both craft are usually monitored from ARV's and many safety features have been incorporated into the remote control circuits to stop them in case of control failure. They are normally used with water-filled practice bombs or small miniatures. When under rocket or machine gun fire, however, a target spar should be towed on a short haul behind the boat. Twenty-five craft of each type have been procured for use at all training stations where gunnery is taught.

Both models of the skipperless target boats already have completed their acceptance tests successfully. Deliveries are expected to be completed before 1 July. Previously, the Navy relied on slower armor-plated, manned boats.



36′ TARGET, CAPABLE OF OVER 30 KNOTS, CLOSELY SIMULATES COMBAT CONDITIONS

SERVICE Test
INTERIM REPORT DIGEST

F8F-1 (470 Hours' Test)

Cold Weather Test. BuNo. 94764 is being transferred to ComAirLant for cold weather test. This aircraft has flown a total of 470 hours since 11 June 1945.

Auxiliary Fuel Pump. Pump, Pesco 2E609A, failed after 109 hours. Disassembly showed pump vanes jammed by small foreign particles. It is believed that foreign particles entered fuel tanks during routine servicing and were carried to pump which is not protected by strainers when taking suction from the drop tank. Main strainer located between emergency pump and engine driven pump was found clear.

Cabin Hood Jammed. Hood jammed in closed position during flight. Pilot could not open hood with either hand crank or emergency release toggle after landing. Examination showed that during opening or closing of the cabin hood, the emergency release bell crank, P/N 54183-1PC, strikes and distorts the cabin hood fairing strap, P/N 54344-1, at station 179. When hood is closed in flight, air loads force cabin hood frame under distorted area of the fairing strap, thereby locking hood in closed position. Condition occurred on BuNo. 94764 after 460 hours. BuNo. 94879 showed slight distortion of fairing strap after 210 hours. As temporary fix, fairing strap was bent to prevent release bell crank from striking it.

Exhaust Systems. No difficulties were encountered during this interim on any of the various exhaust system prototypes being service tested.

Hydraulic Actuating Cylinders. Prototype cylinders being service tested had no difficulties during this interim. Two cylinders, P/N 56218, with nitrided pistons, have 59 operational hours; two cylinders, P/N 56210, Parker lubrited, have 103 hours. Cylinders with follow up rings will be installed on the 251st production F8F-1 when it is delivered for test.

Generator Brushes. LHH brushes of generator 1298-1A were badly worn after 230 hours. Excessive wear of 393 inches was apparently caused by insufficient cooling. The cooling blast was placed so that most of the air struck the fork of the barrel and was diffused over the brushes. Cooling blast had been directed in this manner to determine whether or not it is necessary for the air blast to strike the commutator. On another airplane the blast was directed to strike the commutator direct. Wear on this installation was .1622 inches in 155 hours. Worn brushes were replaced and the blast directed to strike the commutator direct. Brush wear will be checked and condition reported every 60 hours. Units having brush wear trouble should investigate their cooling systems to make sure that the blast is striking commutator direct with no impediment by fork of barrel.

Starter Failure. Eclipse starter 1416-6B failed to mesh after 230 hours and was found to be completely oil soaked. Motor turned starter satisfactorily at loads not exceeding 300 foot pounds; at greater loads motor continued to run but starter stopped. Starter clutch is being disassembled to determine cause. Model 1412-12 starter was installed as replacement for the defective starter type 1416-6B.

Gun Mount. Concentration pattern was fired with BuNo. 94764 before transfer to ComAirLant so that jump card showing pattern

concentration could be drawn and compared with the acceptance jump card. Fifty rounds were fired from each gun at the 36" diameter bull's eye of a 12' x 12' target at a distance of 300 yards. Firing showed that trunnion mounting yoke of port outboard forward gun mounting was out of adjustment so that all rounds fired from port outboard gun were below bull's eye and off target.

FR-1 (310 Hours' Test)

Oil Pump Failure. Radio equipment was saturated with lubricating oil from jet unit because of oil pump failure. Radio equipment and all accessible cables and plugs were cleaned and replaced.

Wheels Up Landing. BuNo. 39676 made a wheels up landing on 2 February with extensive damage to fuselage and wings. Project will be delayed to make repairs.

F2G-1 (214 Hours' Test)

Oil Leak. Following a routine test flight with no malfunctioning of engine, excessive amount of oil was discovered leaking from B-1 cylinder, engine YR 4360-4, after 187 hours of engine time. Since exhaust rocker box was full of oil and both spark plugs were firing, it was assumed that oil had entered combustion chamber via valve guide and stem. Removal of cylinder showed cylinder wall and piston assembly in normal condition. Investigation revealed following discrepancies: *1.* All exhaust rocker boxes and moving parts were covered with heavy carbon deposit in varying amounts. *2.* All blades of the inducer, which is integral with the impeller, were heavily nicked by contact with undetermined foreign material. *3.* One carburetor boost venturi was found split for approximately ¼", cause undetermined. *4.* Main oil strainer was found collapsed from excessive carbon.

Engine was removed for overhaul and replaced with R 4360-4 engine. New type sand cast rocker box covers were removed from former engine and installed on replacement, using white gaskets P/N 99338. The intake pipe hose couplings, P/N 103737, and intake pipe hose shields, P/N 103938, also were removed from former engine and installed on present engine.

Elbow Blast Tube. Tube on A row leads of ignition harness was found chafed after 120 hours. Failure occurred at metal sleeve above spark plug terminal nut and was caused by continuous chafing of the rolled edge on the elbow blast cooling tube. As temporary corrective measure the rolled edge on the elbow blast cooling tube was flared outward from the terminal nut approximately ¼". Contractor is providing a new type ignition harness.

Oil Consumption. Specific oil consumption check at 180 hours engine time: 65% cruise (1625)—.00455 lb. per hp hour; NRP (2500)—.00888 lb. per hp hour.

Oxygen Flow Indicator. Visual interference of the oxygen flow indicator to the console panels C137/ARC and C115/ARC1 makes it difficult to see that channel selection has been made on the AN/ARC1 VHF control box. As an interim measure the oxygen flow indicator has been relocated under the dilutor regulator, permitting good visibility of the console control boxes. *Recommend* that a study be made on relocating all oxygen controls and indicators to the port side.

XBT2D-1 (Preliminary Inspection)

Pivot Assembly. Right main landing gear pivot assembly, P/N 4253572, had excessive movement during acceptance check. Disassembly showed 15 of the 75 bearings (chrome steel 9/32" diameter) were broken and bearing races were marred. Pivot assembly and pivot pin have been replaced with new parts.

Fuel Tank Vent. Main fuel tank vent system has been revised in accordance with Doug-

las E. O. 5256195 change No. 2 to eliminate spillage of fuel during arrested landings and to provide short vent for filler neck to eliminate blow back of fuel during filling operations.

Drag Link Lock Plates. Main landing gear lock plates, P/N 2253404, originally manufactured of chrome-moly steel .093″ gage plate, have been replaced in accordance with Douglas E. O. 2253404A, which incorporated same lock plate manufactured of chrome-moly steel .125″ gage plate.

Rudder Balance Weight. Rudder balance weight support bulkhead, P/N 9252021-188, has been replaced with P/N 9252021-240 reinforced with angles P/N 9252021-248, and the rudder balance weight P/N 5251427-80 has been installed in accordance with Douglas prints No. 5251427 and No. 9252021.

Tail Wheel Replacement. Tail wheel, tail wheel axle, and tail wheel casting have been replaced because of hard usage received during previous arrested landing trials.

Valve Replacement. Main fuel tank outlet assembly Pacific Aviation valve D27-100 has been replaced with Aerodraulics valve P/N A-04-01 in accordance with Douglas service report E 912-8-629.

Exhaust Collector. Assembly P/N 5256330 has been replaced with a complete new set of production type exhaust stacks and clamps for accelerated service test in order to obtain accurate parts usage data.

Spark Plugs. Type RB-19-R plugs have been installed for a test run of 240 hours for evaluation.

Induction Vibrator. Bendix Scintilla type 1030385-1 in use with the former 3350-8 engine has been replaced by type VJR 24 B5 with the 3350-24 engine in an attempt to evaluate the production model BT2D-1.

Thermocouples. Cylinder head bayonet type thermocouples have been installed on each of the 18 cylinders of the Wright 3350-24 engine, in anticipation of possible valve failures while simulating dive bombing, torpedo missions, carrier take-offs and other high power operations. Iron and constanton leads with an 18-point selector switch and an 8 ohm indicator with a common resistor are used. Accelerated service test syllabus includes recording of cylinder head temperatures under standard power settings each flight. This will give accurate indication of any incipient cylinder head temperature change due to valve failures.

Rudder Stop. Rudder stop, P/N 2253100 and bolt, P/N S-100242-4-10 HP bent under normal strain. Adjusting bolt bent because of contact with the stop plate on the vertical fin. Rudder stop should be redesigned and reinforced to eliminate side loads on the bolt.

Cable Clamps. Electrical cabling supporting methods are unsatisfactory because of nonstandard cable clamps. Steel locking clamps are not approved by Navy. They do not provide firm grip on cabling. At slight pressure the clamps open, rubber insert falls out, and cable is no longer secured.

Cable Routing. Routing in the wing section near 20 mm. cannons and through wheel wells is undesirable. Suitable chafing material or tubing should cover cables to prevent rocks and dirt from damaging the leads. Relocation of cables to forward part of wheel wells will lessen possibility of damage.

Firewall Connectors. Breeze connectors on the firewall are unsatisfactory, as engine oil seeps back into forward equipment compartment through shielding connectors and chafing material. *Recommend* that cannon type plugs be used instead of Breeze connectors. Cannon plugs and receptacles should be used on firewall for the generator and starter leads to facilitate easy removal of either accessory without removal of cables.

Amplifier. The Servo amplifier is striking the reverse current relay, creating electrical short. Amplifier mounting rack is not substantial and should be strengthened.

Reverse Current Relay. Relay should have a protective cover to prevent electrical short or should be relocated above or below present position to prevent accidental striking by Servo amplifier.

Directional Controller Inverter. Inverter, R 88-I-4205, is mounted too close to DC voltage regulator; therefore cannon plug connector cannot be removed without first removing voltage regulator. Leads C29, C39, C42, and N25 in this connector are chafing on the DC voltage regulator cover, preventing full sway of regulator on the shock mount. *Recommend* that inverter be moved at least two inches forward, allowing sufficient clearance and preventing danger of electrical short.

Mast Not Grounded. The AN 104AX VHF mast is not grounded in accordance with T. O. 36-44 and BuAer Dwg. E784-A which show a ground connection from metal sheath to fuselage. Exposed wood for the antenna was painted. Type AN 104AX is now issued in both copper and iron plated form. *Recommend* that all new construction use copper-plated type ASO stock No. R16-A-4989-2.

New Planes Found to be Warmer

Tests of temperatures inside and out of several types of carrier aircraft, made by NATC Patuxent River, indicate the newer planes are warmer inside.

Lowest temperature was recorded in the F6F-3. With cockpit temperature vents open it showed -21° C at 34,000 ft. when it was -23° C outside temperature. The F7F-2N showed -8° C, the F4U-4 -12° C and the F8F-1 3° C. Considerable difference in cockpit temperatures was found in the SB2C-5, where the gunner's cockpit logged 7° colder than the pilot's which was -7° C at 25,000 feet. In the TBY-2 at 24,000 feet, the pilot cockpit was 16° C, radioman position was zero C and turret 2° C.

PHOTOGRAPHY

Adhesive to Mount Waterproof Papers

The following suggestion has been received from a manufacturer for a method of mounting waterproofed paper on masonite and metal.

The most practical adhesive is a good grade of white shellac ready mixed. However, due to the fact that some commercial shellacs contain adulterants harmful to sensitized emulsions, it is safer to obtain flake shellac and pure methyl alcohol and mix the solution.

Apply the shellac to both the base and the back of the print with a paint brush, coating both as rapidly as possible so that the entire coat will dry uniformly. Allow to dry as closely as possible to the maximum stickiness before mounting the print to the base. (Maximum stickiness may be gauged by permitting the coated surface to dry to the point where the finger will lightly touch the shellac without having the shellac stick to the finger upon withdrawal.) Only moderate pressure is necessary for good adhesion.

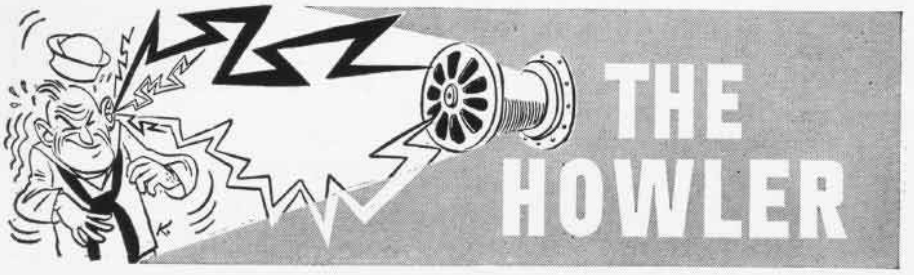
Stainless Steel Versus Salt Water Use

Since conservation of fresh water aboard ships is a major problem, the substitution of a salt water supply in photographic laboratories should be effected whenever possible. For this reason, sinks, washers, Houston Processing Machines and other equipment in photographic laboratories aboard ships are equipped to operate with fresh or salt water.

It also has been found that washing photographic film and prints in sea water has shortened the photographic process (See NavAer 10-1R-23, dated March 1943). However, reports indicate that its use has resulted in corrosion of metal surfaces, including stainless steel, when they are allowed to remain in contact with salt water for an excessive time while not in use.

Although stainless steels are not subject to corrosion under normal conditions, all steels will deteriorate if allowed to remain in contact with corrosive substances for extended periods of time.

Therefore, it is essential that all traces of salt water be removed from equipment by rinsing immediately before securing. Salt water should not be allowed to remain in tanks when not in use. Subsequent issues of handbook instructions for equipment using sea water will contain these necessary instructions, and all new procurement will be adequately marked.



Supercharger Drain Valves. Overhaul activities report that F4U-4 supercharger drain valves, P&W P/N 85619, are not being returned with the engines. Part number VS-43571 adapters take the place of supercharger drain valves because of installation problems. BuAer reminds F4U-4 aircraft maintenance personnel that when R2800-18W engines are turned in for overhaul, P/N VS-43571 adapters should remain with the aircraft for subsequent installation in replacement engines, and supercharger drain valves should be removed from replacement engines and installed in the engine being returned for overhaul.

Hydraulic Fluid Spray. According to several recent reports, F4U-4 pilots in catapult operations are getting unscheduled baths in hydraulic fluid sprayed or squirted from the Warner master brake cylinders. This results from the fact that maintenance personnel when servicing, checking, or refilling the brake cylinders have failed to bleed the reservoir properly by removing drain plugs and lowering oil level to the specified mark.

Furthermore, in some instances personnel have removed the ball from the ball check valve, which is also the filling plug. Failure to drain to the required level or to see that the ball is in the check valve will cause any excess fluid to be squirted at the pilot. All activities should inspect for this condition before catapulting.

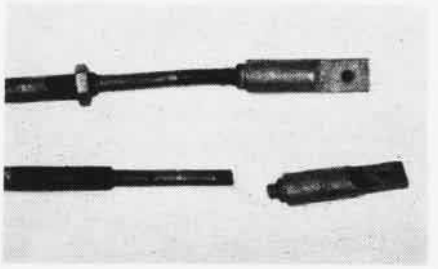
Lock-pins Shearing. Shearing of the wingfold up-lock pins has been cause for concern among squadrons operating F8F-1 equipment. In accordance with manufacturer's recommendations, beginning with plane #26 (Bu No. 94754), an outer panel tie back has been installed. This will tend to eliminate excessive working of the outer panel which is one of the causes of hole elongation and wear on the up-lock pin.

The pins have been shearing at the beginning of the taper in single shear. When this pin is properly engaged it is in double shear and is of adequate strength. All personnel should be instructed to exercise extreme care during folding operations so as to insure that the pin is fully engaged before removing handling bar.

Inspect Arens Actuating Unit. Failure of Arens actuating unit mobile rod, P/N 24604, resulted in collapse of the landing gear on an F6F-5 aircraft. Examination showed that the mobile rod was bent and broken.

Another case of a bent rod was discovered at the same activity when the pilot noted, before flight, that the Arens locking unit was not functioning correctly. In case of a bent rod the locking unit works only part of the time because of the friction-holding condition existing between the rod and the Arens actuating unit. Illustration shows condition of rods taken from the two planes.

Further investigation on all planes assigned to the squadron revealed that several other units showed signs of impending material failure of the same kind.

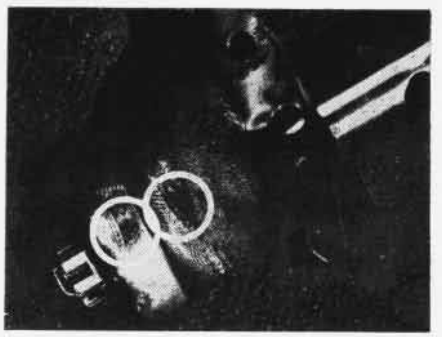


BENT AND BROKEN ARENS ACTUATING RODS

Thorough routine checks should be made of the Arens actuating unit and related parts on all F6F-5 aircraft to prevent this potentially dangerous condition.

Check Scotchlite Kits. NAS Miami has reported that several bottles of adhesive in Scotchlite kits, used in connection with placing a reflecting surface on the blades of life raft oars, had hardened to such an extent that the adhesive could not be used. Service activities are requested to watch for this condition and advise BuAer by RUDM if found, so that corrective action can be taken. ASO stock number R83-K-710380 is assigned the Scotchlite kit.

Ruptured Fuel Valve. On investigation of a recent crash involving an F6F-5, the fuel feed valve diaphragm was found to be ruptured. A close examination showed that the guide washer bore scratches as if a pair of pliers had been used during assembly. It was these scratches which had worn the diaphragm and caused it to rupture and fail. In the future the manufacturer should maintain a closer inspection of this fuel feed valve assembly. The scratches are plainly evident in the accompanying photograph.



SCRATCHES ON VALVE CAUSED THIS BREAK

Removing ADI Equipment. Faulty maintenance and careless workmanship are blamed for loss of an F6F-5 aircraft recommended for strike after major damage in an emergency landing. The pilot (luckily uninjured) had made previous emergency landing when engine cut out completely. Plane was then checked and found to have three loose spark plugs, one plug bushing badly burned, and mixture too rich. Trouble was remedied and plane ground checked, proving satisfactory.

After take-off the engine began cutting out, and pilot turned back for second emergency landing. With mixture control in auto-lean, engine cut in but would not produce enough power to stay airborne. Pilot landed downwind and could not prevent plane from running off runway.

Investigation showed that at some time before assignment of plane to the activity involved, the carburetor anti-detonant injection system had been removed. Fitting at carburetor derichment valve and jet assembly, P/N 397426, was plugged off with a non-vented plug instead of vented type. It is believed that engine heat closed derichment valve at high power engine operation, decreasing fuel flow to engine.

Failure to comply with R-2800 Engine Bulletin #120 by the activity removing ADI equipment was the cause of the engines cutting out. All activities are warned to comply fully with this bulletin when removing or disconnecting ADI equipment. The squadron concerned has checked all planes to be sure that no others have non-vented plug installed.

Heaters Warm Up Yellow Perils

NAS Glenview—In conjunction with installation of cockpit enclosures, this station installed cabin heaters in N2S aircraft for cold weather operation.

The heater installed was the Janitrol gasoline-fired type. This unit delivers 15,000 BTU an hour and burns gasoline supplied from the plane's fuel tank, fed by gravity to the heater unit where it is ignited by a glow coil.

Pressure set up by speed of the aircraft is utilized for circulating air through the system when in flight. Heated air is delivered to both cockpits through flexible tubing. The heater automatically shuts off when forward motion of the plane is too slow to provide a sufficient flow of air through it.

To provide necessary electrical power, a 24-volt battery and generator were installed. Pilot comfort resulting from the installation was improved greatly by the installation, which permitted an increase in flying hours in winter.

TECHNICALLY SPEAKING

Pilots and other aviation personnel will find technical orders and technical notes issued during the month of January and February listed here in summarized form. Reading of these summarizations does not release pilots and other personnel of responsibility of studying these TO's and TN's in their entirety.

TO 5-46 *(To be read by all pilots)*

Deals with the inspection of engines after accidents involving sudden stopping of propellers or damage to props. Engines that are in accidents in which the propeller is stopped suddenly while the engine is turning at high RPM should be held for disassembly. If the propeller has struck the ground thus causing sudden stoppage of the engine it should be necessary for competent personnel to judge as to the method of handling the engine. If facilities are available where the accident takes place the inspection and disassembly should be taken care of immediately. A check should be made of the crankshaft runout and propeller shaft. Engines, especially geared engines, have a bad habit of coming up with cracked and broken gears and teeth after a propeller has been run into the ground.

TO 6-46 *(To be read by all VF pilots)*

Sets forth the restrictions to be observed in operation of Model FR-1 airplanes. The following are permissible maneuvers when not carrying bomb, droppable tank, or other external load: Loop, roll, chandelle, wingover, vertical turn and inverted flight.

Contains speed and acceleration graph as contained in this T.O.

TO 7-46 *(To be read by all pilots)*

This T.O. furnishes pilots, ground crews, parachute riggers and service activities with pertinent data relative to proper method of wearing and adjusting Navy quick-fit chest type parachute harness.

Adapters have been deleted from the leg straps and quick fit adapters have been added to the snap and "V" ring. Chest straps now terminate at side of body just below ribs.

Contains photographic layout on proper method of donning parachute.

TN 5-46

A technical note to inform operating personnel that new lubrication charts have been prepared by the Bureau for a majority of operation aircraft. The charts as described in these TN's are furnished on light weight cardboard, cellophane laminated. They are 11" by 15". These charts should be available at the airplane at time of lubrication to do the job correctly.

TN 6-46

This TN discusses the latest improvements in design and adjustment of DC carbon pile voltage regulators.

Adherence to and compliance with procedures outlined here will aid materially in obtaining proper operation of aircraft DC electrical systems. All DC regulators properly adjusted will maintain the DC voltage output of the engine-driven generator between 27.0 and 28.4 volts.

TN 7-46

A report on the treatment of AS-242/A antenna to prevent corrosion. Plating on this antenna to date has not been suitable to prevent rust and corrosion. Antenna parts are silver-plated steel and a slight amount of wear permits corrosion. Instructions are contained in this TN as to proper methods for rectifying this condition after corrosion has taken effect.

TO and TN Quiz

1. What is the function of a voltage regulator?
2. What are the permissible maneuvers with the FR-1 airplane when carrying an external load such as droppable tank, etc.?
3. What is the voltage output of the DC voltage regulator?
4. Near what type of clouds will a pilot usually find gusts exceeding the design values of his airplane?
5. When carrier aircraft are operating ashore, at what point should they begin folding wings?

(Answers on Pg. 40)

TN 8-46 *(To be read by all pilots)*

Contains general information and terminology pertaining to restrictions on operation of Naval airplanes. Takes up terminology as affecting strength of aircraft, definitions of maneuvers, pilot techniques in dives, pull outs, and gusty air, engine speeds, and folding wings of the planes.

SCREEN NEWS

Smooth Job They may call it aerodynamic smoothing in the engineering department, but it's just a good paint job out in the shops. Whatever you call it, it's an essential element in lowering resistance and consequently increasing plane speed. A current color film release shows the entire procedure for renovating the paint job on an F6F, with special emphasis on proper use of stripper, paint gun, rubbing compound, and wax finish. The film is applicable for all plane types.

MN-3636 *Painting Naval Aircraft* (Nonclassified, 23 min.)

Snail Fever Precautions for avoiding snail fever, also known variously as blood fluke and Schistosomiasis, are given in a current Army film which is being distributed to aviation libraries and to a selected list of carriers. The picture shows the life cycle of the germ—including its incubation period in a snail which is found in Japan, China, Luzon, Samar, and Leyte.

MA-1865 *Schistosomiasis* (Snail Fever) (Restricted, 10 min.)

Pacific Air Traffic The role of radio and radar in guiding planes over Pacific routes is described in a recently released Army film which is also applicable for naval flying personnel. DF, Loran, GCA, and SCS-51 are included.

MA-1856 *Air Traffic Services* (Nonclassified, 21 min.)

Added Info New footage on the light-weight summer flying suit has been distributed for insertion in training film MN-2361 *G and You*. Directions for insertion accompany the film. Additional prints are available from Chief of Naval Operations.

MN-2361B *G and You* (Insert) (Nonclassified, 7 min.)

MARS Docking The use of permanent facilities for docking and undocking large flying boats is shown in a photographic report produced for training of personnel newly assigned to the Mars-handling job. Distribution of the film is limited to activities having the permanent installation.

MN-9128 *Docking and Undocking Large Flying Boats* (Nonclassified, 11 min.)

Where to Get 'Em: Central Aviation Film Libraries and Sub-Libraries are listed below:

NAVAL

NAS Navy #115, NATB Corpus Christi, NAS Navy #116, NATB Pensacola, NAS Navy #117, NAAdvTraC Jacksonville, TAL Navy #128, NAT&EC Lakehurst, NAS Navy #720, NAS Alameda, TAL #2 Navy #926, NAS New York, CASU(F) 42 FPO San Francisco, NAS Patuxent, NAS Kodiak, NAS Quonset, NOB Norfolk, NAS San Diego, NAMC Philadelphia, NAB Seattle, NAMTD Memphis.

MARINE CORPS

MCAS Navy #61, MCAS El Toro, MCAS Cherry Point, MCAS Parris Island, and also at the Marine Corps Air Station, Quantico.

SUPPLY NEWS
FROM ASO AND SUPPLY DIVISION BUAER

New Type Paddles For Pararafts

Telescopic paddles, stock No. R83-P-48020, are currently being distributed to all aviation supply activities to replace the old fabric paddle now in all PK-1 pararaft kits.

Due to a change in specification this new paddle will have either of two types of reflex-reflecting material on one blade of each paddle: reflexite or hi-angularity scotchlite. Both types of reflecting material are considered satisfactory for use as a reflector.

Technical Note 91-45 describes in detail the telescoping paddle and gives instructions for placing it in pararaft kit.

Mark Flight Clothing Correctly

Article 2750-7 of the Bureau of Supplies and Accounts Manual states that name, rank, and squadron insigne may be placed on articles of flight clothing. However, this marking must be placed on separate material which shall be sewn or stamped on in such a manner as will allow removal without damaging the clothing.

The practice of stamping markings directly on articles of flight clothing causes much additional expense to make them suitable for re-issue. Use detachable labels.

VF-11 Gets Out Technical Dope

VF-11—Dissemination of technical information from original source to the lowest echelon that has need to know is one of the more difficult administrative problems in aviation operations and maintenance. It is a problem that requires the attention of an officer.

Fighting Squadron Eleven maintains a technical library and combines it with material formerly handled by A.C.I. Each department is provided with a list of all available information. This provides department heads with an expedient means of finding all the latest information on any subject.

All information of general interest to all pilots is posted weekly and is required reading for that week.

Succeeds List Dated March 1946

LATEST BULLETINS ENGINE, AUXILIARY POWER PLANT, ACCESSORY, PROPELLER Dated 1 March 1946

ENGINE	BULLETIN	DATE	SUBJECT	EXPLANATION
PRATT & WHITNEY				
R-985	187 Rev. 1	2-28-46	*Knuckle Pin Size Classification*	To include only applicable engines of current production and to reclassify standard and oversize knuckle pins.
R-1340	209 Rev. 1	2-28-46	*Knuckle Pin Size Classification*	To include only applicable engines of current production and to reclassify standard and oversize knuckle pins.
R-1830	415 Rev. 1	2-28-46	*Knuckle Pin Size Classification*	To include only applicable engines of current production and to reclassify standard and oversize knuckle pins.
	421	2-21-46	*Conversion of R-1830-90C with Two Speed Blower to R-1830-90D with Single Speed Blower*	To provide information for converting from a two speed blower to a single stage blower to eliminate clutch failures.
	453	2-26-46	*Roll Peened Crankshafts*	To inform activities of the roll peening process of crankshafts crankpin fillets.
R-2000	95 Rev. 1	2-28-46	*Knuckle Pin Size Classification*	To include only applicable engines of current production and to reclassify standard and oversize knuckle pins.
	135	12-23-46	*Impeller Shaft Front Oil Seal Ring Liner Assembly Drift*	To give instructions for reworking PWA-2140 to insure proper alignment of the oil holes of the front oil seal ring liner with the oil holes of the blower case of applicable engines.
	140	2-26-46	*Roll Peened Crankshafts*	To inform activities of the roll peening process of crankshaft crankpin fillets.
R-2800	139 Rev. 1	2-14-46	*Type 3 and Type 4 Counterbalance—Design and Part No. Differences*	To give instructions for the reworking of the crankshaft to accommodate the type 3 or type 4 counterbalance and related parts.
	267 Supp. 1	2-20-46	*Rear Oil Pressure Pump*	To have incorporation of bulletin apply to operating activities.
R-4360	2 Supp. 1	2-6-46	*Basic Engine Differences*	To provide latest information on R-4360-2, -2A, model designations and include a revised list of serial numbers of R-4360 engines.
	15	2-28-46	*Knuckle Pin Size Classification*	To include only applicable engines of current production and to reclassify standard and oversize knuckle pins.
	14	2-26-46	*Front Crankcase Bolt Washers*	To provide for the security of flexible control conduits passing through the bulkhead deflectors.
	16	2-27-46	*Crankcase Suction Pumps*	To give instructions for improving the lubrication between the hub and inner rotor of the crankcase suction pump.
WRIGHT				
R-1820 R-2600	0 Supp. 1 to Rev. 1	3-14-46	*Index, Numerical—Wright R-2600 Engine Bulletins*	To list R-2600 engine bulletins in effect.
	157 Supp. 2	2-25-46	*Carburetor—Stromberg PR-48A1 and PR-48A2—Reworking to Incorporate a Throttle Actuated Accelerating Pump*	To cancel Sup. No. 1 of basic bulletin.
GENERAL ENGINE BULLETINS				
	88	2-14-46	*Cam Lubricators—Bosch Magnetos—Inspection of*	To furnish information to prevent accumulation of excess grease on magneto cam lobes.
CURTISS ELECTRIC PROPELLER				
	0 Rev. 1	2-26-46	*Curtiss Electric Propeller Bulletin Index*	To provide an index of subject bulletins.
GENERAL PROPELLER				
	0 Rev. 1	3-13-46	*General Propeller Bulletin Index*	To provide an index of subject bulletins.
HAMILTON STANDARD PROPELLER				
	0 Rev. 1	3-13-46	*Hamilton Standard Propeller Bulletin Index*	To provide an index of subject bulletins.

AVIATION ORDNANCE

INQUIRIES SHOULD BE ADDRESSED TO THE CHIEF OF BUREAU OF ORDNANCE

Handle These Bomb Fuzes With Caution

Aircraft bomb fuzes AN-Mk 228 Mod 0, lots 1 through 41, and AN-Mk 228 Mod 1, lots 1 through 68, have been determined to be sensitive to rough handling and are now restricted from issue and use. Activities having stocks of these restricted fuze lots on hand should, if they have not already done so, request disposition instructions from Bureau of Ordnance.

Requesting Miniature Practice Bombs

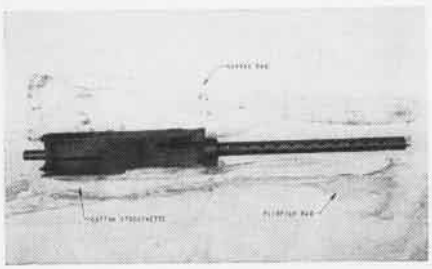
Activities should, when requesting miniature practice bombs, give consideration to the type target with which the practice bombs are to be used. The lead AN-Mk 43 Mod 1 should be used for armored boat targets only and the cast iron AN-Mk 23 Mod 1 should be used for all other targets.

This is desirable for two reasons: (1) Improved functioning of the AN-Mk 4 signal and the AN-Mk 23 Mod 1 bombs, and (2) production of the AN-Mk 43 Mod 1 bombs has ceased and supply is critical.

Test for Machine Gun Covering Is Made

Tests, to determine the relative effectiveness of the plastic dip packages and "Pliofilm" coverings used for the preservation of aircraft machine guns and to estimate the effective life of these packages were made at U. S. Naval Gun Factory, Washington, D. C.

The first gun (No. 1) tested was covered with a plastic dip package (ethyl cellulose) but did not contain any desiccant bags within the package. The package was then placed in a heat chamber and held at 160°F. for a period of 4½ hours and then removed to a cold chamber at –20°F. for 1½ hours. This process was



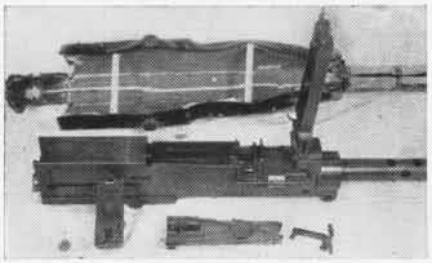
30-DAY SALT SPRAYS FAIL TO HARM GUN

then repeated for a period of 2 hours at 160°F. and at –20°F. for 3 hours. The package was finally subjected to a 20% salt spray test for a period of 30 days.

Upon removal from the salt spray cabinet, salt deposits were found on the plastic package of gun No. 1. The plastic package contained one rupture about 3" from the breech end of the gun and water was found within the package. This had resulted in considerable rusting on the right and bottom sides of the receiver.

Gun No. 2 was covered with a plastic dip package and contained three bags of desiccant (silica gel) within the covering. The package was then placed in a packing box which had been previously painted inside and out with black asphaltum paint and lined with asphalt treated building paper which had been given an additional coating of the same paint. A sheet metal tray, placed in the bottom of the box, was filled with peat moss, cotton waste and water. The container, with package was then put in an exposed position on the roof. Relative humidity was maintained at approximately 100% by adding water periodically during the three months test period.

When examined following removal from the plastic package, the gun was found to



COVER CUT OFF, GUN IS IN PERFECT SHAPE

be in excellent condition. Approximately 48 grams of moisture had been absorbed by the desiccant and it was felt that this moisture had entered through several small ruptures in the plastic which had been repaired prior to the test.

The third gun (see illustration) was prepared and tested in a manner similar to No. 2, the period covering only one month.

Examination of the third gun showed an identical pattern with that of No. 2. Approximately 13 grams of water had been absorbed by the desiccant and the gun was in excellent condition.

Gun No. 4 was covered with a plastic dip package but contained no desiccant bags within the package. It was treated similarly to guns No. 2 and 3 for a period of 6 months and then exposed to a 20% salt spray for 7 days.

When removed this gun was also found to be in excellent condition, the only noticeable effect being a discoloration of the plastic.

The fifth gun (see illustration) was wrapped in a stockinette cover and 3 desiccant bags, were inserted. The package was then sealed in a pliofilm container and placed in a canvas over bag. The tests were as for Gun No. 1.

Upon examination this canvas cover was found to contain deposits of salt, while on the pliofilm bag there were beads of moisture. The gun was entirely dry and in excellent condition, the desiccant bags having absorbed 150 grams of moisture.

Gun No. 6 was prepared in the same manner as the fifth gun but subjected to the tests of Gun No. 4.

When examined the canvas bag was found to have deteriorated slightly and was torn in several places. There was a tear in the "pliofilm" covering near the muzzle and several small holes in the stockinette cover. Despite 250 grams of moisture having been absorbed by the desiccant the gun was in good shape.

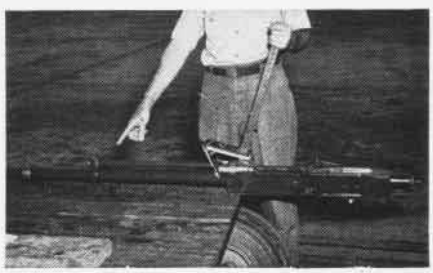
Note: All guns were coated with preservative oil O.S. 1361 before the protective coverings were applied. As a result of these tests it has been decided by the Bureau of Ordnance to use the plastic dip packages with desiccant in preference to the pliofilm covering for the preservation of aircraft machine guns when the period of time is under one year. This procedure may also be used in the preparation of guns for shipping, provided the guns are properly boxed or secured to the wing or bomb bay shackles of an airpalne. When using the plastic dip package it is strongly recommended that extreme care be exercised in handling to prevent a break or tear in the protective covering.

Tool Aids 20 mm. Maintenance

NAAS Cecil Field, Jacksonville—Designed to promote better maintenance and to increase efficiency, a tool was recently designed here for the 20 mm. M2 aircraft cannon. This tool may be employed in shop overhaul or used in checking guns mounted in the wings of *Helldivers* prior to their rearming for gunnery flights.

The tool straddles the yoke of the gas cylinder sleeve and the fulcrum end of a levering bar bears against the charging cam bracket. The piston head glands are thus exposed for oiling when the levering bar is pulled back.

Constructed of scrap materials, the tool consists of the following: sheet iron 12" by ¼" bent to a 60° angle and one section of scrap iron 1' 10½" by 1¼".



TOOL EXPOSES CANNON PARTS FOR OILING

The front end is cut to fit over the gas cylinder sleeve yoke. The after end forms a slot through which a levering bar is pivoted by means of a ¼" bolt.

Further uses of this tool are to test the freedom of movement of the gas cylinder sleeve, to test the alignment of the gas cylinder and its guide, and to loosen the sleeve fouled by carbon in the gas cylinder.

[Designed by Joseph F. Klak, ACOM]

LETTERS

SIRS:

While re-reading the November 1945 issue of NAVAL AVIATION NEWS, I came across the article by Lt. E. F. Michaud as to his desire of receiving the NEWS after his separation from the Naval service as a flier.

I have given this some thought myself and think something could be arranged whereby aviation personnel such as reserve pilots and enlisted men, who held aviation rates and elect to stay in the standby or ready reserve, could receive their issue of NAVAL AVIATION NEWS.

This would keep all concerned up on the latest developments and improvements. Highly secret developments could be left out and taken care of during the two weeks a year the person elects to come in active service. Also men would not get stale as even a short period of two weeks a year couldn't take the place of NAVAL AVIATION NEWS received monthly.

JOE JULION, AMMI 1C
Operations, NAS Livermore

¶ As we have said before, Navy regulations forbid sending NAVAL AVIATION NEWS to civilians, even those in the reserve, because of its restricted classification. However, NANEWS is sending 4,550 copies monthly to the 15 Naval Reserve air stations, where interested parties can secure them whenever they visit the station.

SIRS:

On page 10 of the Feb. 1946 issue of NANews appears the following statement, a part of your fine article on the *Midway's* shakedown:

"The *Midway* is the first carrier to carry her own drone unit, with 15 TDD's, a catapult and operators."

This statement is rather interesting but even more incorrect. The records of the Commander Utility Wing, Service Force, Pacific Fleet show that the U.S.S. *Independence* carried her own TDD unit in July and August of 1944. This carrier is one of the first to have such a unit of her own aboard. Her experience was soon duplicated by the U.S.S. *Cowpens.*

In the latter part of 1944 the *Intrepid, Ranger, Saratoga, Ticonderoga, Wake Island* and *Makassar Strait* had complete TDD units temporarily on board. In the first half of 1945 the *Windham Bay, Block Island, Shipley Bay, Shangri La, Monterey, Nehenta Bay, Gilbert Islands, Bon Homme Richard, Kasaan Bay, Manila Bay, Salamaua, Tripoli, Lexington* and *Cape Gloucester* had complete TDD units temporarily on board.

In the late spring and early summer of 1945 the *Hancock* and *Savo Island* carried permanently based TDD units with 40 to 60 TDD's into enemy waters. Task Force 58 presently has a TDD unit permanently based on one of its carriers, the U.S.S. *Antietam.*

The above listings are in approximate chronological order and do not include services from other craft. This letter does not claim that it is entirely free of omissions. Its purpose is to point out that the *Midway* cannot claim a "first" in TDD unless the Navy's Pacific Fleet is completely discounted.

M. A. HENDRICKSON
ENSIGN, USNR
SERVICE FORCE, PACIFIC FLEET

¶ Ens. Hendrickson's comment is true. The *Midway* was not a "first." TDD units were placed aboard Pacific ships (CV's, CVL's, CVE's, BB's, CA's, etc.) by CincPac direction in an effort to provide Fleet AA gunnery training with a live target best able to simulate the *Kamikaze* suicide dive bomber.

SIRS:

After reading your article, "CVB Shakedown", I am in doubt about the picture of the Mk 51-40 mm director. I believe it to be a Mk 14 Mod 7 or 8 gunsight on a 20 mm mount. I base my opinion on the range knob as it has a thumb adjusting range knob to enable the 20 mm gunner to estimate his own range. The 40 mm director has a long extension on the range knob so that the range can be estimated by a separate director operator.

NAS JACKSONVILLE
FRED "B" GLOVER, PR 1C
FORMER QUAD 7 DIR. OPERATOR
U.S.S. *Intrepid*

¶ BUORD says photograph showed a Mk 14 Mod 6 gunsight mounted on a 20 mm.

SIRS:

Several times throughout my service career, of which the last two years have been spent as pilot of a PBY, the question has arisen to me and to fellow pilots as to why said aircraft is referred to as a *Dumbo.* As yet no satisfactory answer has been offered.

Any information you could give to clarify this question will be greatly appreciated.

W. E. KRUSEN,
Ensign, USCGR

¶ When PBY's began standing by for rescue of pilots on combat missions, ComAirSoPac needed a handy name for reference to the planes. Capt. C. F. Coe, then Chief of Staff, named them *Dumbos* after Walt Disney's elephant. The above is the most authentic information that NANEWS can discover.

The Cover The peacetime Navy heeds the advice of the Revolutionary War colonel who warned "keep your powder dry." Antiaircraft gunners sharpen up their marksmanship with twin 40's in practice firing at sleeve.

CONTENTS

ANSWERS TO QUIZZES

● GRAMPAW QUIZ (p. 10)

1. By voice "wheels down" and also give "thumbs down" signal with fist clenched. Ref. A.C.L. #95-44.
2. Accumulated moisture within the lines may cause erroneous airspeed, altimeter and rate of climb indications. Ref. T.N. 99-45.
3. Bureau of Aeronautics. Ref. BuAer Manual Art. 6-130.
4. Pilots. Ref. BuAer Manual Art. 6-130.
5. (a) One pilot qualified in type aircraft assigned.
   (b) A first pilot holding a valid Standard or Special Instrument Rating certificate and a copilot, both qualified in the type aircraft assigned. Ref. A.C.L. #13-46.

TO AND TN QUIZ (p. 36)

1. To maintain voltage of generator at desired value 2. Wing-over, vertical turn, slow aileron rolls, inverted flight 3. 27 volts 4. Cumulus and cumulonimbus 5. After pilot has reached parking area only

● RECOGNITION QUIZ

(inside back cover)

1. Iowa class BB. 2. Baloo class SS. 3. North Carolina BB. 4. Alaska (CB). 5. Kent (CA). 6. Gangut class BB (Russian).

● NAVIGATION QUIZ (p. 16)

Answer: 273° true. A table of offcourse corrections is one of the many valuable items available to naval aviators in the pocket-size *Air Navigator's Handbook.* Your publications officer can get it by ordering NavAer 00-80V-32.

● BEST ANSWERS (p. 19)

1. B 2. A 3. C 4. A 5. D 6. C 7. C

NAVAL AVIATION NEWS

Published monthly by Chief of Naval Operations and Bureau of Aeronautics to disseminate safety, survival maintenance and technical data to the aeronautical organization. CONTRIBUTIONS INVITED. Air mail should be used where practicable to insure speediest delivery of material submitted for publication, addressed as follows: Chief of Naval Operations, Naval Aviation News, Navy Department, Washington 25, D. C.

RECOGNITION QUIZ

Fleet Depends On Its Aerial Spies to Tell Types of Enemy Ships, Number, and Disposition

THE REAR seat radioman-gunner in this TBF is an important cog in the Navy's system of scouting and reconnaissance. Upon his immediate and accurate recognition and reporting of what he sees from his turret may depend the lives of hundreds of men on friendly ships below. If he can't tell a troop transport from an oiler or a destroyer from a battleship, he may radio back the wrong information. It is easier to keep abreast of recognition in peacetime than in war's hurly-burly.

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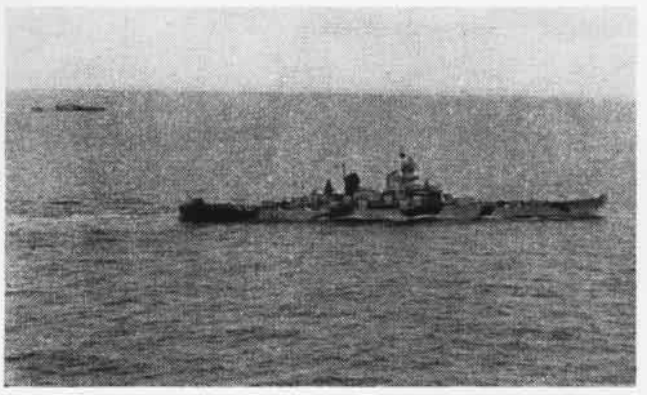

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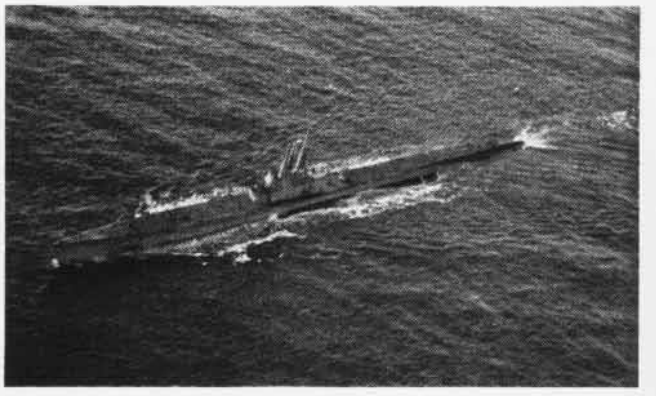

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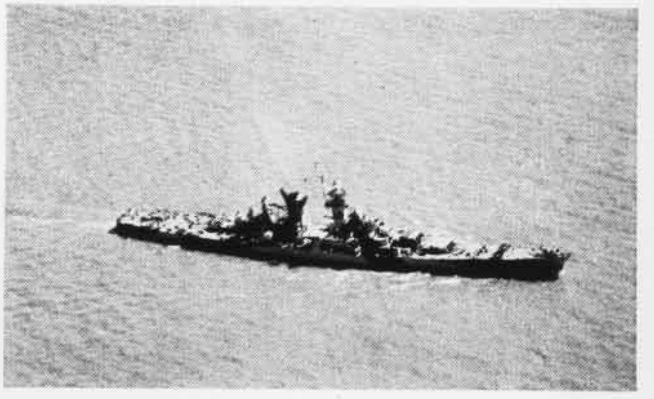

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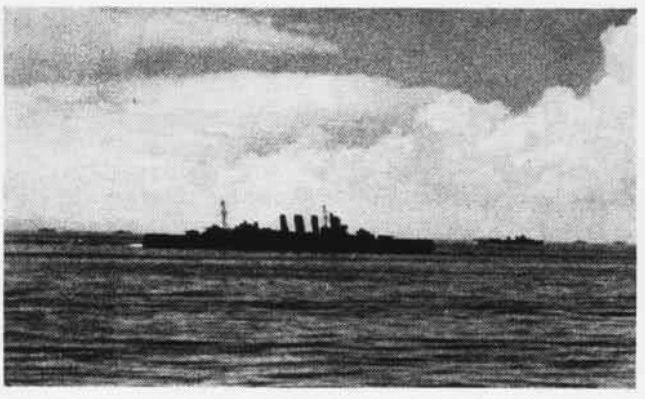

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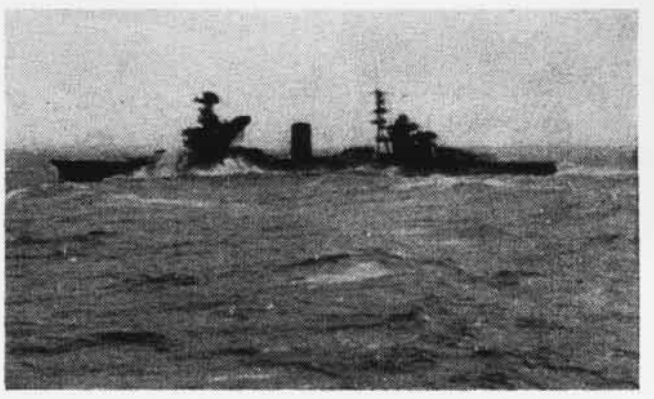
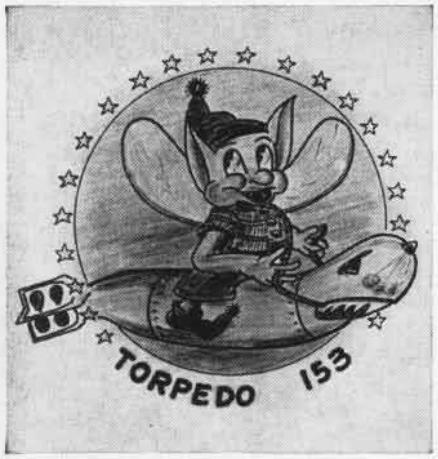


Restricted

Answers on Page 40.

SQUADRON INSIGNIA

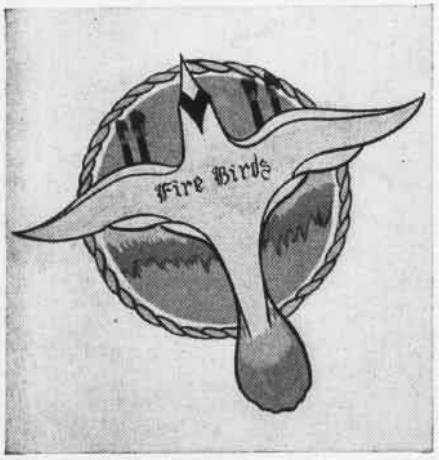
NAVAL AVIATION NEWS reproduces here in black and white the insignia of nine different Naval and Marine Corps squadrons that have been recently approved by the Chief of Naval Operations. Beginning with this issue, NANews will each month feature the insignia approved by CNO. Squadrons should submit their proposed insignia designs in accordance with Article 21-102 *BuAer Manual*. Regulations that during the war prohibited the use of the color red in insignia and banned the incorporation of the actual designation are 'out.'



VT-153

VT-82

VT-43



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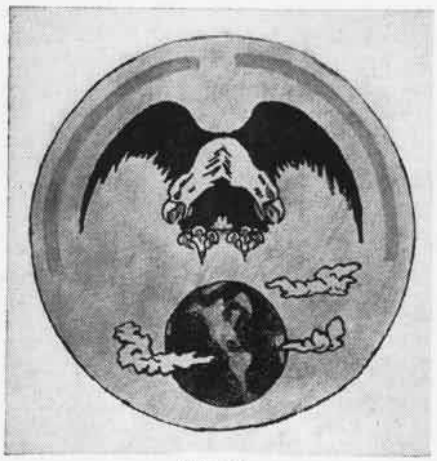
VMSB-244

VMTB-464

VF-82



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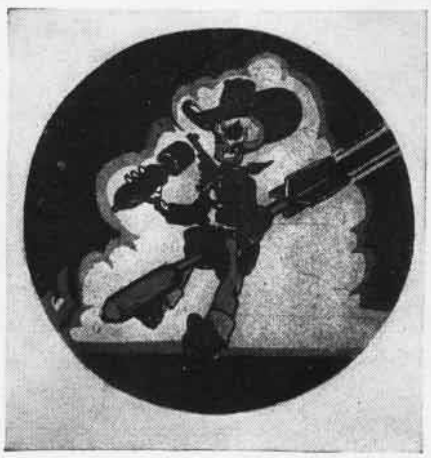

VBF-17