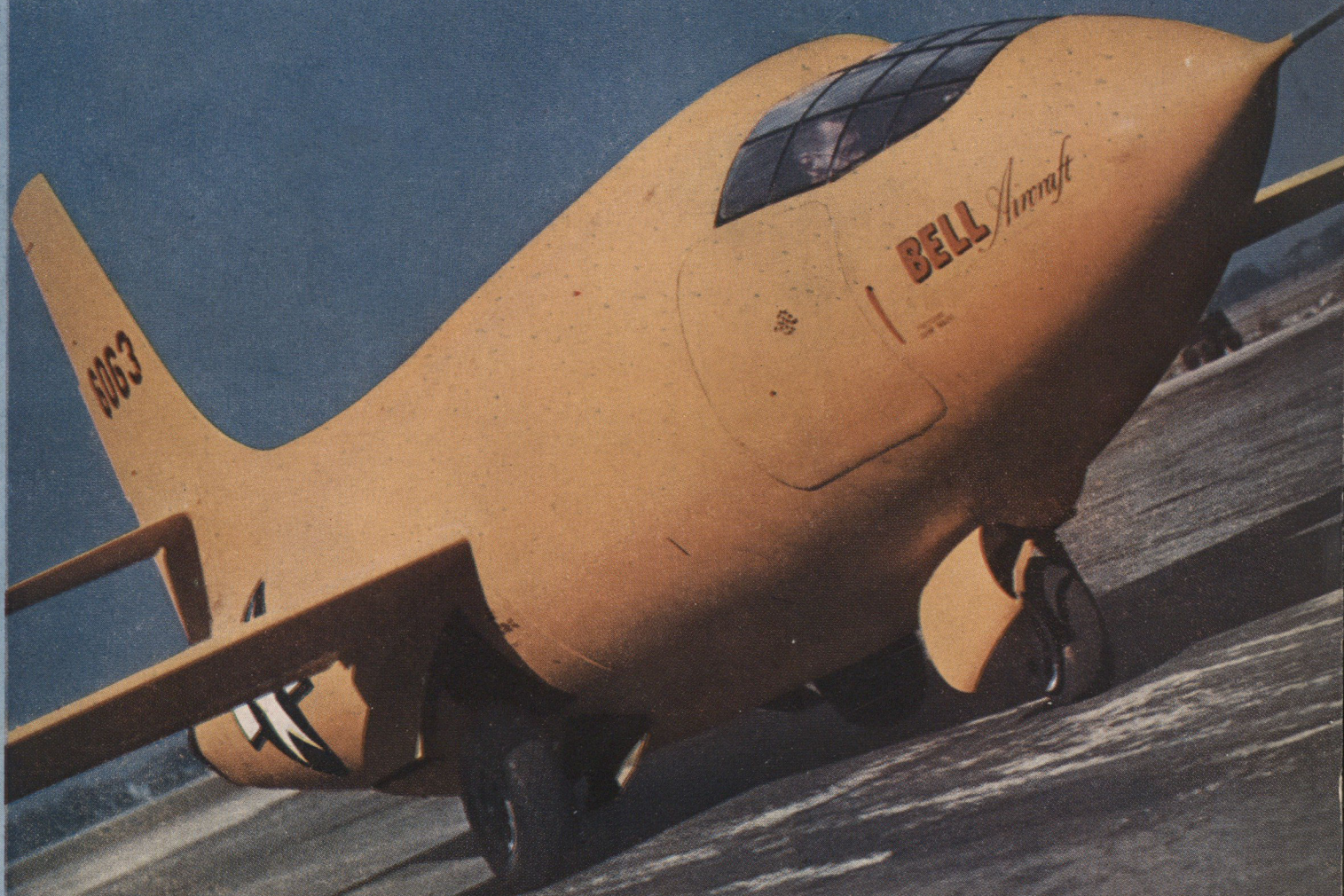


AIR FORCE

THE OFFICIAL JOURNAL OF THE AIR FORCE ASSOCIATION, FEBRUARY, 1947



Bell XP-1



Flightweight

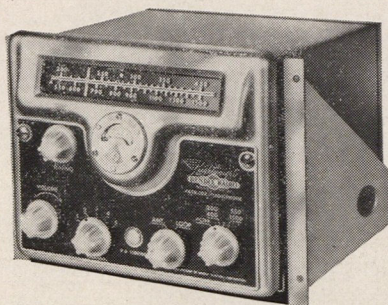
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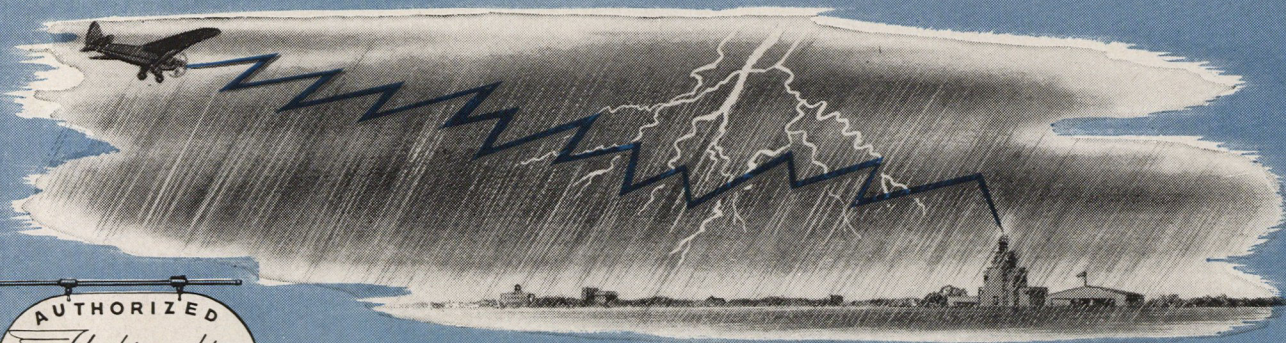
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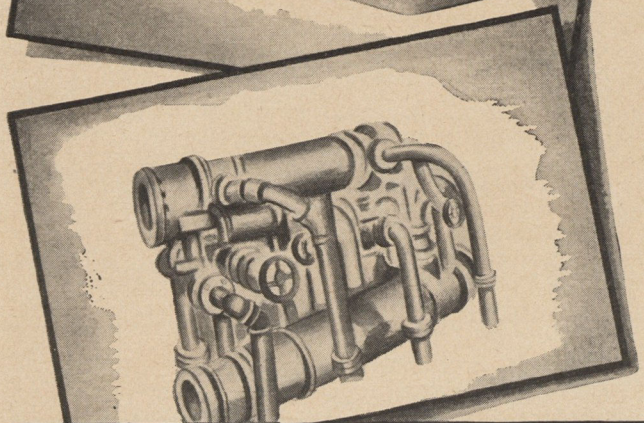
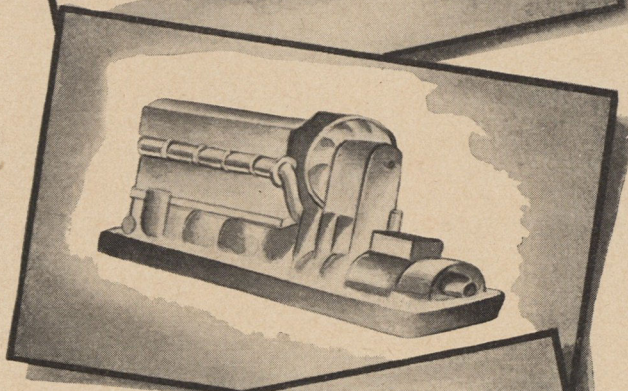
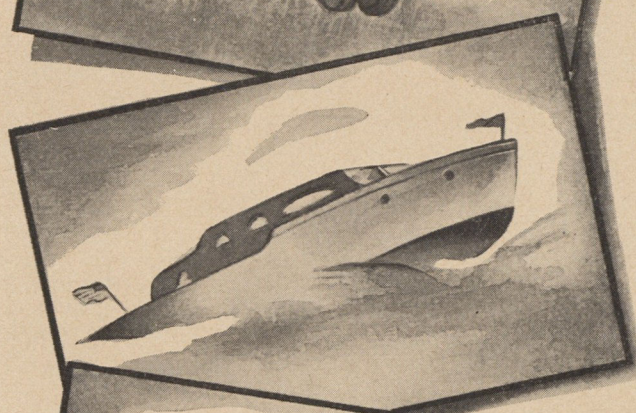
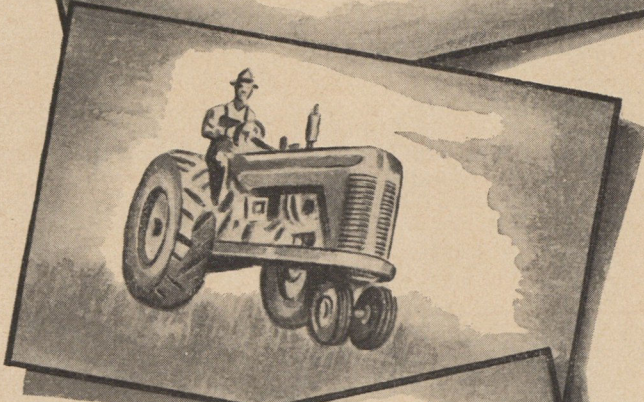
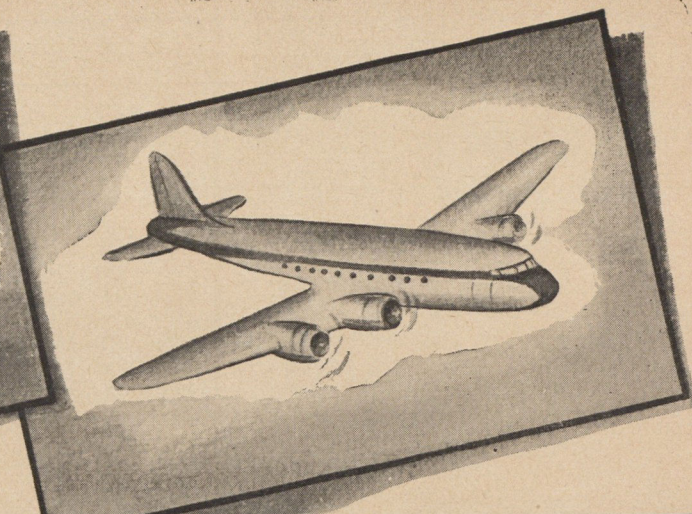
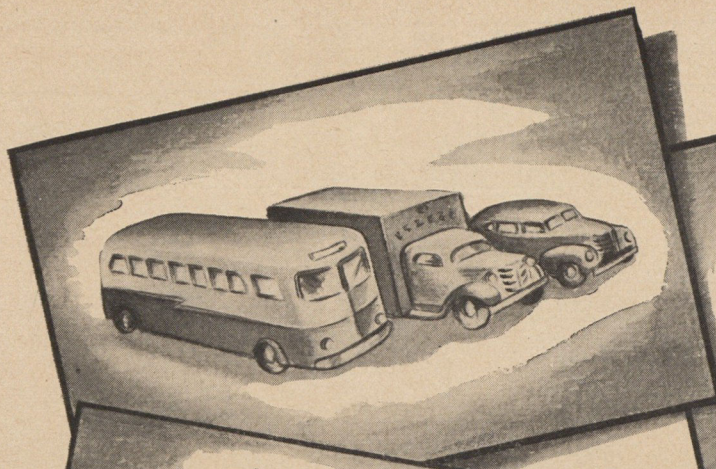


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How to Avoid Saving Money

by DANNY KAYE



To avoid saving money, the first thing is to cut off all your pockets. (Or throw away your purse and keep your lipstick in your snood.) Thus you will have to carry your money in your hand. Which will insure that you—1. spend it, 2. lose it, 3. get it taken from you—*quicker!*



Also to be avoided like crazy are piggy banks and sugar bowls. Keep these out of your home! The kiddies in particular are victimized by such devices, often saving quite a bale of moolah. Be stern even if the little ones cry—remember what money could do for them! And be sure to avoid budgets. It is best to draw your pay and walk down Main Street buying anything you don't particularly hate.

Above all, don't buy any U. S. Savings Bonds—or it's *impossible* not to save money! These gilt-edged documents pay fat interest—4 dollars for 3 after only 10 years! There is even an insidiously easy scheme called the Payroll Savings Plan by which you buy bonds *automatically*. Before you catch on, you have closets full of bonds. You may even find yourself embarrassed by a regular income! Get-gat-gittle!



IF YOU MUST
SAVE

Danny Kaye

SAVE THE EASY WAY...

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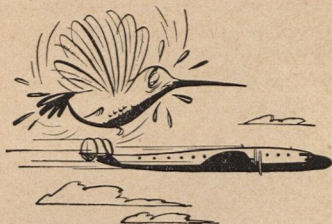
HANGAR FLYING



Hummingbirds vs. Constellations

Hummingbirds, who hold the record, can fly 600 miles without refueling. And it doesn't take a John J. Audubon to figure out that hummingbirds are probably pretty tired cookies when they land. But the *Constellation*, no slouch itself when it comes to records, can now fly more than 4000 miles nonstop without even breathing hard—thanks to its new long-range wing.

The wing adds about a thousand miles to the plane's range. An extra tank inside each of the two outer wing panels increases gasoline capacity by over a thousand gallons—with a weight



increase of only 600 pounds (exclusive of the gas, of course).

And, according to certain cabalistic signs which engineers love to make on graph paper, the payload of such *Constellations* is doubled in the latter stages of a flight. Money in the bank.

Adding another thousand miles to the long-range *Constellation* may sound like gilding the lily. If that's what it is, Lockheed spends an important part of its time lily-gilding—constantly making the *Constellation* a better plane. And making better hangar flying, too.

L to L for L

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Air Mail

First WAC Sqdn.

Gentlemen:

On page 39 of the November issue of *AIR FORCE*, credit for the formation of the first all-girl squadron is given to New York City. I believe this distinction belongs to Baltimore.

We were formally organized on October 29th at the War Memorial Building, and our charter was signed on November 2nd. According to Col. Fitch, no other charter for ex-WACs had been received at that time.

Last June Baltimore chartered the first squadron of men in the country. We are growing, slowly but surely, and are looking forward to a grand future in AFA.

L. M. "Bunny" Gardner
Commander, W.A.C. Sqdn. No. 1
Baltimore, Maryland.

AFAer Gardner is correct in claiming the distinction of organizing the first all-girl squadron, but incorrect in quoting AIR FORCE as crediting New York with the honor. Mary Gill's New York drive was to get former WACs to join regular squadrons, not to start squadrons of their own. She has since decided, however, to have a unit composed exclusively of girls.

How About Us Guys?

Gentlemen:

Not all of us were attached to the Air Force on the flying end of it. Some of us were with separate units. I myself was with Radar-On-The-Ground attached to Air Force. I like your magazine a lot, but I would like to offer a suggestion that would be an improvement for us guys. How about incorporating a separate section in *AIR FORCE* devoted to radar, with pictures of typical sets in the ETO and Pacific?

Harry Ottens,
Brooklyn, N. Y.

AIR FORCE will follow the developments in radar assiduously. But until

such time as its application to commercial aviation progresses beyond the discussion stage, there seems to be little justification for a special department.

Incommunicado

Gentlemen:

I feel a little bit out of touch with the association. Some time ago I lost my AFA pin, and then last month I didn't get my magazine. Both items are rather important to me and I wonder if you could (a) send me another pin, (b) let me know why I haven't received my copy of *AIR FORCE*.

C. O. Bickell,
Paso Robles, Calif.

Reader Bickell and others in a similar dilemma are referred to the notices on pages 62 and 65.

Pencil Pushers

Gentlemen:

Have been reading your recent issues of *AIR FORCE* and have noted in your articles that nothing has been mentioned of the rôle a navigator or radar navigator can fill in postwar aviation. How about an article or paragraph on us poor "pencil pushers?" Just where and what is to be our future in postwar aviation, military and civilian?

J. B. Rifkin,
Philadelphia, Penna.

AIR FORCE apologizes if it has slighted the all-important navigators. Stories on this subject will be forthcoming in early issues.

Morning Mission

Gentlemen:

I modelled "Morning Mission" (see cut) in my off-duty hours while stationed at Seymour Johnson Field. The daily sight of student-officers going to their ships prompted me to record that one phase of immense and varied efforts of the AAF.

Robert A. Weinman,
Forest Hills, L. I.



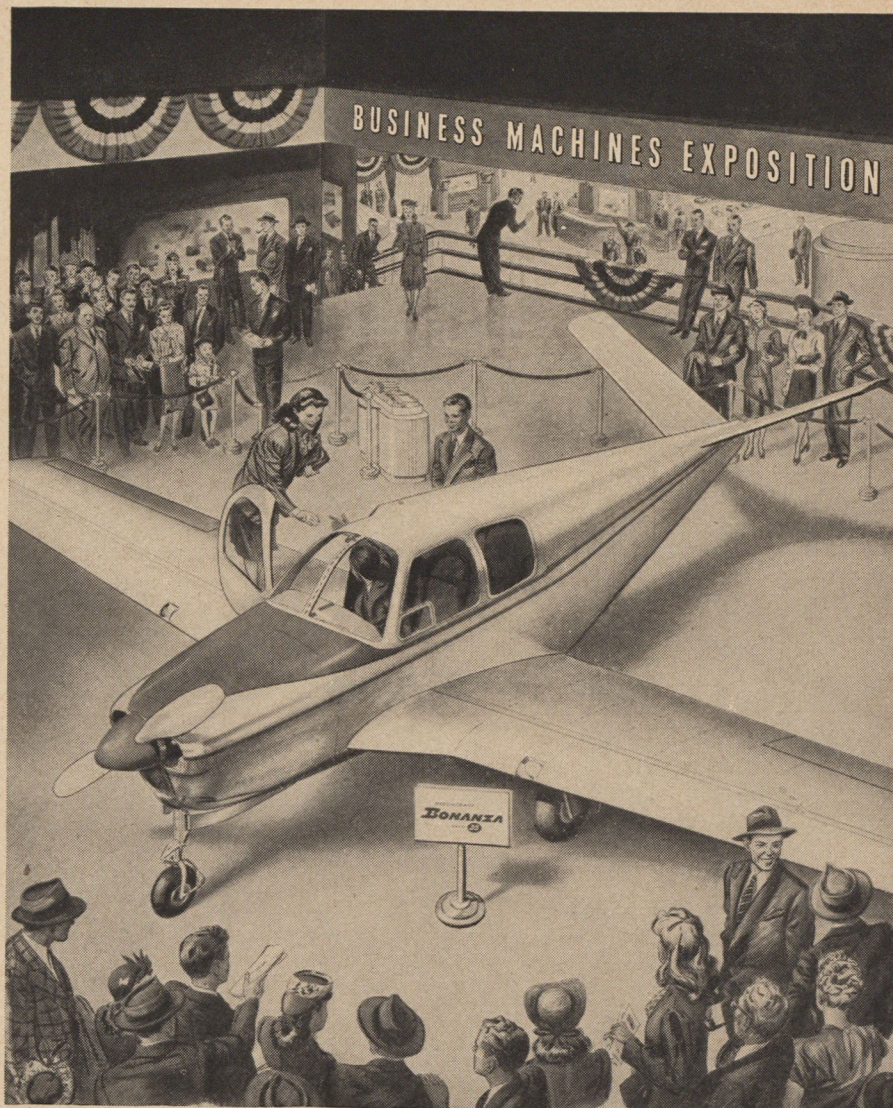
Morning Mission, by Robert A. Weinman.

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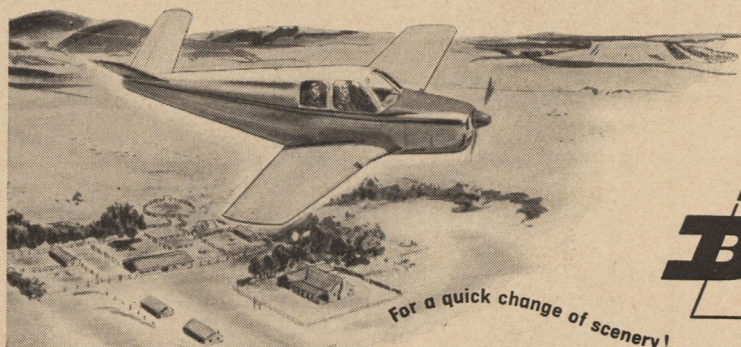
WHAT's a business machine for? To save time, save labor, save money, improve a product or service. The Beechcraft Bonanza qualifies as one of the most useful, efficient and economical business machines ever presented to American industry! And it not only does superlatively well the things required of a good business machine, but makes a new kind of executive out of the business man himself!

The Bonanza is a four-place, 175

mph business vehicle that brings travel costs to as low as one cent per passenger mile while providing limousine luxury and comfort to every passenger. You go when you want to go—in *any* direction. The plane is equipped for round-the-clock, round-the-season travel—two-way radio, landing lights, instruments, cabin temperature control. And it is as quiet as an open car on the road at 55 mph!

The Bonanza *had* to be a revo-

lutionary plane to provide the utility demanded for business use. It is revolutionary, achieving a speed and payload with its 165 hp engine and controllable propeller that no other plane has ever achieved before with less than 330 hp! Yet for this business machine—capable of saving thousands of dollars per year in man hours and executive efficiency and of making substantial savings in travel expense—the cost is just \$7,345 F. A. F. Wichita, Kansas.



Production for early 1947 is already sold. Orders for delivery will be filled in the sequence received. There is a Beechcraft distributor near you, ready with additional facts and figures—and a Bonanza. Write for his name. Beech Aircraft Corporation, Wichita, Kansas, U.S.A.

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This
Month

The Cover

On December 9 the U.S. launched its first supersonic aircraft, the XS-1, from the undercarriage of a B-29 flying 25,000 feet above the desert sands of Muroc Army Air Base in California. For seven minutes after it was cut loose, the little craft—its wings barely extended to the two inboard engines of the giant Boeing mother plane—darted about the sky while the pilot, Slick Goodlin, turned on one of its four rocket engines after another. It was built to fly 1700 miles an hour, but in this, the first of a long series of cautiously planned shakedown tests, both the Army Air Forces and Goodlin were satisfied with an unspectacular five fifty. When the fuel was exhausted the ship settled to earth sans power “as lightly as a feather.” According to broad-smiling Goodlin, “the plane, the engine—in fact, everything about the flight—was beautiful.”

The next step: more tests. About the only thing learned from the first flight was that the XS-1 is airworthy. It responds nicely to controls, and the engines function as they were planned to on the drawing board. It will probably be several months before the AAF, Bell, and Goodlin are ready to push the throttles all the way down. (Additional pictures on page 56.)

The Arctic War

“War Below Zero” (page 26) was written by Colonel Bernt Balchen for the Corey Ford, Alastair MacBain book, “The Last Time I Saw Them.” Not many of us in the Air Force are familiar with the kind of war fought by Balchen and his men in Greenland, and it’s probably just as well. As Balchen says, “The Arctic is a relentless and unscrupulous enemy. It fights with any weapon that comes to hand, and it follows up an advantage without mercy.” The man who meets the enemy and comes out without mental laceration is a rugged type indeed. Such a man is Bernt Balchen. Of him Ford and MacBain say:

“When the Nazis invaded Norway, there was one task which took precedence over everything else. That was a private score they had to settle with an obstinate citizen of Oslo who had the distinction of being Number One on their blacklist. Gleelessly they seized all of Bernt Balchen’s property, confiscated his money, and as a final gesture took the medals he had won during a lifetime of flying—the Cross of St. Olaf, which amounts virtually to knighthood in Norway, the Congressional Medal of Honor awarded him for his flight over the South Pole, the Gold Medal of Paris he received for piloting Byrd across the Atlantic—and sent them back to Germany to be melted down for bullets.

You can always win more medals; and, anyway, awards don’t mean much to Bernt Balchen. Action is the important thing. He is a flyer’s flyer: Clarence Chamberlin unhesitatingly calls him ‘the greatest pilot in the world, bar none,’

AIR FORCE

and Professor Lawrence Gould, Byrd's second in command in the Antarctic, says, 'If I ever made a two-man expedition, no matter where or under what conditions of danger, I'd rather have Balchen along than any other man I know. He'd always find a way through.' It was Balchen who was the guiding genius in that Antarctic expedition, personally piloted Byrd's plane over the Pole, was again at the controls that fogbound night when Byrd's ill-fated America, lost over the Atlantic, somehow managed a miraculous landing in the rocky surf of Val-sur-Mer. He received his pilot training with the Royal Norwegian Air Forces in 1919. With the late Floyd Bennett, he made the famous Greenly Island flight to bring out the stranded Bremen flyers in 1928; spent two years as chief pilot with the Wilkins Antarctic expedition; led the salvage work in the Viking disaster off Newfoundland in 1931. He tested ships for Fokker, flew gold in Canada, had reluctantly settled down at last as civilian manager of Norwegian Air Lines in Europe when the outbreak of war sent him back—to his immense delight—into active service again. On detached service to the British R.A.F., after the fall of Norway, he made three trans-Pacific hops to Singapore with Captain Clyde Pangborn. In 1941, as a full colonel in the U. S. Army Air Forces, he was put in command of our remotest base in Greenland: the northernmost American air base in the world.

Bernt Balchen loves two things: action, and cold. He has a strange, almost fanatic affinity for snow and ice; he recalls, as a boy in Norway, tunneling a hole in the snow to sleep. He was the most disconsolate member of Byrd's crew when the freighter *Eleanor Bolling* came in sight of Balboa at last, after nearly two years in Little America; he loved the Arctic silences, and he had no desire to come home. Hardships, loneliness, sub-zero temperatures have no terrors for him; he is as durable as an iceberg, and about as hard.

He is modest to the point of being inarticulate about himself. He never uses words like adventure, risk, hazard; a flight is always 'very good' or 'very interesting, you bet.' He has the greatest difficulty with the first personal pronoun; we are setting down these facts about him here because you would never learn them from his own narrative. In fact, our main problem in working with Bernt was to get him to admit he took any personal part at all in the events he describes. 'So the B-17 came in at fifty feet and strafed the German gun positions. . . .'

'Who was flying it, Bernt?'

'Who? Oh. Well, I happened to be piloting at the time. . . .'

They have a saying about him in the North countries. '*Han er siste av Vikingur*,' they sigh; 'he is the last of the Vikings.' There is another expression that you hear about him sometimes: *Han skal leve til han dor*. A man who will live until he dies. Somehow it seems to fit Bernt Balchen."



Sgt Henrich D. Doleman, Colonel Balchen, Capt Harold Strong and Sgt J. D. Healey. In Greenland you soon discover that too much clothing is bad. Windproof jacket and long underwear are SOP.

FEBRUARY, 1947

the 9th AIR FORCE service command

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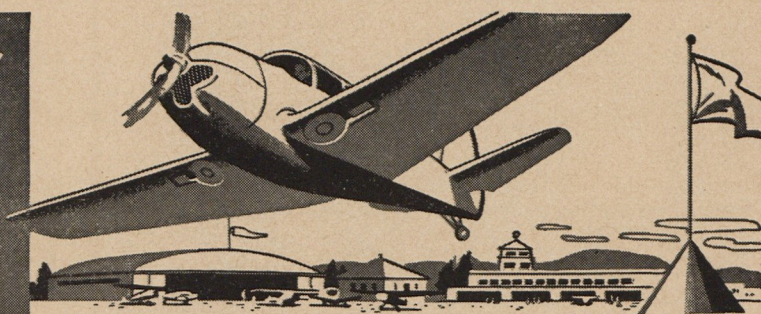
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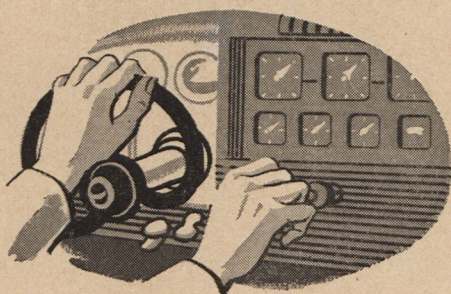
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PLANE FAX



A page of service tips for private flyers and fixed base operators

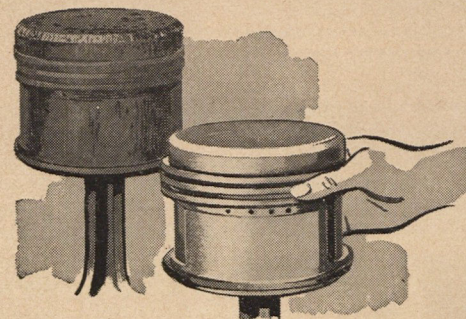
Improper idling greatest cause of forced landings



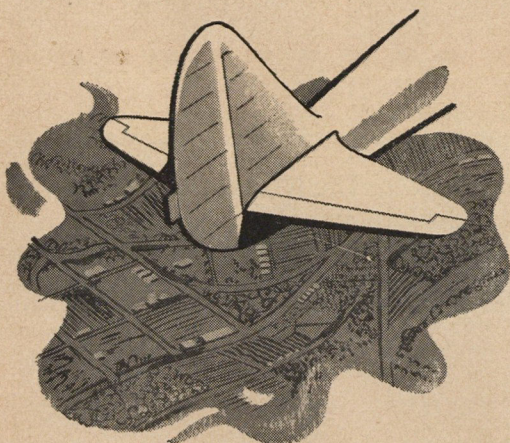
Throttle-stops set too low for proper idling are the greatest single cause of forced landings, according to the CAA. For maximum safety throttle-stops should be set for 500 rpm on the ground with the engine warm. With throttle closed, the idling mixture adjustment should be set for maximum rpm. The possibility of forced landings can be further reduced by using a fuel of proper volatility, such as Chevron Aviation Gasoline. Set throttles for best idling on Chevron. Then stick with it, for you can depend on Chevron for safe, sure power. Check periodically for wear on throttle stops.

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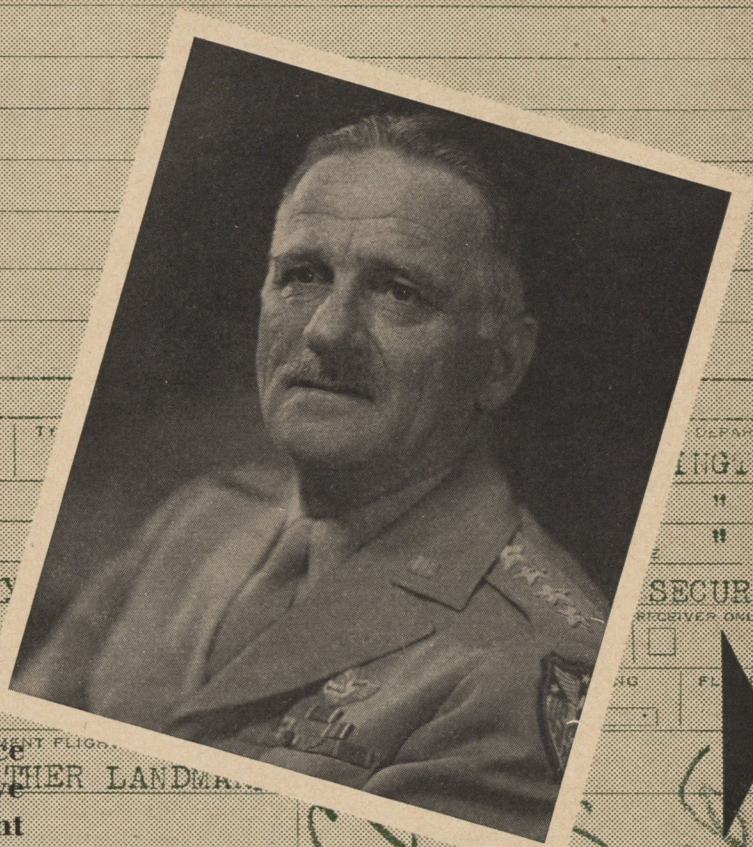
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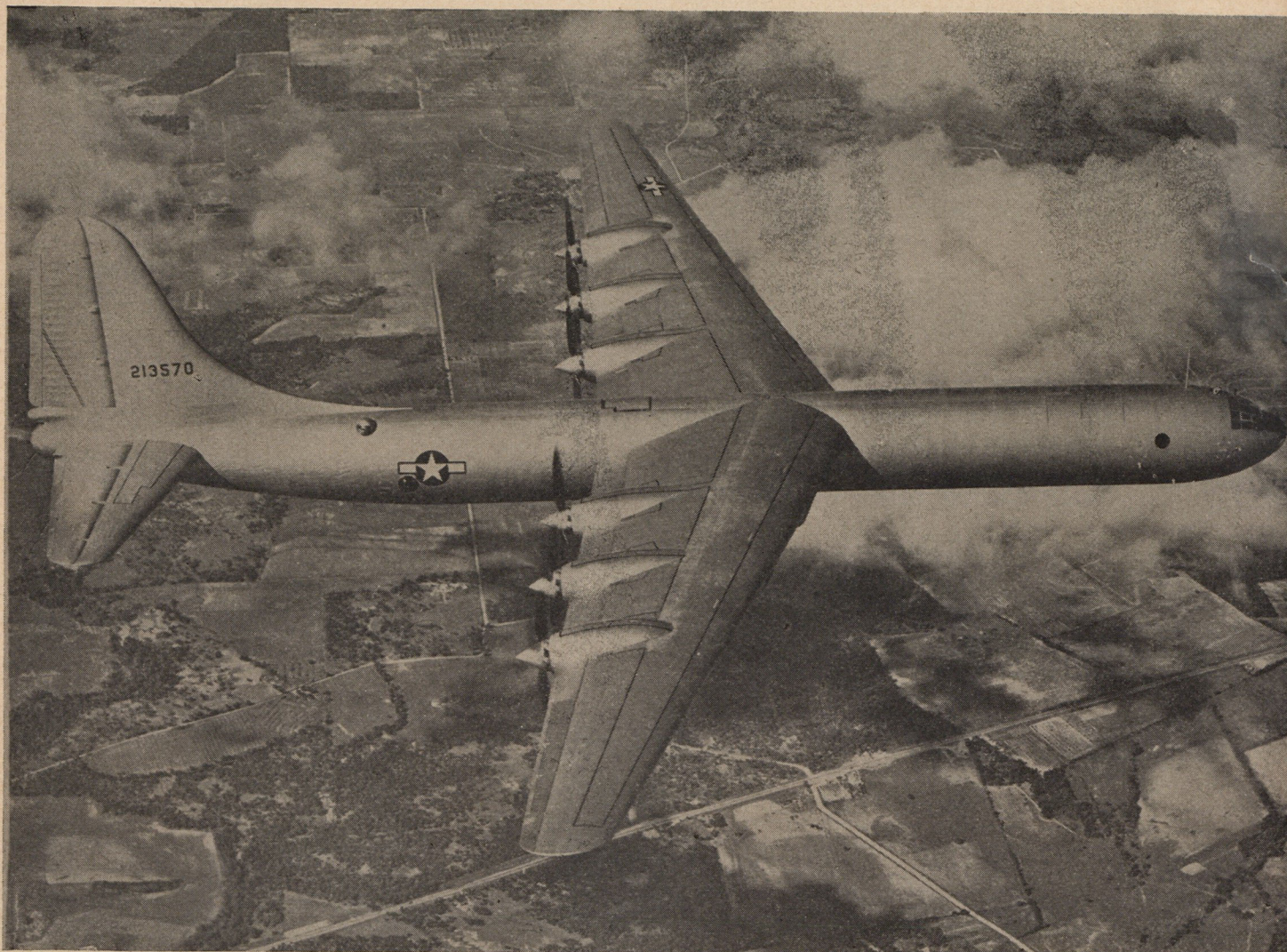
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Pvt. George Davis		Major Ralph Cohen		
Pfc. N. Strychalski		Lt. Col. R. T. Nelson		
Cap. George Mason		Col. J.Z. Crumpf		
Sgt. Patrick O'Toole		B.G. Damon S. Wark		
Lt. Louis Palazzio		M.C. W. W. W. W.		

C WEATHER DATA	LIST OF LOCAL WEATHER STATIONS ON SEPARATE SHEET	ALTIMETER SETTINGS
EXISTING ROUTE	LOCAL SO. CLOUDS, VISIBILITY LIMITED	LOCAL ZERO
DESTINATION (LATEST) QUESTIONABLE	TIME	DESTINATION UNKNOWN
ALTERNATE (LATEST) NO ALTERNATE	TIME	ALTERNATE NONE
FORECASTS (ESTIMATED FLIGHT TIME PLUS 2 HOURS)		RESET ALTIMETER BEFORE APPROACH
ROUTE STORMS GATHERING		
DESTINATION CAVU		
ALTERNATE		
WINDS ALOFT GIVE ALT. DIR. VEL. AS PILOT REQUESTS	TURBULENT	
AAF FORM 23A REQUIRED	<input type="checkbox"/> NOT REQUIRED	<input checked="" type="checkbox"/> FORECASTER

FLIGHT PLAN (PILOT COMPLETES) RADIO CALLS		TYPE	DEPARTURE
D PLAN			ENGLON
1 ALT 60,000	2 ALT "		"
CFR ROUTE DIRECT	CFR ROUTE "		"
IFR TO PEACE	IFR TO SECURITY		SECURITY
AIRPORT OF FIRST INTENDED LANDING PARITY, U. S. A.		TRUE AIR SPEED X M	RECEIVER ONLY NO RADIO <input type="checkbox"/> <input type="checkbox"/>
PROPOSED TAKE OFF TIME	EST. TIME ENROUTE	ALTERNATE AT	FLIGHT PRIORITY <input type="checkbox"/>
REMARKS SHOW EXES WHICH WILL BE REPORTED WHILE ON INSTRUMENT FLIGHTS UNIFICATION PEAKS AND VALLEYS OTHER LANDMARKS			
TOWER FREQUENCIES DESTINATION KC ALTERNATE KC		WEATHER CODE RECEIVED <input type="checkbox"/> YES <input type="checkbox"/> NO	TO MILEAGE DEST. TO ALTERNATE <input checked="" type="checkbox"/> COMMAND PILOT <input type="checkbox"/> SENIOR PILOT <input type="checkbox"/> CONTRACT PILOT OF CARGO AIRCRAFT <input type="checkbox"/> PILOT



General Carl A. Spaatz files clearance papers for the AAF for the next twelve months. It will be an eventful flight



FLIGHT PLAN: 1947 BY GENERAL CARL SPAATZ

Commanding General, Army Air Forces

IN this air age, a country's defense against destruction from the air can be measured only by the readiness of its air force to carry a greater destruction to the enemy. Today the best defense against air power is air power. The Army Air Forces, realizing the potentialities of air war, is planning its program to assure an adequate defense and a powerful counteroffense, should war be forced upon us.

Essential in the AAF's program for security is the Air Reserve Training Program. The modern air force is a highly technical organization that requires skilled and proficient men in its operations. These men cannot be trained overnight. They must be trained now and their proficiency maintained. We have designed the Air Reserve Training Program to provide a reserve of skilled personnel who are available to immediate call to active duty.

In 1947 the Air Reserve Training Program plans for the training of 120,000 enlisted men and 50,000 officers. The officers will comprise 22,500 pilots, 11,056 other rated personnel, and 16,444 non-rated personnel. The Reserve personnel, plus the Air National Guard and the Regular Army Air Force, will provide a force of 1.5 million men.

We have proposed 121 Air Reserve installations for this training. Sixty-two of these bases have been activated and 14 others authorized for activation. The remaining 45 are now under consideration.

Proper weapons are as essential in aerial defense as trained personnel. Aviation is developing rapidly, and the powerful weapon of today may likely be obsolescent tomorrow. Our defense depends upon air superiority and superiority depends upon constant research and experimentation to provide the latest and best instruments of war.

The AAF plans to establish a Research and Development Center that will be used for the continuous development of all matériel contributing to air power in its broadest sense. Research and experimentation will embrace such fields as supersonic speeds for aircraft and guided missiles, the application of nuclear energy to the propulsion of aircraft and the detection and control of weapons in the field of guided missiles. In general, we plan to investigate the entire expanding field of aeronautics and apply the results of research and invention to the development of air weapons for national defense. We must remain foremost in scientific research.

The Army Air Forces has recently been charged with the responsibility of developing guided missiles for the United States Army. We have a well-established plan which includes the thorough development of each category of guided missiles. Research and development are underway to produce families of surface-to-surface, surface-to-air, air-to-surface, and air-to-air missiles capable of covering all tactical and strategic ranges. Regardless of the branch of the Army

which may eventually operate any type of guided missile, the AAF is striving to create a balanced program that will produce all types of missiles for present day defense. At the same time we are accumulating research material for missiles of the future. Progress has been gratifying and the AAF is already firing an experimental missile designed to destroy the highest flying aircraft of the present day. Constant improvements are being made on the existing air-to-surface missiles and new air-to-surface, air-to-air, and surface-to-surface missiles are reaching experimental stages.

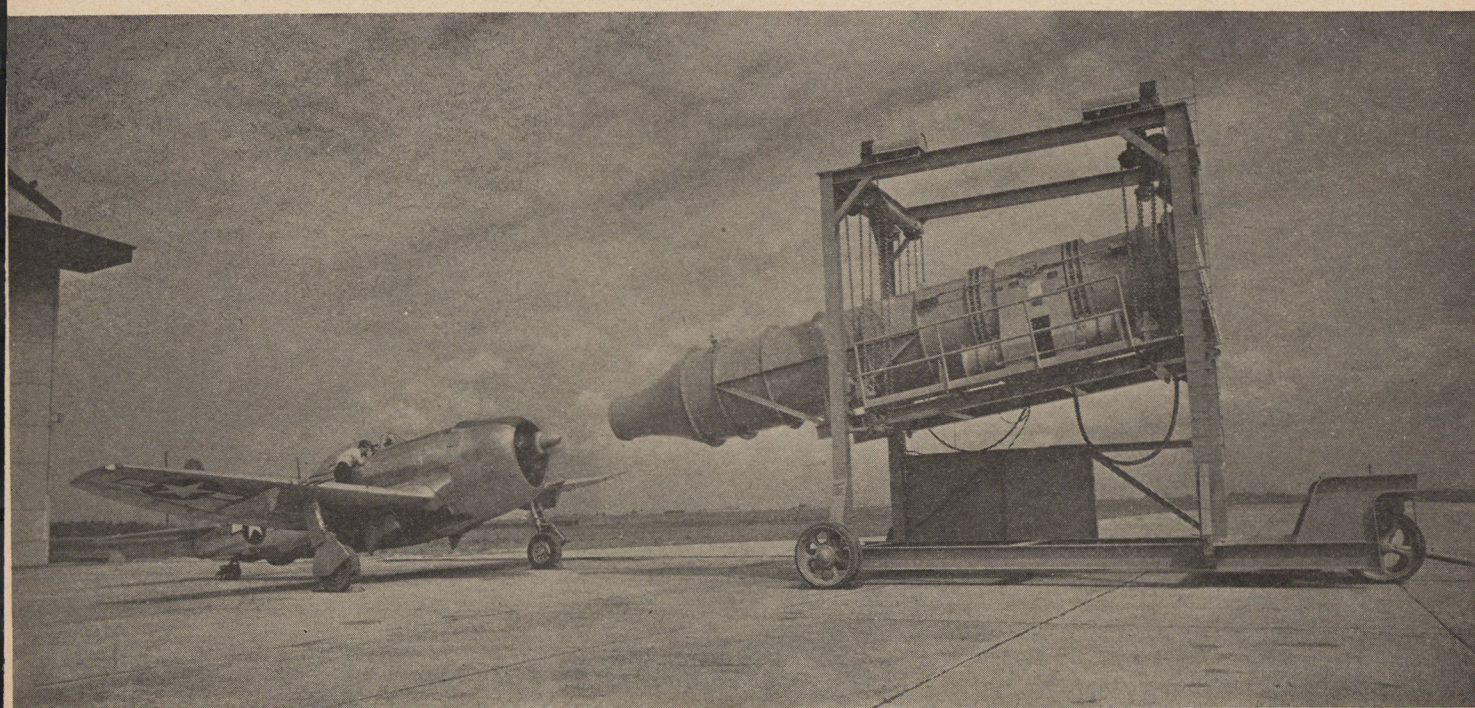
During 1947 the AAF will thus carry on its mission to provide security for the United States. The accomplishment of this mission remains the primary objective of the Army Air Forces until the security of all nations is assured by a firmly established international authority that will enforce peace upon all countries.

The success of our national security program depends upon the understanding and support of the people of the United States. Not all people comprehend the importance and necessity of air power in preserving our independence. It is a responsibility of those who have served with the AAF, and allied organizations, and who thus realize the powers and potentialities of aviation, to promote understanding and active support of the Army Air Forces security program. National security demands national support.

Many former members of the AAF have asked me "How can I continue to be of service to the AAF?" My answer is this: learn all you can about air power, past, present and future; talk about it—and keep talking; and lend your active assistance to one or more of the patriotic organizations that support air power.

Until international organization succeeds, our surest guarantee against an aggressor is a military machine sufficiently powerful to discourage aggressive ambitions. The American citizen's enthusiastic support of air power will continue if he knows his money is being spent wisely and well to get the greatest amount of security for his tax dollars.

Defense of the U.S. is dependent today, and for some years to come, upon an adequate Air Force built around such instruments as B-36 (left). The AAF's training program, momentarily halted after war, will be accelerated in 1947. Mechanics (right) are high on training priority list. No gadget is new NACA blower (below) which permits engines to be tried at take-off power before plane is test flown.





In Tokyo as elsewhere, G.I. Joe, with some official aid, is learning to make himself comfortable and quite happy

at home ABROAD

BY T/SGT. DAN OTA

K.P., janitorial and other menial details which constitute the more unpopular aspects of Army life are all but unknown among the 1300 G.I.'s of Tokyo's Air Force headquarters. For at the billets of the Pacific Air Command, U.S. Army (PACUSA)—located in the heart of the Marunouchi, a downtown section scarcely damaged by the war—such routine tasks are delegated to a corps of Jap laborers, and the G.I.'s live and work under conditions which, 18 or more months ago, would have surpassed the most optimistic dreams of the men who were fighting the war on the airstrips of Iwo, Okinawa and the Philippines.

Very few old-timers could enter the billets, an eight-story building of concrete and steel, and remain unimpressed at the sight of linoleum on the dormitory floors, spring cots with mattresses, pillows and clean linen, spacious individual clothes closets, room desks and chairs, fast elevators, and private flush toilets with duo-toned plastic seats.

Formerly the home office of the Tokyo Kaijo Insurance Company, the building has had its interior completely re-

finished since PACUSA's occupation. The office rooms have been repainted and converted into comfortable steam-heated dormitories, libraries and gymnasiums.

Three enlisted men's clubrooms, open every evening, serve cold beer, Stateside liquor and soft drinks in seemingly unrationed quantities. One of them has attained considerable fame in Tokyo for its unique Japanese-style interior decoration and roof veranda. All dates accompanying G.I.'s into the clubrooms are U.S. and British Commonwealth civil service employees, since club rules forbid admission of native girls.

Several Japanese commercial firms operate concessions in the Kaijo building, conveniently offering photo service and sale of souvenir gifts and fresh flowers to the billeted troops. Among other services available in the building are portrait paintings, studio photography, voice recording and tailoring. Quartermaster laundry, usually taking no more than three days, is done for one dollar a month.

Dining accommodations may be compared favorably with some of the better restaurants in the States. During dinner

hours, the G.I. "patron" has but to enter any one of the four dining halls, seat himself at an attractively set four-man table and unfold the napkin to summon the uniformed Jap waiters. Skillfully prepared food is served in courses on colorful china and crystalware while a Jap orchestra goes through a repertoire ranging in variety from boogie-woogie to Beethoven's Fifth.

The AAF men in Tokyo are fortunate also with respect to their location. Directly across the street from the Kaijo is a Victorian-style brick building, formerly the Japanese bankers' club, now an American Red Cross center. Through 10 hours each day, refreshments and entertainment steadily attract men and women in uniforms representing the armed force of over half a dozen United Nations. Bridge tournaments, exhibitions of Japanese fine arts, chess and billiard instruction, language and dancing classes and cultural lectures are some of the items on the center's program.

Off another side of the PACUSA billets, across a tree-shaded plaza, is the Tokyo Central Station, whence a soldier need spend just three minutes on the "El" cars to get to the famous Ginza.

Called the "Fifth Avenue of Tokyo" before aerial bombing left most of it in shambles, the Ginza is still the city's No. 1 shopping district, although retail sales are now conducted chiefly by sidewalk vendors instead of by established stores. A few of the large department stores, such as the well-known *House of Mitsukoshi* and the *Matsuya*, are again bidding for the enormous trade they carried before the war.

More than a year after the first occupation force landed in Japan, native bazaars still seem to have ample stocks of silks and souvenir merchandise for sale. One explanation is that exorbitant prices have discouraged the average G.I. from making purchases. His Army pay is based on the arbitrary exchange rate of 15 yen to one U.S. dollar, but



he finds in dealing with the Japs that the actual purchasing power of 15 Bank of Japan yen is considerably less than a dollar. To help the soldiers obtain silks and native handicrafts at reasonable cost, the Army has established souvenir departments in its post exchanges, where all transactions are made in military currency backed by the U.S. Treasury.

In the immediate vicinity of the Ginza are several Army-operated theatres—including the ultramodern *Ernie Pyle Theatre*—which show movies and stage productions nightly at 15 cents for G.I.'s and dependents. In addition, Japanese theatres normally "off-limits" to soldiers, hold special free entertainment for the G.I.'s, such as a recent performance of Tschaikowsky's "Swan Lake" by a talented ballet group.

School-minded PACUSA men find educational opportunities literally within easy reach, for the Army Education center is conveniently located within two blocks of their building. College-level mathematics, physical and social sciences, busi-

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Tokyo's top entertainment spot is the Ernie Pyle Theatre, one of several taken over by Special Services for use by Allied military and civilian personnel. Ladies from various Allied commands and civilian agencies are preferred company, but their time is at a high premium. Top photo, shown sitting and chatting on the rampart of the Imperial Palace Moat, are Sgt. Robert M. Davis of Berkeley, Calif., Miss Bernice Eklund of Brisbane, Australia, Miss Iona Cassidy of Hagerstown, Md. and Cpl. Wayne L. Wilson of Colorado Springs, Colo. Below, Cpls. Lester Jaycock of Los Angeles and Ernest Hamilton of Chicago, shopping on Tokyo's famed Ginza. On opposite page, one of four enlisted men's dining rooms at the Kaijo Building, with waiters and orchestra playing stateside music.



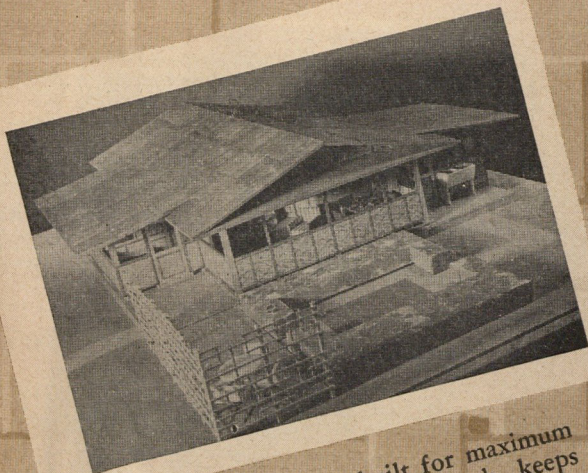
A G. I.'s MANILA HOME



Model of G.I. family dwelling to be built at Ft. McKinley, Manila, designed by Lt. Thomas Fransioli.



Interior, showing two-bedroom and terrace plan, not age better-class Philippine home.



The AAF home is built for maximum ventilation. The sliding sash keeps out rain during the winter season.

ness and agriculture, mechanics, Russian and other foreign languages, and fine arts are taught in day and evening classes without cost to interested military and civil service personnel.

A rare opportunity open to PACUSA men is the free personalized instruction offered by Japan's *judo* champions. For outdoor sports, G.I.'s flock to the city's several Army recreation centers, where facilities and equipment exist for swimming and diving, tennis, handball, archery, baseball and football. Everywhere in Tokyo new ball parks have appeared within recent months, for occupation units learned in short order that probably in no place can ball parks be so easily opened as in a bombed-out city.

Since the local Army Service Forces began operation of a fleet of sleek rear-engine busses for intra-urban transportation of occupation troops and civil service employees, those G.I.'s to whom walking for any distance may be uniformly distasteful can now catch a bus each morning and ride to work at the PACUSA headquarters, just two blocks' distance from the Kaijo building. For transportation to places outside the downtown district, a G.I. may use Army busses or the Japanese Government's "El" cars and Lilliputian trolleys without fare.

The Pacific Air Command headquarters is situated in an imposing building of granite on the broad boulevard alongside the east Imperial Palace moat, halfway between the Kaijo billets and General MacArthur's SCAP headquarters. Veterans assigned to headquarters duty here after wartime service in battle areas find working in an eight-story building with swivel chairs and marble-walled corridors an extreme contrast to their memories of the months spent hacking at dust-clogged typewriters in sunbaked tents. As in the Kaijo building, menial tasks of maintenance and operation in this headquarters building are performed by Japanese laborers.

During off-duty time, many PACUSA men make trips to Mount Fuji, 60 miles west of Tokyo, to picturesque Nikko and other mountain retreats to the north, or to the beach resorts to the south. Most of the men, however, usually spend their leisure hours in the city, where post facilities, Special Services' recreation program, Army schools and sight-seeing are enough to keep the average G.I. fully occupied.

Centers of tourist attraction in Tokyo are innumerable, but an American soon realizes that sight-seeing in the Orient cannot be accomplished without a tolerant sense of smell. Everywhere one goes in Tokyo he becomes aware of an invisible pall carrying the blended essences of human perspiration, night soil, pickled octopus and a variety of less mentionable ingredients. Once accustomed to these odors, however, an inquisitive G.I. can find countless sights of interest while wandering through the narrow streets and visiting native shops.

The possibility of strong Japanese resentment against the American soldiers who wore the Army Air Forces shoulder insignia was cause for some apprehension during the initial phase of the occupation, but the Japanese people have shown no sign of special bitterness toward the men who

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THE BEAR HAS WINGS

For at least twenty years we have only one potential adversary to face. We must plan our defense accordingly

BY W. BARTON LEACH, *Colonel, A.C. Res.*

ED. NOTE: Barton Leach is a Professor of Law at Harvard. From 1942 through 1945 he served as Chief, Operations Analysis Division, Hqs., Army Air Forces.

LET'S face it. If we have war it is going to be with Russia. If we have no war with Russia we shall have no war at all for at least two decades. A joint police operation in South America perhaps, or some measures for protection of American lives in India or China, or a muscle-flexing UNO enterprise in Spain—but there will be no war unless it's with Russia.

Everyone knows this but it is important to say it. Only by saying it can we start our thinking on the right track as to what this country has and what it needs to assure its security, what we must devote to the armed services in money and men and what is sheer prodigal waste of the taxpayer's dollars. It is time to take inventory and time to make a plan.

Having but one potential adversary, we face a greatly simplified problem. We are no longer concerned with a dynamic Nazi Germany, a growing Japanese sea power feeding its malignant growth upon our own scrap iron and petroleum, or a strutting Fascist Italy proclaiming the Mediterranean as Mare Nostrum. These powers are crushed and their ghosts laid. If a resurrection should take place—and history teaches that it will—the timing will inevitably be such that the weapons and military organizations of today will be nothing but handicaps. Resurgent military powers have the inestimable advantage of building anew, unburdened by present possessions and the psychological resistance to progress and innovation that possessions generate. The planning to meet these future threats must be done some years in the future on the basis of the political and scientific realities of that time. The planning for now must be the planning for the current potential adversary.

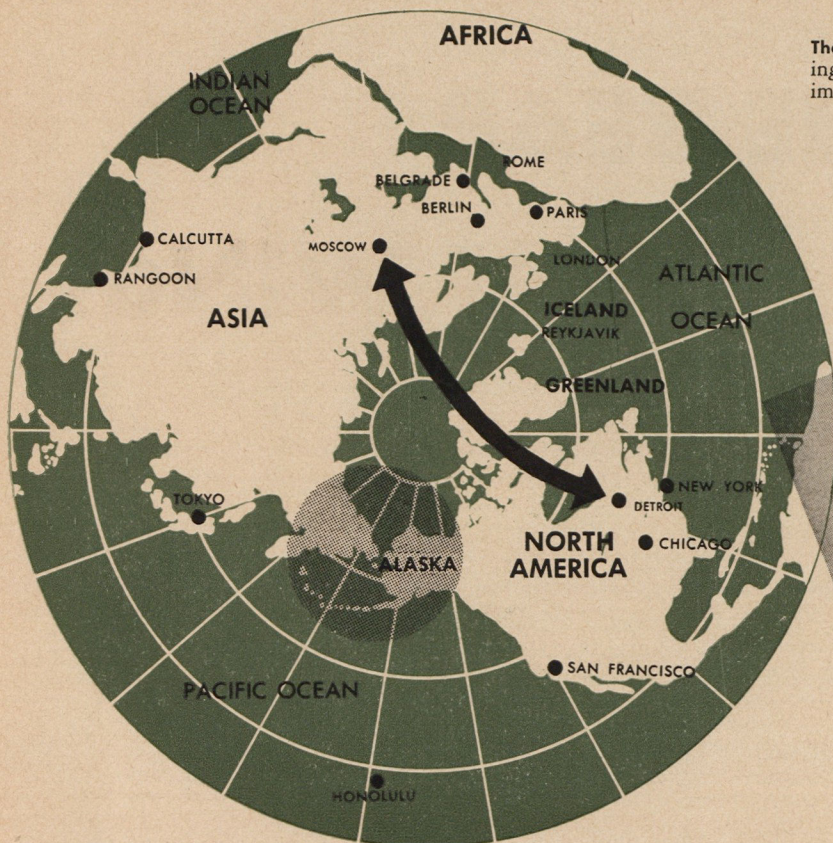
All wars teach us geography. Victory or defeat may depend upon our skill in anticipating the lessons. Consider how vital to Allied victory was the British evaluation of a desert rat hole called El Alamein, how important to defeat of the French was their overestimate of the impenetrability of the Ardennes Forest. Think what it might have meant to us if we had accurately forecast the geographic importance of Guam, and developed the air power to make it in 1940 what it became in 1944!

In World War I—Liege, Vimy Ridge, Gallipoli, Jutland, Chateau-Thierry, Caporetto, the Marne. In World War II—Bengazi, Kharkov, Guadalcanal, Ploesti, Cassino, Bastogne, Hiroshima. What will be the names to emerge in a new war if it should come?

Here are some leading candidates: Nizhni Kolymsk, Golchikha, Sterlegova, Koloniyo, Kuchichan, Taimyr Peninsula, Murmansk, Cape Chelynskin. These rather sinister polysyllables represent an arc of place names on the map just outside the Arctic Circle stretching 3500 miles from the Norwegian-Russian border to Behring Strait. They are all substantially equidistant from New York—between 3900 and 4300 miles. They are all closer to Fargo, North Dakota, than they are to the big cities of the Eastern seaboard. They



The Russian Air Force—perfected behind an iron curtain—could be the instrument used to project Red army into Western Hemisphere.



The old Mercator maps show the northern coast of Russia stretching comfortably east. But there is little comfort in the proximity of strategic points as indicated on a Polar projection.



Until very recently it was not generally known that Russia had developed pure jet planes of her own. This picture proves it.

look down the throat of the Chicago-Cleveland-Pittsburgh industrial triangle. Implemented with air bases for planes equivalent to the current Army Air Forces B-36, they are adequate for sustained bomber operations, with or without atomic explosives, on all American cities down to the latitude of Charleston, South Carolina. Conversely, these potential bases are open to attack from the Western Hemisphere, but only by long-range land-based aircraft operating across the polar wastes.

The usual flat map conceals these realities. Mercator drew his charts for an age of ocean travel, mostly in the temperate and tropical latitudes. Distortion in the high latitudes was unimportant and the relationships of land masses around the Arctic Ocean both unknown and immaterial. The Mercator projection shows the northern coast of Russia stretching comfortably East, more and more distant from the United States the farther it goes, whereas in fact it curls around the Arctic Ocean maintaining a stubbornly constant distance from the heart of America. A globe shows this nicely, or a polar projection.

Not only can this Arctic air route be flown by bombers, it can be flown by troop carriers and cargo ships. And while we are on this subject it is worthwhile to recount some of the least known but most prophetic operations of the last war. They were trucking operations, as unglamorous as a dray horse, but they demonstrated in various locales and tactical situations the capacities of aircraft as a means of projecting ground-force power. In 1942 the Japs were thrown back across the Owen Stanley Mountains in New Guinea by one Australian and one American division supplied mostly by air where ground supply over precipitous mountain trails was nearly impossible. On D-Day troop-carrying aircraft dropped three divisions, complete with artillery, behind the German lines. Then in the India-China area a more ambitious project was undertaken.

The British and American forces in Burma wanted to take Rangoon. The required ground force ran around 300,000

men. An amphibious operation was impossible because all landing craft had been diverted to Normandy. A land expedition through the Burmese jungles and across three mountain ranges seemed out of the question, for supply lines would be hopelessly vulnerable to the infiltrating enemy. The air commanders announced that they could handle the supply problem. They pointed to Phil Cochran's deep penetration exploits in which a few planes placed battalions, including machines and animals, far behind the Jap lines and then kept them operating. They recalled, as tactfully as possible, that air supply had already bailed out one large element of British ground troops which had been caught with its communications down. Their plan was approved.

Three hundred thousand men disappeared into the jungle on a three-hundred-mile expedition with no food but what they carried on their backs, no ammunition but what could be transported by pack animal, and no conventional method of getting out their sick and wounded. From the time they started they were surrounded by the Japs. Aircraft brought to them 500,000 tons of supplies and ammunition, and evacuated their sick and wounded. Rangoon was taken on schedule.

All this was done with C-47's or similar types—the 21-passenger, two-motor jobs developed some years before the war. Airwise they are Model T's. They look like toys beside even today's transports, the Boeing Stratocruiser, the Douglas DC-6 and the Lockheed Constellation. What the C-47's could do at 250-mile range in Burma, planes now built and building can do at whatever range you care to name. Armies can be picked up and put down, supplied and serviced, practically anywhere.

Now back to geography and related matters.

Russia hasn't any seacoast to speak of and her people are not seafaring people. You have probably never seen a Russian sailor and you probably never will. For one thing, Stalin doesn't like to have his people get around very much. They might get contaminated by ideas inconsistent with Kremlin-style democracy or dazzled by the false glitter of the plutocra-

cies. Moreover, Russia has no need of the seas as a channel of commerce. She is self-contained economically, except in the little matter of petroleum reserves which seems to be adjusting itself along familiar lines in the Middle East.

The economic self-sufficiency of Russia bears underscoring. The major wars any of us remember are the two World Wars, and these were contests of strangulation. The wrestlers rolled about the mat of the global ring striving to lock an arm under the enemy's Adam's apple and squeeze it—and the arm was mainly naval power. England and Germany fought it out on these lines from 1914 to 1918, one with surface forces, the other with submarines. Germany went back to the same tactics with great success in the second war, rendering herself immune to countermeasures by drawing from the slave populations the food and material that she was denied by sea. Submarine and aircraft attacks on Jap shipping strangled the Nips with telling effect from 1943 to V-J Day.

But there was one attempt at strangulation that utterly failed—the German and Jap attempt to strangle the U.S.A. Why? Because, in the matter of national economy, we have no neck. They could deprive us of rubber and force us to synthetics, of quinine and force us to atabrine, of tankers and force us to the Big Inch. But then they were through. They could inconvenience us and make us do things the hard, expensive way; but then we could sit back and laugh at them, for we had no neck to strangle. Neither has Russia.

From the foregoing you would suspect that Russia is not, has not been, and will not attempt to be a naval power. This is correct. Since 1905 Russia has had no pretensions on the sea. In that year Admiral Rozhdestvenski steamed out of the Baltic, nearly got himself into a war with England by nervously firing on British fishing trawlers at the Dogger Bank, led his ships into the Pacific and lost them all to the fledgling Jap fleet under Togo. At the present time Russia has less than half a dozen ancient battleships, all built before 1915, a handful of cruisers, a few good submarines, and no carriers at all. No big carriers, no medium carriers, and no escort carriers. None at all of the striking force of modern fleets.

Plainly then we must revise our thinking. We are used to planning for the defeat of adversaries

- (a) who have naval power for us to neutralize,
- (b) who have an economic system dependent upon over-

seas commerce and hence vulnerable to blockade and strangulation tactics, and

- (c) who must cross ocean spaces in ships if they are to bring war to America.

These are the assumptions of the Mahan school of strategy. They are the necessary basis for the concept, wholly valid thirty years ago, that "The Navy is America's first line of defense." But none of these characteristics of our previous adversaries are found in our one potential adversary. Russia

- (a) is not a naval power,
- (b) is not dependent upon overseas commerce, and
- (c) need not rely on the sea to bring war to America.

The future security of this country may well depend upon how light-footed we are in adjusting to these changed conditions. If we fail in this, our armed might will be tailored to conditions that are gone and enemies who are dead.

This changed situation is a mighty sad thing from our point of view. Just suppose that we were back in 1910 with a United States Fleet 40% more powerful than all the other fleets in all the rest of the world, the British having the only other Navy worth considering. Wouldn't it be wonderful! In a day when naval power was synonymous with national power we would have been top dog with no competitors. A bark from us and the Balkans would have been pacified, a snarl and the Kaiser would have quivered. Arthur Brisbane would have sounded pretty silly talking about the Yellow Peril. We would have had some trouble with a roundfaced articulate ex-correspondent, name of Churchill, who was just coming into the Admiralty at that time and whose conception of the fraternity of the English-speaking peoples was less highly developed at that time than it later became, but William Howard Taft and Philander C. Knox could probably have handled that situation.

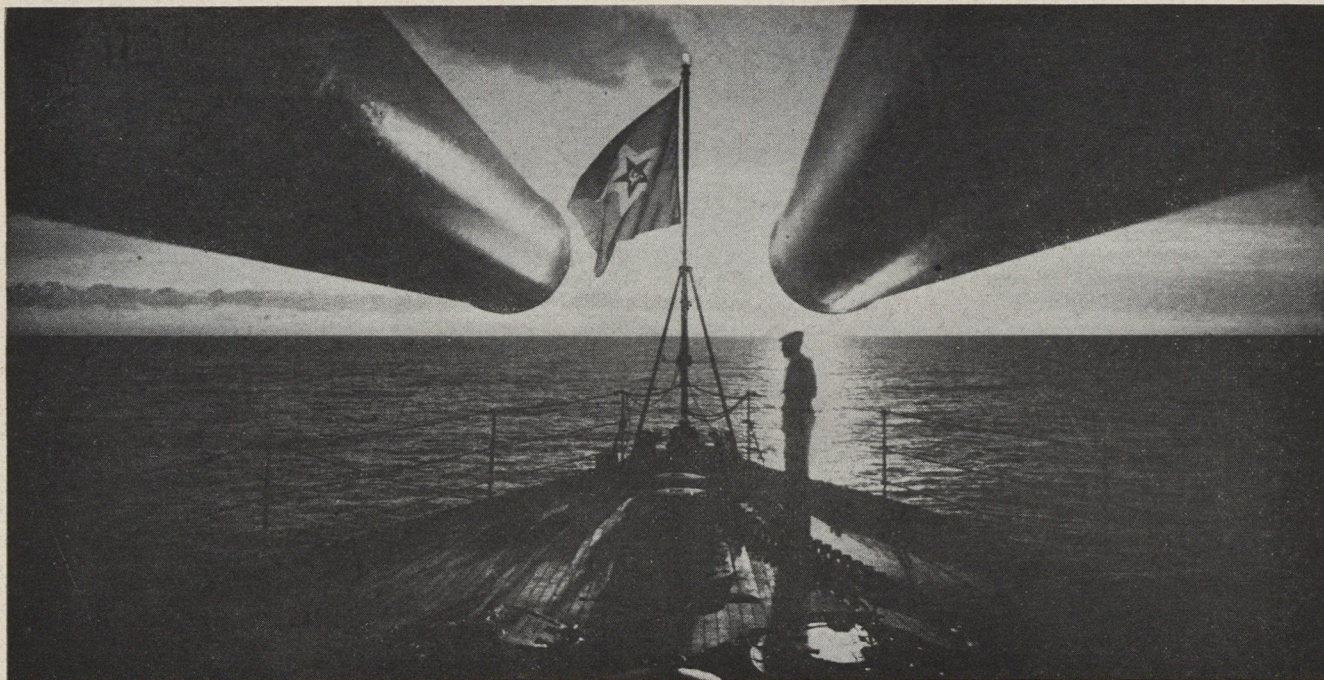
Come back from that rosy dream! Russia is what we are discussing.

Russia's basic element of armed power is the Red Army, massive in men and equipment, blessed with a totalitarian freedom from any problem of selective service, ready to take any required losses, and certain of the outcome in any contest of attrition.

In any war with us Russia's offensive problem is to project the power of the Red Army into the Western Hemisphere or

(Continued on page 64)

Since 1905 Russia has had no pretensions on the sea. At present she has five ancient battleships, several cruisers and subs, no carriers.





ORDER OF

Fifinella

BY CLARA JO MARSH STEMBER

THE WASPs may have made a mistake when they selected the happy little Fifinella as their trademark during the war. Her lighthearted countenance might have been one of the things that conveyed the erroneous idea to the general public that the Women's Airforce Service Pilots were themselves somewhat lacking in sincerity of purpose. They weren't. But believe me, it was a tougher job convincing the man on the street of this than it was to learn to fly—by a long shot.

Our record during the war is a matter of history. The Program was activated late in 1942 under the AAF Training Command with these objectives:

- (1) To see if women could serve as military pilots and if so, to form the nucleus of an organization that could be rapidly expanded;
- (2) To release male pilots for combat;
- (3) To decrease the Air Forces' total demands on the cream of the manpower pool.

In the Fall of 1942 not even our best strategists could guess how deep we were going to have to dig in our manpower barrel. Things weren't so rosy then. Pilots for overseas duty were at a premium, and it seemed logical that if women could handle trainer planes, and do routine jobs such as towing targets, tracking, etc., it would be expedient to teach them to do so. There were no critics of the program then. It was only after the war took an unpredictably favorable turn—after it became known that our battle losses were much less

than had been expected—that the carpers found voice. They protested that women were being trained when the AAF had more male pilots than it knew what to do with. They argued that even if we could learn to fly we would be physically and mentally undependable. We lacked stamina, they said. In condemnation that was meant to be all-inclusive, they said we were "women."

On all but the last count, the record proves them wrong. During our short career we flew a total of 60 million miles, not counting time spent in training. We flew everything the Army had from Cubs up to and including Boeing B-29s. In addition to ferrying, target towing and tracking missions, we participated in searchlight missions, simulated strafing runs, smoke laying, radio control flying, basic and instrument instruction, engineering test flying, and administrative and utility assignments. We freed a lot of combat pilots for overseas duty when they were needed badly.

The Air Surgeon spiked the argument that we were physically and mentally undependable in a report which he concluded as follows: "It is no longer a matter of speculation that graduate WASPs were adapted physically, mentally, and psychologically to the type of flying assigned. My Surgeons have stated that they stood up well to their job; that the male personnel lost more time due to being grounded."

We were not playgirls either. Thirty-eight WASPs lost



Authoress Clara Jo Stember (left) shows the Disney-drawn Fifinella to Emma Coulter Ware of Puerto Rico. Above: Some of the anxious Fifinellas chart course for mass delivery flight.

their lives in line of duty. 364 others were involved in aircraft accidents of varying degrees of seriousness. It was hardly a debutante cocktail party, yet amazingly few women resigned. More of them were of the caliber of "Tony" Martin who joined the WASPs after her husband was killed on the first B-17 daylight raid over Germany. Tony flew B-26s at Laredo until the program was discontinued, then she went to Manila to do what she could as a Red Cross representative. She's now in Europe in the capacity of Red Cross Educational Advisor—still doing what she can.

Our program was ended in December of 1944. We left the "service" without reserve status, without a G. I. Bill, without insurance or compensation for disabilities, and without priorities for new or old Civil Service jobs. I mention these things not as a bid for sympathy at this late date, but because they illustrate what happened as the result of a mistaken concept of our program and ourselves.

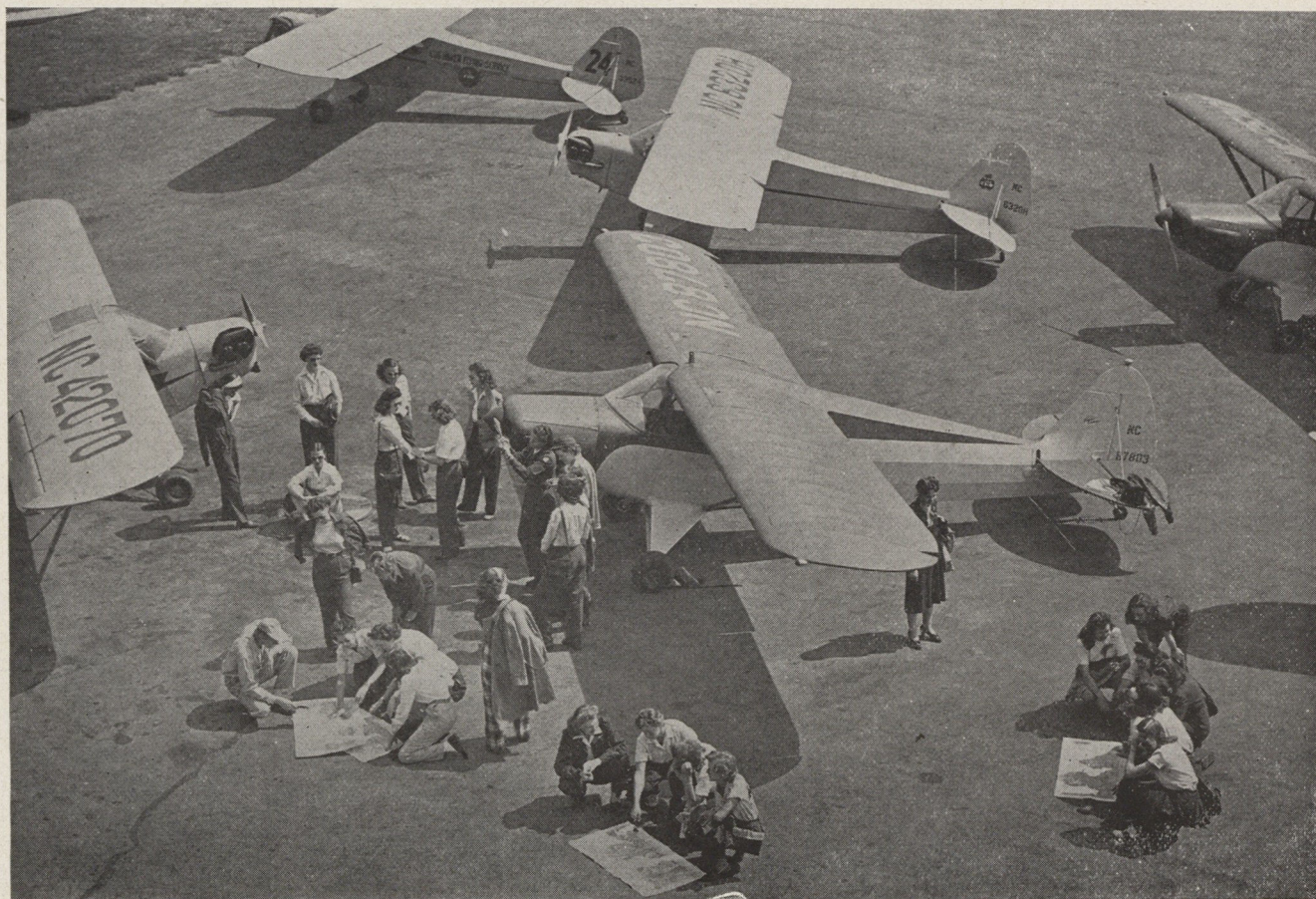
Today the WASPs are projecting their interest in aviation through their own "veteran" organization—the Order of Fifinella, which I am privileged to head. The O of F was created at Maxwell Field, Alabama, as soon as word was out that we, the WASPs, were to be deactivated. Many of us were placed in the unenviable position of having to start from scratch to find new jobs—sans government assistance—so one of the first things we did was to publish a WASP Newsletter which was almost entirely an employment information service with a few tips about how other girls were solving their problems. By the time we were actually inactivated, the Order of Fifinella—though not all its individual members—was a solvent and going concern.

First Fifinella reunion since the deactivation of the WASP program was held recently at Piper factory at Lock Haven, Pa. Since war's end some of the girls had married and had babies. Others had turned to professional careers. All still loved the air. After ceremonies they flew 100 Piper Cubs to consumers from Coast to Coast.

Out of 1074 rated WASPs, there are now close to 900 Fifinellas in chapters throughout the country. A recent employment survey of Fifinellas showed that just slightly under 40 per cent of the women who flew for the AAF are still flying commercially. Most of them are instructing. Many are ferrying from factory to dealers and distributors. Instructors ratings, instrument ratings, water ratings, and so forth have been secured without a G. I. program. The gals have paid for their "graduate" education themselves and have then gone out and landed good jobs. There are close to thirty WASPs operating their own airports. In addition to the girls who work in aviation directly, there are two hundred who are employed in related occupations.

One of our major postwar accomplishments was the recently completed Airport Inspection tour conducted under the direction of the National Aeronautic Association. For some time prior to the inspection which began in August, the NAA, CAA, CAB and other aviation associations had been concerned with the lack of a uniform working procedure for all airports. The absence of certain minimum operating practices, the associations felt was responsible for an alarming accident rate which, if unchecked, would reach fifty thousand by 1955. The objective of NAA's safety program was to intercept the trend before it got so far out of hand as to seriously prejudice the cause of aviation. They planned to accomplish their objective in two steps: (a) to conduct a drive against all prominent causes of aviation accidents, (b) to issue a certificate of merit to airports meeting minimum good practice requirements. The WASPs were called in to assist in the second move. Twenty-six of them, headed by Gloria Heath who works with a vice president of NAA, were given inspection lists and asked to check airports in their regions against the safety items listed thereon. Fields which satisfied minimum requirements were issued "Certificated of Good Practice." For four months the 26 Fifinellas visited airports

(Continued on page 59)



4

IS COMPANY

BY MICHAEL STEVENSON

Design trends in private aircraft run to working vehicles, comfort, economy and four seats

"PERSONAL planes have to go back to work." One of the nation's best-known fixed-base operators made that statement in the days that immediately followed the war. Many of the manufacturers are taking him and other well-informed pilots at their word. The recent exposition in Cleveland, while it was predominantly military in nature, did indicate in the personal-fixed base class a marked trend to four-place aircraft, designed as light transports rather than trainers.

This would imply that an increased number of owners intend to use their aircraft for utilitarian purposes, for carrying people cross country and for short-range charter operation; not for training, for sport or other.

Airplane sizes have been dictated by several factors, not all of them logical. In the days that followed World War I, three-place open biplanes were the mode. The early ones were conversions or modifications of the Curtiss Jenny and the J-1 Standard biplane, with the front cockpit widened to accommodate the extra passenger.

In the early 20's, Clyde Cessna, Giuseppe Bellanca, and a few other pioneers created four-place aircraft. This was considered an adequate size for a working airplane powered by the then-current middle-power series, the 100 to 170 hp radials. When the Wright Whirlwind series became popular in the late 20's, the trend was toward larger craft, and the six-place Stinsons, Bellancas, Travel-Aires and Buhls. There was a period in which Cessna was virtually alone, getting a maximum performance out of a 110 hp Warner engine, carrying four passengers and performing fairly well alongside six-place equipment using nearly twice the power. A strikingly clean full-cantilever high-wing monoplane, the basic design changed little from the time it was originally laid down by Clyde Cessna to the 170 which was in production up until wartime need for Bobcats pushed it off the line. Current reports indicate that, despite the heavy orders in their current all-metal side-by-side, Cessna is preparing to re-enter the four-place field with a design known as the 190.

Piper Aircraft, long noted for two- and three-place craft, has announced a four-place design which will probably be available this year. This Skysedan will differ from any previous attempt by Piper, not only in size but in structure and application. The prototype, currently in operational test, appears to be a development of the PT-1 which was built during the war. It is an all-metal low-wing monoplane powered by a 165 hp opposed-six Continental engine, equipped with retractable landing gear and flaps. Top speed is clocked at over 160 mph; cruising speed at 100 hp is 140. It lands at 49 mph. Flaps and landing gear are electrically operated.

Among the loading features of the new design are the turret top and V-windshield, which provide for 360-degree pilot vision. Special design consideration has been given the problem of loading women passengers. The cockpit door is extra wide and the trailing edge step is an easy distance from the ground. While the final sales price is difficult to determine, due to unstable material and labor costs, Piper is shooting at the lowest possible retail level for this plane.

Stinson's Flying Station Wagon and the Standard 1947 Voyager affirm Stinson's return to the four-place design. The original Stinson biplane of the middle twenties was four-

place, and even after the fame of the six-place Detroit had been established, at the insistence of the immortal Eddie Stinson, a four-place 125 hp Warner-engined Stinson Junior was created. In the early thirties, when the depression knocked the bottom out of the new plane market, Stinson entered the field with a four-place job, powered by 210 hp Lycoming engine, which sold for \$5775, brand new.

The Station Wagon and the Voyager are both braced high-wing monoplanes, powered by 150 hp opposed Franklin engines. Some of the structural theories used in the Stinson are somewhat conventional. The fuselage is structured of welded steel tubing, fabric covered. One of the features of the 1947 Stinsons is the Fibreglas soundproofing, which has dropped interior acoustical levels.

The wing structure differs from previous Stinsons in the total elimination of wooden members. Former Stinson light transports had stamped metal ribs and wooden spars. The 150 series has metal ribs and spars, but uses drag and anti-drag wires in the classic manner, making an extremely strong member. The ailerons are all metal.

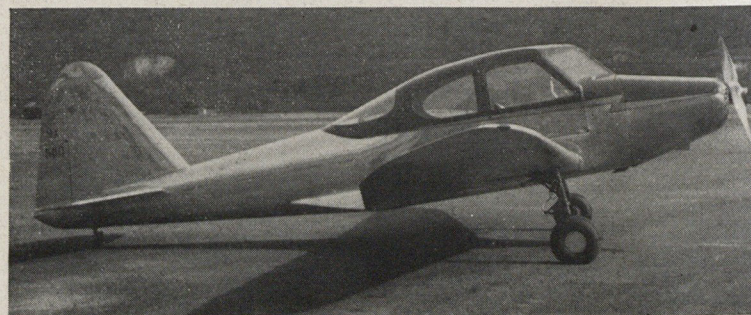
The Station Wagon differs from the Voyager in interior arrangement. While the Voyager is finished strictly as a small transport, the Station Wagon, as its name implies, is rigged as a utility transport, aiming at farm and industrial use. The back seats in the craft can be removed in about five minutes, giving the craft a 600-lb. cargo load plus pilot.

Postwar Stinsons incorporate many of the features taken from the L-5, which was operated so successfully during the war, including improved slots and flaps and such civilian luxuries as dual mufflers, dome-type radio speakers, sealed beam landing lights, two-way radio and fixed homing loop.

The all-metal North American Navion is another example of the "go to work" light transport. The first commercial offering by N.A. since it was founded in 1935, the Navion incorporates much of the structural theory that was evolved for the building of the Mitchell and the Mustang.

Powered by a 185 hp Continental, this four-place design uses the sparless accentuated anti-stall wing design, making the craft unusually easy to fly. At 75% of power, it cruises at 152 mph with its regular load. The Navion incorporates many practical features for the tourist, camper, and charter operator.

Piper's Skysedan, powered by a 165 hp Continental, will appear in 1947 as the least expensive of the 4-place landplanes. It will feature turret top, 360° cabin vision and electrically operated gear.



Structurally, the Navion resembles the NA-35 military trainer that was built on an experimental scale just before the war. It features differentially connected Friese-type ailerons, hydraulically operated selector flaps and a hydro-gravity landing gear system.

In the same general class is Beechcraft's Bonanza. Also a four-place all-metal low-wing monoplane, equipped with tricycle landing gear, the Bonanza incorporates the unique "Butterfly tail" which gives the airplane all the favorable characteristics of a two-control plane, with the added advantage of rudder characteristics for such events as cross-wind take-offs and landings.

One of the fastest of the light fours, the Bonanza cruises at 175 mph with a 165 hp Continental opposed six engine. Following the most modern merchandising policy, the Bonanza is delivered with complete instrumentation; two-way radio with homing loop, with marker beacon receiver and automatic antenna reel, full sound insulation. Beech continuously variable prop, adjustable sun blade, etc.

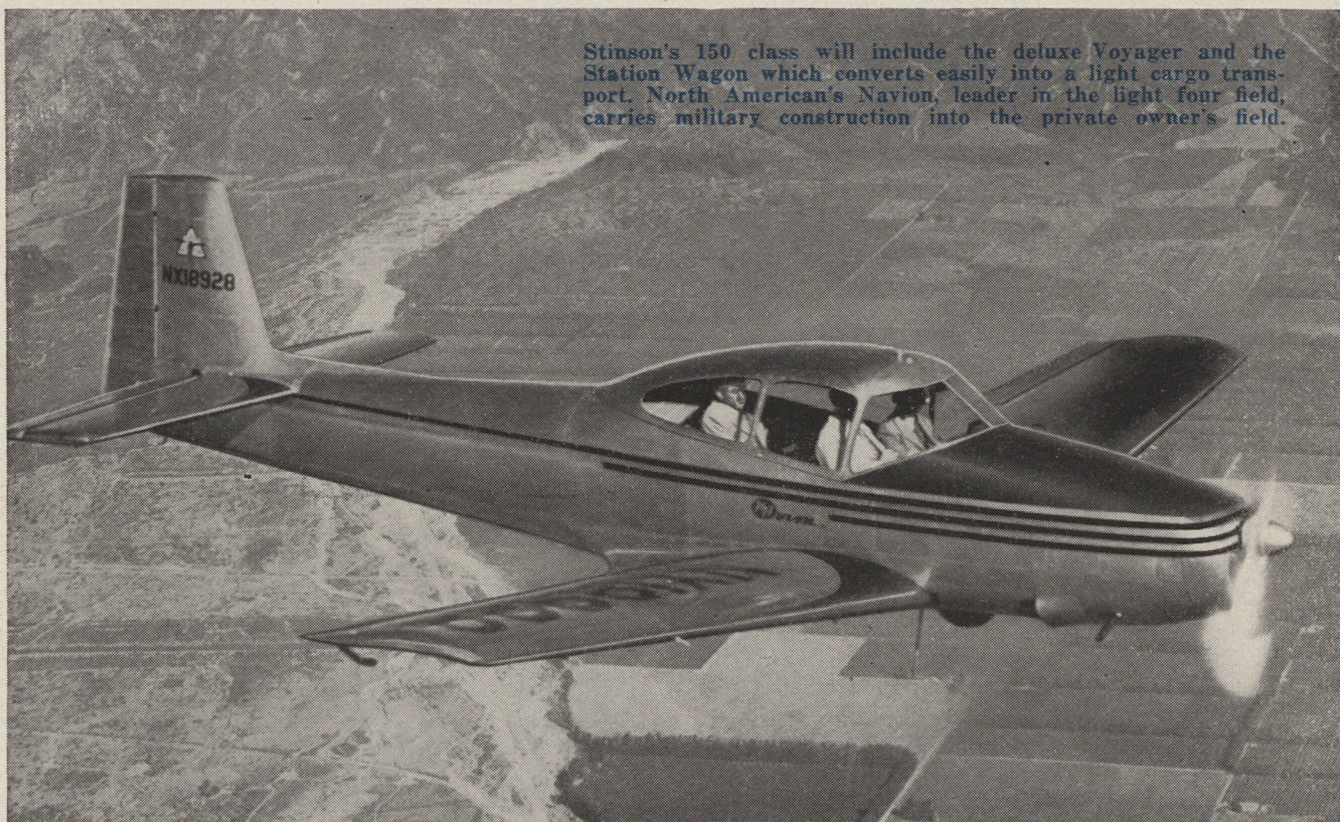
Republic's much-discussed Seabee lines up generally with its forerunners in light amphibious craft. While they carried generally more power, Loening's Commuter, the Sikorsky S-29, and some of the early Ireland amphibians stuck to the four- five-place class. This however, was a limitation enforced by the inferior efficiency of the early land-water craft, as compared to the straight boat or landplane of the day. In the days of the J-5 engines, the typical Whirlwind-engined commercial craft was six-place. The J-5 (220 hp) Whirlwind-engined Ireland carried five passengers as a flying boat and four as an amphibian.

Republic's effort to mass-produce a low-price postwar plane is well known. The pity is that unstable conditions in labor and material prices have forced them to increase the original cost. The theory was that the plant originally equipped to turn out Thunderbolts could knock out a light plane like tin cans, providing the ship was designed to put the existing production system to work at its best advantage.

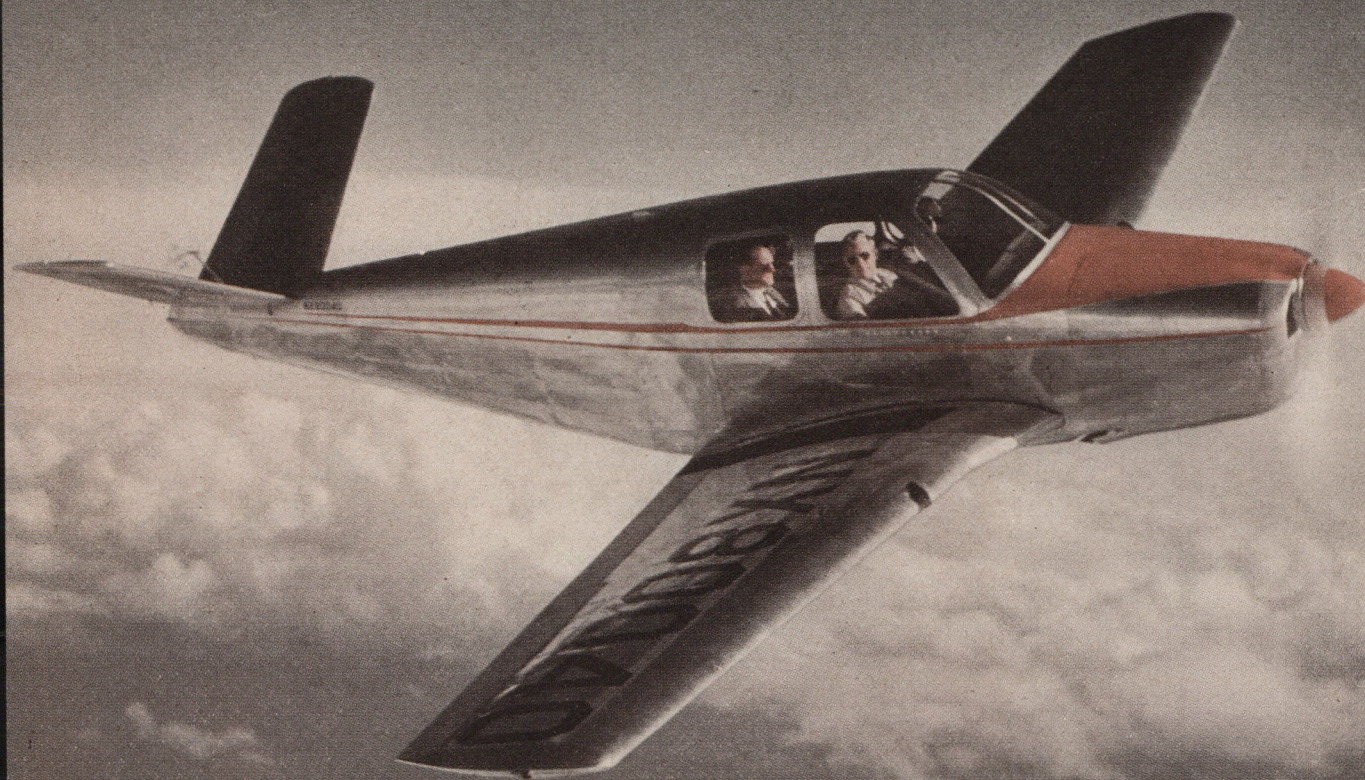


Republic started with the high-performance Spencer design. The blueprints were turned over to the structures experts who proceeded to simplify it, using thick alloys to give strength to the unsupported structure wherever possible. Next the theory of mass production was added; whole factories were bought or placed under contract to cut overhead.

Even the Seabee's most ardent booster will admit that the production model will not perform quite as well as the original prototype, built with conventional structure. However, it can be sold at a fraction of the cost of the original proposal. Still, powered by a 215 hp Franklin engine, it cruises well over 100 mph, carries a useful load of 1050 lbs.



Stinson's 150 class will include the deluxe Voyager and the Station Wagon which converts easily into a light cargo transport. North American's Navion, leader in the light four field, carries military construction into the private owner's field.



4 IS COMPANY

Fastest of the light fours is butterfly tailed Beechcraft Bonanza, 175 mph with pilot and three passengers, which brings operating costs down to 1.5¢ a mile.

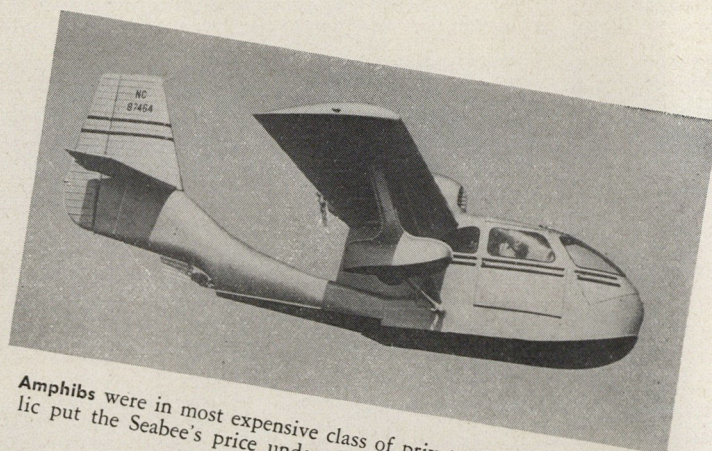
and has such features as over-the-nose water loading, easily accessible back seats, and the general operational advantages of amphibious aircraft for less than the price of most landplanes in the same power class.

Fairchild's 24, popular for several years before the war, is still a pilot's favorite. Hundreds of them were used during the war, both by the British and by the AAF as a light personnel transport. The craft has been called "the best behaved four in service." Powered by a choice of six-in-line Ranger or radial Warner engines, its performance is somewhat less spectacular at 135 mph than some of the retractable-gear ultra-moderns. Nevertheless, it has a following equalled by few craft in the field. There are pilots who are protesting Fairchild's shifting to the production of a sleek four-place low-wing design, equipped with the latest in retractables and top performance.

Pioneer in the modern fours is the Cruisair, in which Bellanca returned to the size and power range that first made him famous. Oldsters in the industry remember his little sesquiplane, powered by a ten-cylinder Anzani, which flew circles around many of the military planes of its day, about a quarter of a century ago. The Cruisair started with small radials like the LeBlond and the Ken Royce before the war. Since that time, the Cruisair has been developing more performance for less power, is considered by many as the leader of the trend back to four places. It accents the low-wing retractable landing gear design. It should be noted that, while the Bellanca is traditional in its steel-tube and fabric structure, it has managed to squeeze a lot of performance out of its 150 hp Franklin engine—900 lbs. useful load and 150 mph.

While this trend to four-place ships has come and gone twice in two decades, it has always been fostered by a hope that the small airplane would stop being aviation's kept woman. Two-place aircraft had their place as trainers. The function of three-place planes for purposes other than barnstorming has always been questionable.

In the early 30's companies like Brunner-Winkle tried to get an extra seat into their three-place Bird. Curtiss-Wright's expansion of the famed three-place Robin to four was a change made with hopes for a more utilitarian airplane.



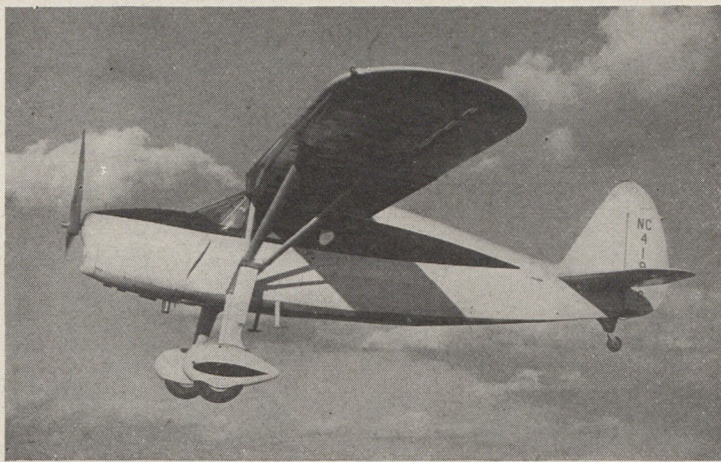
Amphibs were in most expensive class of private plane until Republic put the Seabee's price under that of most four-place landcraft.

When the seating hit five and six, it started dragging the useful load over the 1200 lb. mark, and that brought with it plus 200 hp engines. They began to be big airplanes, and the expenses of high-powered engines came with them.

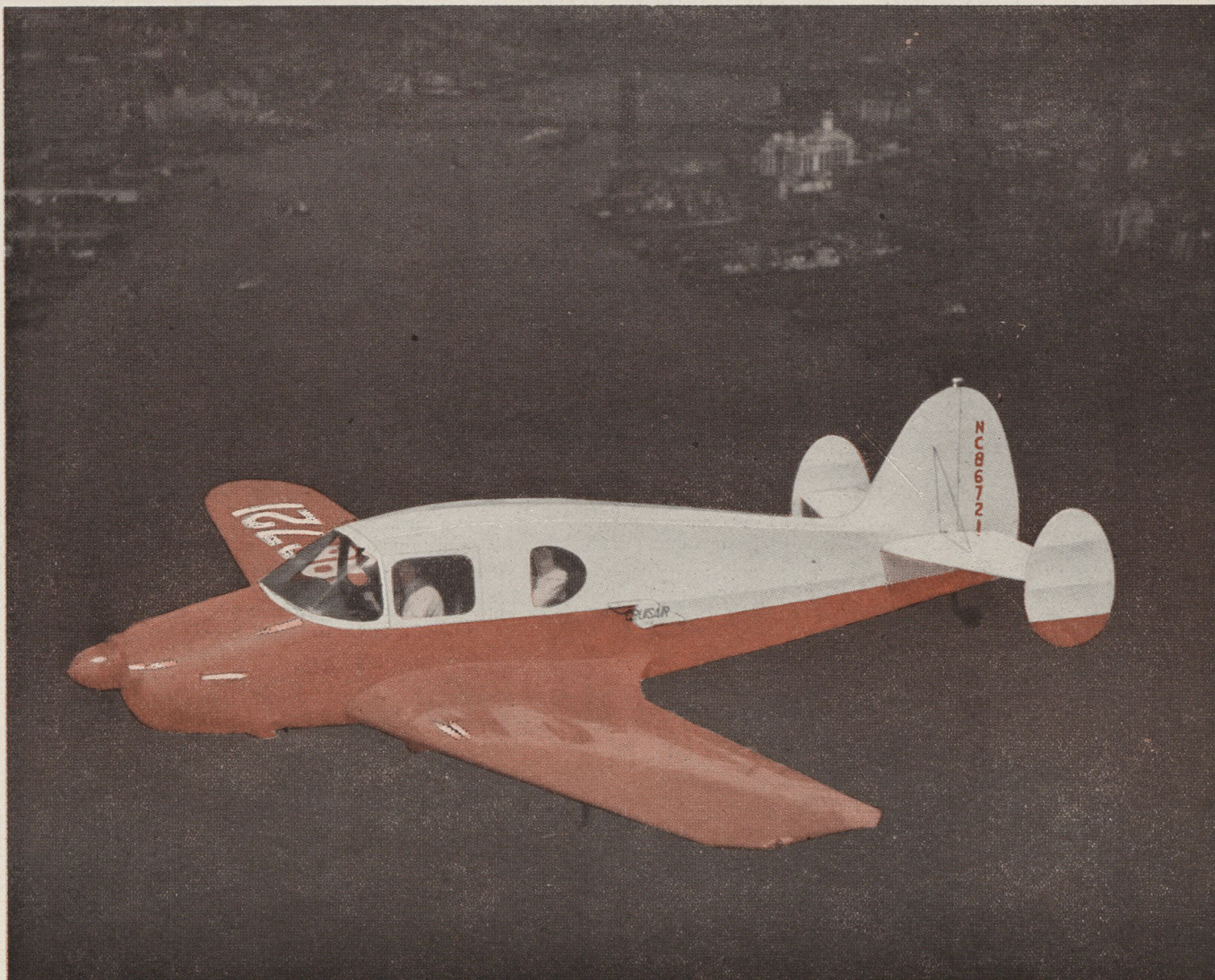
Whether the conclusion has been arrived at through science, through inquiry, or sheer experience, the typical American vehicle has to be built to the typical American family, which statistics show is made up of Pop, Mom, and a couple of kids. The average motor trip of any length starts out with four people and a little luggage. The airplane, if it is to be socially useful, must agree in number with other social functions. The airplane is dynamically more sensitive to this need than an automobile.

Unlike the automobile, it cannot be overcrowded. You can't seat an extra passenger on someone's lap.

On the other hand, if one simply decides on the bigger plane just for comfort, the operator, private or otherwise, is faced with the problem of carrying the extra load and mass through the air. That means more power, it means more expense. It even means more hangar rent and in some places increased landing fee. In short, the cost rise is more critical than in any other vehicle.



Both the Fairchild 24 and the Bellanca Cruisair (below) were popular designs before the outbreak of war and lead the trend to four-place medium-powered aircraft. The Fairchild is soon to be replaced by an ultramodern low-wing design in the same seating category.





WAR

below zero

BY COL. BERNT BALCHEN

Taken from "The Last Time I saw Them," By Corey Ford and Alastair MacBain. Reprinted by permission of the publisher, Charles Scribner's Sons.

WAR in the Arctic is a lonely war. It is not a big show like Russia or Italy; there are no vast armies, no major campaigns, no epic battles of a million men. It is a war of long distances and longer silences: a war of waiting. Events are far apart and small. A trawler halts in a hidden cove. A group of men in green German army tunics set up their equipment on the barren beach. A passing dog-sled driver is ambushed and shot. And between these events is nothing but the waiting and the silence. . . .

Evidently the driver of the sled never heard the command to halt. The wind off Greenland's Ice Cap was sharp, the flying snow crystals stung his face as the team of huskies trotted ahead of him; he pulled his parka hood tighter over his head against the cold. With two other members of the Greenland Sledge Patrol, he was hurrying back to Eskimonaes after an uneventful two weeks' reconnaissance to the north; there had been no sign of enemy installations along the coast. Nothing aroused his suspicions as he led the way over the shore ice toward the deserted trapper's cabin at Sandodden where they planned to spend the night.

The first shot, fired from the door of the cabin, struck his lead dog; the animal dropped in its traces, kicking once or twice convulsively. Before the driver realized what had hap-

pened, his second dog leapt into the air and doubled over, biting at a spreading red stain on its white fur. Instinctively he stooped to grab his rifle from the bottom of the sled; a bullet drilled him through the temple, and he fell face forward onto the snow.

That shot, by a Nazi trooper, marked our first fatal conflict with the enemy in Greenland; it was the initial contact with an armed German invasion-force anywhere in the Western Hemisphere. You did not know—the facts could not be revealed until now—that the Nazis had actually established a foothold on this side of the Atlantic. You did not know, all 1942, that their planes were flying within bombing distance of the shores of North America. Their U-boats, refueling in Greenland's silent fjords, were striking at will at our convoys to England and Murmansk. Their well-equipped weather station, on the island's undefended east coast, was in daily radio communication direct with Berlin.

Perhaps you did not even know there was a war in Greenland. It was a secret war, waged in semi-darkness north of the Arctic Circle, on a remote battlefield perpetually locked under ten thousand feet of solid ice. The weapons were not tommy-guns and tanks; the real heroes of this war were nameless enlisted men working in Air Force ground-crews at

The war in Greenland was not a big war. There were no major battles, no epic encounters. Mostly there was just cold and loneliness. The Arctic was an unscrupulous and relentless enemy

fifty below zero, or standing guard on Coast Guard cutters fighting through the pack-ice, or living all winter long in isolated weather stations along the Ice Cap, buried under eighteen feet of snow. Once each day they would tunnel to the surface to take their wind and temperature readings; the rest of the time there was nothing to do but wait.

But in Greenland we were not fighting to defeat a division, or capture a ridge. It was not a war for territory. It was a war for weather. . . .

There is an awesome quality in that quiet intense cold. You step outdoors and your rubber-lined trench coat freezes stiff as a board before you can shut the door. You feel your face wither in a matter of seconds, as though it had been seared by a flame. A white dot on your forehead foretells a week of agony; a deep breath will shrivel your lungs. A little snow sifting down carelessly inside your boot-tops may mean a couple of amputated toes, perhaps the loss of a foot. The danger dogs your every footstep, trailing unseen on silent pads, waiting for you to stumble and fall. You hear it in the dry squeak of snow under your heel, the rumble and boom of the shore ice, the occasional rifle-like explosion of a chunk of frozen cordwood.

Day after day the cold increased, the days grew shorter. At first my men put on every item of winter clothing that had been issued to them, bundling themselves in a half-dozen woolen shirts at a time. I did not interfere; I have found that the best way of dealing with a soldier is to let him experiment for himself. Presently they discovered that this extra clothing only served to cut off circulation, and by mid-winter they were all dressed alike: a pair of ankle-high felt shoes with felt soles, regular ski-trooper pants with knitted cuffs to keep out the wind, a single woolen G.I. shirt, a windproof gabardine jacket, and—most important of all items of Arctic clothing—one-piece union suits of long underwear. Two-piece underwear works apart on the trail or when you sleep, the shirt ends up around your neck and the pants sag around your knees, your exposed kidneys are icy cold. We discarded regular G.I. issue, and every man wore a suit of old-fashioned Balbriggans.

I issued only one other order about personal appearance: no beards. Shaving every day seemed an unnecessary ordeal in this Arctic wilderness, and one enlisted man suggested pointedly that somebody ought to tell Santa Claus; but thawing out a set of frozen whiskers can be more painful still.

Even the food tastes of the men seemed to change. They devoured with relish foods they had never dreamed of eating before: codfish liver, codfish roe, seal meat, reindeer, ptarmigan, Arctic hare. They learned to cook fish in the manner of the North, cutting it into chunks and boiling it in sea water.

All that year the possibility of enemy attack was never out of our minds. Since the outbreak of the war, long-range Nazi planes—Focke-Wulfs, JU 88s and Blohm and Voss 135s—had been patrolling Greenland's east coast; more than once they had flown directly over our base. So far no enemy installations had been discovered in Greenland; but we knew that on several previous occasions enemy operators, hiding on small sealing vessels, had been picked up offshore by cutters of the U.S. Coast Guard's valiant and little-known Greenland Patrol. As long ago as the spring of 1941, Lieutenant Commander McCluskey of the Coast Guard cutter *Northland*, on routine antisubmarine patrol, had halted a dubious-looking Danish ice-breaking vessel named the *Buskoe*, and learned from the crew that a group of alleged hunters—with guns and radio equipment—had been set ashore at a cabin several hundred miles to the south. Proceeding to the suspected site,

Commander McCluskey landed in a midnight blizzard, raided the shack and captured some twenty Nazi troopers in army uniforms who were asleep in their bunks: the men are interned in England at this writing. In July we were given further reason to suspect that the Germans had actually established themselves somewhere on Greenland's undefended east coast.

On the fifteenth of July a group of two B-17s and four P-38s were being ferried across Greenland en route to England. It was their second try in a week; an earlier attempt had nearly ended in disaster when they had run into bad weather over the Ice Cap, and for several hours had wandered lost in the fog, the smaller peashooters hugging the wings of the bigger bombers like a flock of frightened chicks as they dove and climbed again in search of a break in the stuff. The clouds dripped freezing moisture, the P-38s loaded with ice, the pilots bent back the throttles and sought to maintain formation: if they ever became separated in this fog, they knew, it would mean curtains. With their gas down to the last teacupful, they managed to land at my base, where they waited a week for the weather to clear.

Bad luck seemed to dog them, however; on their next attempt to fly the Cap they ran into a solid front between Greenland and Iceland, their heaters and pitot-tubes froze as they climbed to get above the clouds. At last they asked, in secret code, for a weather report on an auxiliary field in southern Greenland. The reply came—also in secret code—that this field was socked in solid, with visibility zero, but that another field to the north was open to receive them. As they headed north, the bad weather increased rather than diminished; again they asked for a weather report, and again the reply in secret code ordered them on.

They throttled back and reduced engine r.p.m. to conserve fuel, dropped their auxiliary tanks, held on grimly as long as they could; at last Lt. McManus in a P-38 called that he would have to set down. He dragged the Cap for several miles, decided that the surface was smooth enough to try a wheels-down landing, dropped both flaps and prepared to come in under power. For a moment all went well; then the nose wheel buckled, the ship over-ended at fifty miles an hour, there was an ominous puff of black smoke, and silence. Without hesitation the rest of his comrades in the flight set down their ships one by one, sliding on their bellies to safe stops, and floundered knee-deep across the soft white snow toward Mac's ship. The last peashooter made a pass over the wreckage, then pulled straight up from a 350-mile-per-hour dive and executed a triumphant slow roll: the signal to the rest that Mac was alive and only slightly hurt. You can't lick a peashooter pilot.

The eight ships—twenty-five men in all—had come down in perhaps the largest successful crash landing in history; save for the bitter sight of their broken planes, which they knew would never fly again, they were okay. Hurriedly they set to work making camp, divided their rations to last for fifteen days, detailed the gunners to melt snow for drinking water, sat down to their first meal in twenty hours. The radiomen meantime set up aeries suspended from box kites and ran the engines to recharge the batteries; that evening they got through a report to the auxiliary field giving their positions which the navigators had checked accurately by sun shots.

That night the storm closed in and they knew the rescue planes might be delayed for days. With great ingenuity they made themselves comfortable and settled down to wait. They devised a cooking stove for each B-17, using a large oxygen bottle and an engine exhaust stack, with supercharger oil for



WAR below zero

fuel and a parachute strap for a wick. Walls of snow hung with tarpaulins made a cozy kitchen. For recreation they practiced target shooting with their 45's, destroying the bomb-sights and other secret paraphernalia on the wrecked planes. They even set up a battery-operated radio-beam receiving set, and got music from Reykjavik in Iceland; they all staged an old-fashioned square dance on the wing of the B-17. The pilot of the first rescue plane, circling overhead as the storm broke three days later, remarked enviously that he was tempted to land himself and join the happy party.

With the end of bad weather, the rescue ships made up for lost time, swarming above the wreck in an aerial circus; two transports, two Army B-24s, a Navy Catalina. They dropped food, medical supplies, even a quart of Scotch whiskey wrapped in a sleeping bag, to ward off colds. Unfortunately the cork came out of the bottle on the way down; there was a mad scramble to see who would be the one to use the bag that night. The Catalina sent added word that Navy Lt. Crockett, who had been with Byrd at the South Pole, was starting toward them with a dog team. Eight days after their crash-landing, the entire party was successfully evacuated to a near-by base, and returned to the States.

Later we checked our own weather records with the orders the pilots had received in secret code. The reports concerning the two auxiliary fields had been deliberately reversed. The flight had been lured on to disaster by false information, sent either from an enemy submarine or from a secret German radio station located somewhere on Greenland's eastern coast.

The Arctic is an unscrupulous enemy. It fights with any weapon that comes to hand; and of all its secret weapons the most treacherous is the haze. Then the sky and the white ice and the snow blend together into a universal brilliance; there are no horizons, and in that strange milky whiteness your sense of balance is lost: if you straighten too suddenly you will stagger and topple backwards because you cannot tell when you are standing upright. A pilot flying contact with perfect visibility cannot estimate his distance from the ground; he may try to make a landing when he is fifty feet in the air, or—more fatal still—he may fail to judge his elevation correctly, and dive his plane at full speed into the ice.

It was this dreaded haze that caused the disaster to the Flying Fortress piloted by Lt. A. L. Monteverde of Anaheim, California, and precipitated one of the longest and most grueling rescue-operations in the history of the North: a saga of sacrifice and suffering and endurance during six heart-breaking months on the Greenland Ice Cap. Mind you, none of the men involved in this rescue were hardened Polar explorers: they were ordinary everyday American youngsters who had never seen the Arctic before; a few short months ago they had been students or soda jerkers or bank tellers in little towns in Pennsylvania or Texas; they were the kid next door. But they were made of the stuff of heroes. . . .

On November 5th, we received a radio from a C-53 transport that it was down on the Ice Cap at 9200 feet. They had developed engine trouble on the way from Iceland to Greenland, but had landed successfully; they gave their position at 61° north, 42° 30' west. When we laid this position out on the map, it didn't jibe; the longitude they gave would have placed them out in the ocean. On November 8th we managed to rouse them again, and once more they reported the same position, but now gave their elevation as 2000 feet. Their radio batteries were getting weaker from the cold, and we

lost contact. Whether their charts were wrong, or whether they had landed on a fragment of shore ice and drifted out to sea, we do not know to this day. We never heard from them again.

Some forty planes from the various Greenland bases participated in the vast but futile search that followed. The weather was closing in, icing conditions were increasing, the fierce ground-haze made flying more and more difficult. On the evening of November 9th, one of the searching planes in turn was reported down somewhere on the Ice Cap. It was Monteverde's Fortress.

The Arctic had struck with staggering suddenness. One moment Monteverde had been flying low beneath the overcast, scanning the ground for signs of the missing transport; the next moment he felt the ship jolt violently, as though a supercharger had blown up, and it seemed to halt in mid-air. The left wing tip scraped the ice as it banked; the force of the blow righted the ship in the nick of time. It slid two hundred yards on its belly and came to a grinding stop, its flying days ended forever.

For an instant Monteverde sat stunned. A dry snow was driving against the metal sides of the plane with a steady seething sound: the thought flashed through his dazed mind that the ship was on fire, and he dove out through the window of the pilot's compartment. A member of the crew, Sergeant Spina, was lying on the ground near the crumpled propellers, both bones broken in his wrist; there was blood on the snow. Another crew member, Best, had been hurled through the plexiglas nose by the force of the landing, and his face was badly slashed. All the others in the plane were bruised and scratched.

Hurriedly Monteverde and his navigator, Lt. O'Hara, carried the injured man back into the rear half of the broken fuselage. In his haste O'Hara got some snow down inside his boots, but he did not stop to remove it—an oversight for which he was to pay dearly later. The rest of the crew salvaged what rations and blankets they could find scattered in the snow, and made a rapid survey of their position. It was not a reassuring one. There was a deep fissure just ahead of the plane, another one under its tail; the wreck rested on the very edge of the dark crevasse. Their radio was smashed, they had no light and no stove, everyone in the crew had frostbitten fingers or toes. No rescue-party could find them as long as the driving snow and winds continued. They rigged a tarpaulin over the break in the fuselage, and for three days they shivered in utter misery, waiting for the weather to break.

The end of the storm only made the hopelessness of their position more apparent. They were completely encircled by deep crevasses; no plane could possibly land near them, it was doubtful whether anyone could reach them on foot. In desperation O'Hara and Lt. Spencer, the co-pilot, elected to strike out across the ice in hopes of reaching the coast. They had gone only a little distance from the plane; O'Hara, in the lead, heard Spencer murmur: "I don't think this snow is any too—" The sentence ended abruptly. He turned: there was only a gaping hole where Spencer had stood.

Cautiously O'Hara crept on hands and knees over the sagging crust to the edge of the hole. For a moment he could see only the eerie blackness; gradually his eyes adjusted themselves and he could make out the sheer sides of blue-green ice. Some hundred feet down, a loose chunk of ice was wedged across the narrow throat of the slit. Miraculously this block had broken Spencer's fall. The co-pilot lay on his stomach on this teetering perch, staring down into oblivion, not even daring to breathe.

Somehow O'Hara found his voice and shouted for help. The crew from the wrecked plane came running. Swiftly they made a rope of parachute shroud-lines, lowered it to Spencer, and very slowly—for the chunk of ice slipped threateningly every time he moved—he got a loop around his waist. Inch by

inch they hauled him upward, in a desperate tug-of-war with death, until he was within a few feet of the surface. The projecting rim of the hole presented a new hazard; but someone found a jungle bolo-knife attached to one of the parachutes; they lowered it to the dangling flier, and he chopped and hacked at the jagged crust until he had enlarged the opening. Struggling, clawing, stabbing with his knife blade at the ice above him, Spencer wormed out of the crevasse and onto solid ground again. Thereafter they made no more attempts to explore the Ice Cap.

When they returned to the plane, O'Hara mentioned for the first time that his legs had lost all feeling. A hasty examination confirmed his worst fears: both feet were frozen. Monteverde unbuttoned his shirt, and pressed the hard icy stumps against the warm flesh of his body, rubbing them and trying in vain to restore the circulation. O'Hara sat in silence; he knew only too well what any delay would mean. Every hour was precious now.

Since the crash the crew had been working ceaselessly to repair the wrecked radio. The machine was full of ice, but Corporal Howarth thawed it out with the signalling light, and at last he managed to send out their approximate position. The receiver was not working; there was no way of telling whether their message had been picked up. There was nothing to do but sit inside the plane and wait.

That night, as they huddled in the darkness, they heard the ominous sound of rivets popping. The ice was shifting. Bit by bit the rear half of the broken fuselage was slipping backward into the crevasse.

For two weeks our planes had been searching ceaselessly for the lost B-17, taking off before daylight and often coming in long after dark. The area over the Ice Cap was constantly turbulent: gales reached a velocity of 175 miles an hour, and the blowing snow and haze made visibility difficult. Downdrafts were so violent that an airplane would be thrown out of control without warning: one medium-bomber dropped from 2500 to 500 feet in a split second, its 650-pound depth-charges were torn out of their shackles and plunged through the bomb-bay doors, and both engines quit. In the nick of time, another draft caught the ship and hurled it up again to 1500 feet, and the pilot managed to start one engine and then the other.

On the 24th of November we located the wrecked Fortress in a badly crevassed and inaccessible area in southeast Greenland, some 40 miles from Comanche Bay. We circled it and dropped supplies, including sleeping bags, stoves, medicine, and clothing; but the high winds on the ground caught the parachutes as they fell, and before the stranded men could reach them, they sailed tantalizingly out of reach and disappeared into the deep crevasses. Only the supplies which we dropped free-fall were rescued; coffee and sugar were broken open and jumbled together, and the men had to separate the contents by sifting them through bits of mosquito-netting found in their jungle kits.

We instructed them to stay put, and reported their position to the Coast Guard Cutter *Northland*, which proceeded to Comanche Bay at full speed. Meantime, from our auxiliary weather station at Comanche, Lt. Max Demarest and S/Sgt. Tetley started out with a couple of motor sleds and two dog teams, in an attempt to evacuate the Fortress crew overland. Sgt. Tetley was from San Antonio, Texas, and had never seen the Arctic until the previous August; he and Demarest were the first men ever to travel on the Ice Cap in winter. Their progress was necessarily slow; they had to zigzag around the impassable crevasses, Lt. Demarest skiing ahead to test the ground, Sgt. Tetley bringing up one sled at a time and then skiing back to fetch the other.

As the sled drivers were drawing nearer, the *Northland* reached Comanche Bay, and a Grumman Amphibian J2F4

(Continued on page 62)



GI's skiing near Ikatequ, Greenland. Balchen encouraged men to ski to keep their minds active during long winter nights.



War in the Arctic is damp and isolated. Huts like these are a strange thing to call home, but they're a place to get dry.



In the Arctic you learn to wait. The crew of this wrecked plane did their "sweating" in an igloo under plane's wing.

Man-Made EARTHQUAKES

Project Ruby was a noisy, dirty and dangerous show, but it proved that the TNT bomb still has a place in modern war

BY ROGER BYE

MOST of the world was looking the other way. Bombing, in the usual sense, was old; now, only the terrible fury of the unleashed atom rated the headlines and the wonder of warsick people. The microphones and the reporters' pads were at Bikini Lagoon, where twice the atomic bomb was detonated in history's biggest scientific study—Operation Crossroads.

But while the world looked over the physicists' shoulders in the Pacific, the same big Boeing B-29s were in the middle of similar tests in Europe. There, the war's biggest airplane, carrying the war's biggest bomb, was trying to crack the war's toughest defense. This was Project Ruby—bombs versus concrete—the testing of an idea born in the blitz and five years old before peace and science could carry it out. It was a noisy, dirty, dangerous, tiring show, a projected piece of the offense-defense tactics that began when the crossbow's arrows were pitted against armor. And no one seemed to know.

Experts who studied the last frantic efforts of the Germans to offset the destruction of American and British air power agreed on one thing. The Nazis, burrowing like rats into the ground, came near to making much of their oil, aircraft and allied war industry invulnerable to air attack.

Typical of these subterranean structures is the fifty-million-dollar submarine assembly plant at Farge, in the American zone near Bremen. Another, somewhat less massive, is on the island of Heligoland, in the North Sea. Built by prison labor and reinforced all through the war, the Farge structure's walls of steel and concrete are fourteen feet thick; the roofs, fifteen to twenty-three feet. The Farge plant, hit twice by the Royal Air Forces' biggest bombs during the war, showed two minor holes in the roof as the only damage. For all practical purposes, said the Army, the two pens were indestructible in wartime. These were Ruby's targets.

The bombs were an old idea, but as yet, hardly tried. The theory was penetration, rather than blast, and English

scientists had begun active work on them as far back as 1941. If a bomb could be made to penetrate to such a depth that the explosion caused a spherical cavity in the earth, the experts reasoned, then energy would be dissipated more in the form of a pressure wave, running through the earth and producing earthquake characteristics. The small weight of the thousand-pounder, then their biggest bomb with penetrating characteristics, prevented this from being achieved. A ten-ton bomb, dropped from 40,000 feet, was visualized as being capable of delivering the desired pressure effect. In 1941 no plane could carry that weight to that height. The Nazis went safely underground.

In early 1945 the required aircraft were on hand and bombs weighing 22,000 pounds were dropped on the Bielefeld Viaduct, a massive structure carrying an important strategic railway. In two attacks, near misses by these bombs did more damage than hundreds of tons of smaller bombs which made direct hits. War's end stopped tests then, but by the spring of '46 newer bombs had been developed, and the Air Forces of England and America decided on further experiments.

Still to undergo thorough tests were the 12,000-pound "tall boy" of 1943, and the first 22,000-pounder, the "grand slam." On the later-model list were the Army Ordnance Department's big "amazon," a new deep-penetration type bomb weighing 11 tons; and the British-developed *disney*, a rocket-assisted, armor-piercing projectile of 4500 pounds. Because they were testing penetration primarily, and because the pens had to stand up under a long series of bombings, little or no explosive was used. These bombs were just cases and filler—airborne piledrivers. They were Ruby's "arrows."

Seven Boeing B-17 Flying Fortresses, as familiar to the British as to the Americans, were picked to pack the "disney" and lesser-weight armor-piercing bombs. Three Boeing B-29 Superfortresses were called to Europe for the big ones. On the British side, another famous plane—the Lancaster—was added



for the R.A.F. airmen in the joint tests, with both British and American ships carrying the big bombs. They made up an all—"name" cast—and, together, formed Ruby's giant "cross-bow."

Behind the weapons were 160 officers and enlisted men, who formed the project complement at the Marham R.A.F. station. Two civilian experts—an ordnance technician and an aircraft specialist—were added to the project as counsels. The aircraft expert was Boeing Service Engineer Fred Baker, who in wartime had helped keep B-29s flying as a technical representative in the Pacific Theater. His job in Project Ruby was simply described: see that the planes carry the bombs, release them and return safely.

But as the project went on through its five-month run, the job itself was far from simple. While a B-29 can easily carry eleven tons, the 22,000-pound projectile was not designed to fit in a B-29. Fully half of the *Grand Slam* was outside the plane when in position for flight. The rear bomb bay doors were cut away; new devices to secure the bomb were installed; a new releasing mechanism was worked out. *Disneys*, too, were carried externally, creating more modification jobs.

But the bombers flew no matter what the size or shape of their load. Out from Marham several times a week streamed Ruby's aircraft. Above the pretty English countryside, across the Channel, and over the target . . . five months of hits, near hits, misses, and occasionally, mishaps. Data was collected continuously. Bombardment and ordnance experts inspected the pens immediately after the bombings, each result—good or bad—was thoroughly analyzed. Various combinations of height, fusing and filling were tried and retried. New test items were introduced by both countries.

They were a busy five months. The B-17s flew 57 sorties over Heligoland, dropping more than 225 tons of bombs. In 37 sorties over Farge, the Forts dropped 116.5 tons. The B-29s had an even more impressive record. The sub pens at Fargo were hit with 281.9 tons of bombs in 27 sorties. The ten bombers ran up a grand total of 524 flying hours.

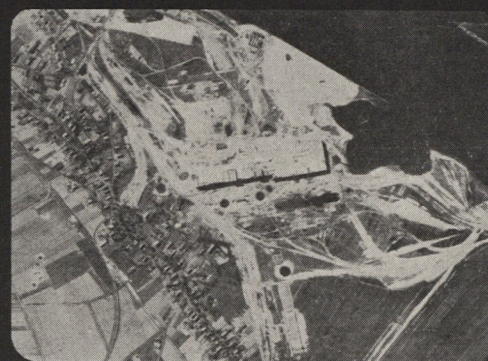
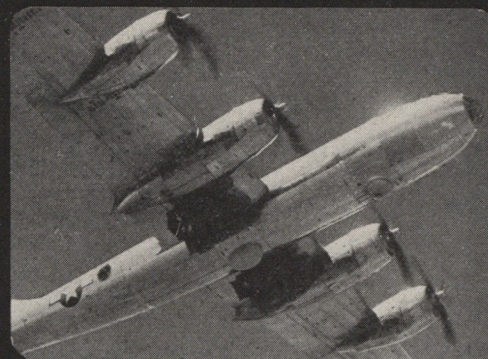
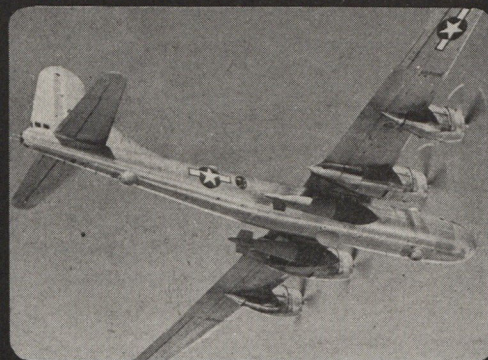
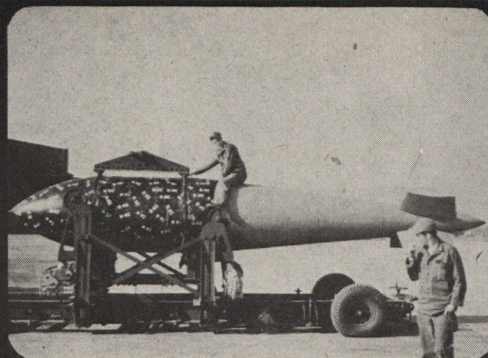
From the dust of the crumbling concrete below came the answers that had waited five years. Most of them will probably never be announced. Some are already shrouded by Army Security; others are still in the laboratories and on the drawing boards of the ordnance men. But some were plainly visible.

"There were bombs that actually bounced from the concrete roof, and were found bent and twisted out of shape," said Baker. "There were bombs that hit and shattered like eggshells from the impact. There were bombs that made only pockmarks on the roof surface after direct hits.

"But there were also bombs that smashed through the heavy, arched concrete; and bombs that went through even into the floor, creating great holes in the lower level. The heavy bars of steel reinforcing were tangled like giant spider webs, the broken ends draped loosely from the ceiling. Huge hunks of concrete were scattered all around."

The man-made earthquake had neared reality.

Lt Col D. G. Hawes (center at extreme left), Commanding Officer of Project Ruby, greets Group Captain Simpson, Air Commodore Spencer, Air Vice Marshal Bottomly and Group Captain Patmore, as they inspect B-29 used in project. Boeing Service Engineer, Fred Baker and an army officer (left) chat atop one of the 22,000-lb. "Grand Slam" bombs used during tests. Top to bottom at right: Special dollies transported Grand Slams to planes. Bombs were not filled with explosives but were merely used to test penetration effects of such super-weight missiles. Special external bomb racks were built for the Grand Slams. Originally designed for Jap targets, the unique racks were not used in the Pacific war. Smaller 4,000-lb. bombs were also used in Project Ruby. Like the Grand Slams, they were carried externally. Targets for the experiments were the massive reinforced concrete assembly pens on the Weser River at Farge, Germany. The craters left by Grand Slams are plainly visible. The last picture indicates the bomb's penetrating power. Without an explosive charge it went smoothly through 20 feet of concrete.



CROSS-COUNTRY

Happy Cabbage

For almost a month and a half now, the Army Finance Office has been mailing bonds in settlement of Armed Forces Leave Act claims. The mailing was delayed a number of weeks to begin with because a New York manufacturer couldn't turn out envelopes as fast as they were needed. It took twelve million of them.

But in addition to envelope trouble, Major General W. H. Kasten, Chief of Finance, announces that there are several other things which are making his task more bulky than it should be. First of all, like *AIR FORCE* magazine, the General is having trouble with veterans changing their addresses without letting him know. The thing that makes it really tough is that postal regulations for mailing federal checks and bonds makes it impossible to forward mail improperly addressed. It has to go back to the sender, in this case General Kasten, where it stays until the addressee announces his whereabouts. "When a check is returned as non-

deliverable at the original address," General Kasten says, "we have no choice but to hold it until the applicant notifies us of his change of address, at which time we will mail it out again to the new location. Because of the volume of work, we are unable to conduct correspondence with individuals to ascertain their correct addresses, but must leave to the individual the responsibility of keeping us informed of his whereabouts."

The other matter which is making the day stretch long for the General and his staff is the ex-GI's practice of sending in original discharge certificates as supporting evidence for claims instead of photostats. Naturally it takes quite a little while to process claims, and in the meantime many vets run into an urgent need for their records to sew up a business deal. If the originals are in the hands of the Finance Office, the resultant confusion can be of considerable proportions. So General Kasten urges all veterans who still haven't submitted claims to send photostats. It's worth the nominal investment.

No Inflation Here

In the midst of soaring prices, the War Assets Administration has announced a drop in the cost of surplus Vultee BT-13s from \$450 to \$250. Henceforth the planes will be sold "as is, where is." No discount will be allowed, and no priority will be necessary.

As of November 7, there were 2,286 BTs in stock, located at WAA Sales-Storage Depots throughout the southern and western United States. Depots having the largest numbers of the planes are Augusta, Ga., Clinton, Okla., Fort Worth, Texas, Jackson, Tenn., Oklahoma City, Okla., Ontario, Calif., and Vernon, Texas.

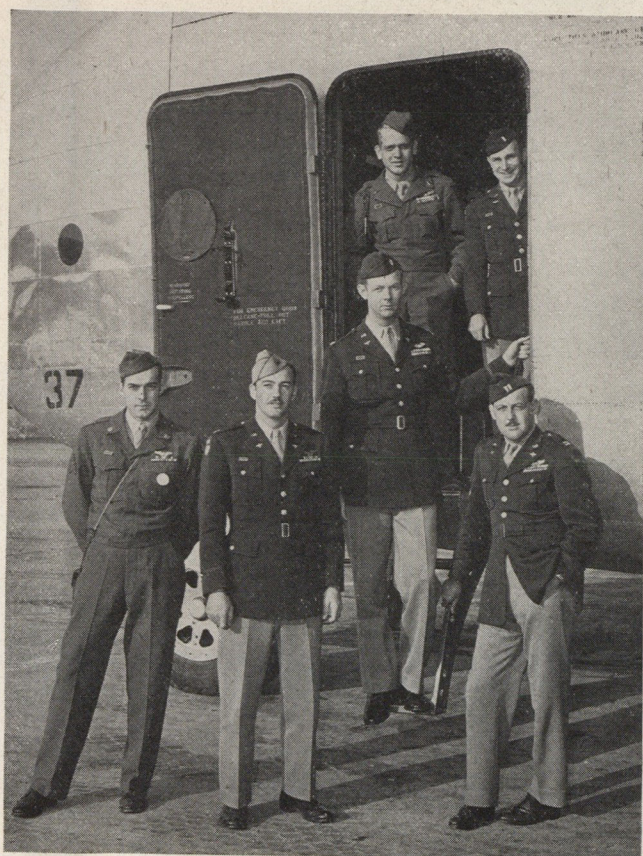
Misplaced Pole

The Royal Air Force Lancaster "Aries," which flew over the Northern Magnetic Pole last year, arrived in Washington recently with a rather startling disclosure. The cartographers who have been drawing maps of the polar regions for many years had misplaced the North Magnetic Pole by about a hundred and fifty or two hundred miles, the crew announced. They said they had made their discovery using the latest electronic and astro navigational equipment. But their announcement, made to AAF officials, fell on unimpressed ears. The Air Forces, the General said, had made the same discovery when the Boeing Pacusan Dreamboat made its record-breaking flight from Hawaii to Cairo in October of last year.

New Rating for Vets

The rating of airline transport pilot has been added to the list of Civil Aeronautics Administration ratings for which veterans may take flight courses under the G.I. Bill, the Veterans Administration has disclosed.

Flight courses under this law previously were limited by



First C-82 to visit Europe returns to Fairchild plant with its crew: Sgt. P. H. Moriarty, Capt. A. T. Ward, Lt. Col. W. F. Mandt, Pfc. R. T. Schwartz, 1st Lt. L. M. Shurgot and Capt. J. A. Robards.

VA to those leading to CAA's private pilot, commercial pilot, flight instructor, instrument rating and multi-engine rating.

Addition of the airline transport pilot rating will open up advanced instrument and radio courses not offered before under the G.I. Bill, VA said.

Most of the other requirements for the new rating already have been included in other flight courses available to veterans.

Veterans will be permitted to enroll in the new course only if they have had enough flight training to actually qualify for the airline transport pilot rating after they have successfully completed the course. VA does not pay for flight training unless it leads directly to a CAA rating.

Like all flight training under the G.I. Bill, the airline transport pilot course must be handled by contract between VA and flight training schools. Because this is less than a 30-week course, VA can pay only up to \$500 of the tuition and supply cost, and the veteran must pay the rest.

VA pays a subsistence allowance if the veteran is eligible. For purposes of the allowance, an hour of flying time is counted as two hours.

Jets Get "Combat" Test

The first extensive testing of jet-propelled fighter aircraft under combat conditions was completed in the recent joint amphibious training exercises in Southern California when Army Air Forces Lockheed P-80 Shooting Stars and their photographic prototype, FP-80s, were used in large numbers during the training operations.

The group, under the command of Colonel Gilbert L. Meyers, was used in the "softening" of San Clemente Island prior to the assault by amphibious forces. After the ground forces took the island, the jet fighters flew patrols over the San Clemente Island waters adjacent to Oceanside, California. Later the group engaged in close-support operations, strafing the beachhead in front of advancing infantry.

When not supporting the ground forces, the jet fighters "went upstairs" to fly top fighter cover for bombing missions and aerial supply flights.

AAF observers expressed complete satisfaction with the jet fighter as first-line equipment for the postwar Air Force. Until jet aircraft replace all conventional types, the striking force of Shooting Stars will complement the latest models of North American P-51 Mustangs and Republic P-47 Thunderbolts still being flown by AAF pilots.

The increasing use and versatility of jet aircraft further emphasizes the role these new airplanes will play in the future. So long as the AAF does not have sufficient numbers of jet-propelled aircraft, development of conventional aircraft and power plants will continue as an insurance measure until full concentration can be given to jet and rocket-propelled aircraft.

Doing Something About the Weather

In these days when no bathroom shelf is considered properly littered without a half-dozen bottles of vitamin pills, aspirins, and other remedial pellets, it is interesting to note that now old Mother Nature herself has succumbed to the capsule craze.

The AAF and the General Electric Corporation have announced that they think they can control the old lady's disposition with dry ice pills—artificial weather control, they call it.

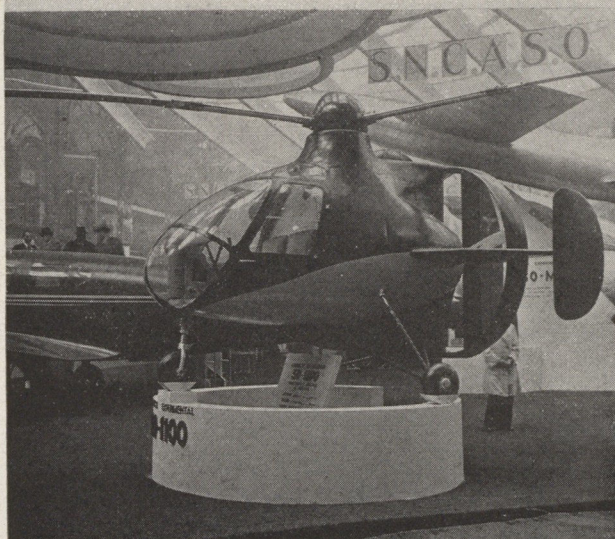
The scheme is this. When M. N. is in a grouchy mood, when she is hung over with all sorts of nimbus and cumulus clouds, a plane is dispatched with a kit full of dry ice pellets which are dropped from a considerable altitude into the clouds. This, the "medics" say, will cause precipitation in the form of snow. If the air is sufficiently warm beneath the cloud formation, the snow immediately melts and turns to rain, the skies are cleared and everybody is happy. It's as simple as that.



Rep. Henry Latham of Queens, N. Y. delivers the new Luscombe to the newly formed Congressional Pilots Assoc., made up of winged legislators. Inspecting members are Reps. E. H. Price and J. P. Priest.

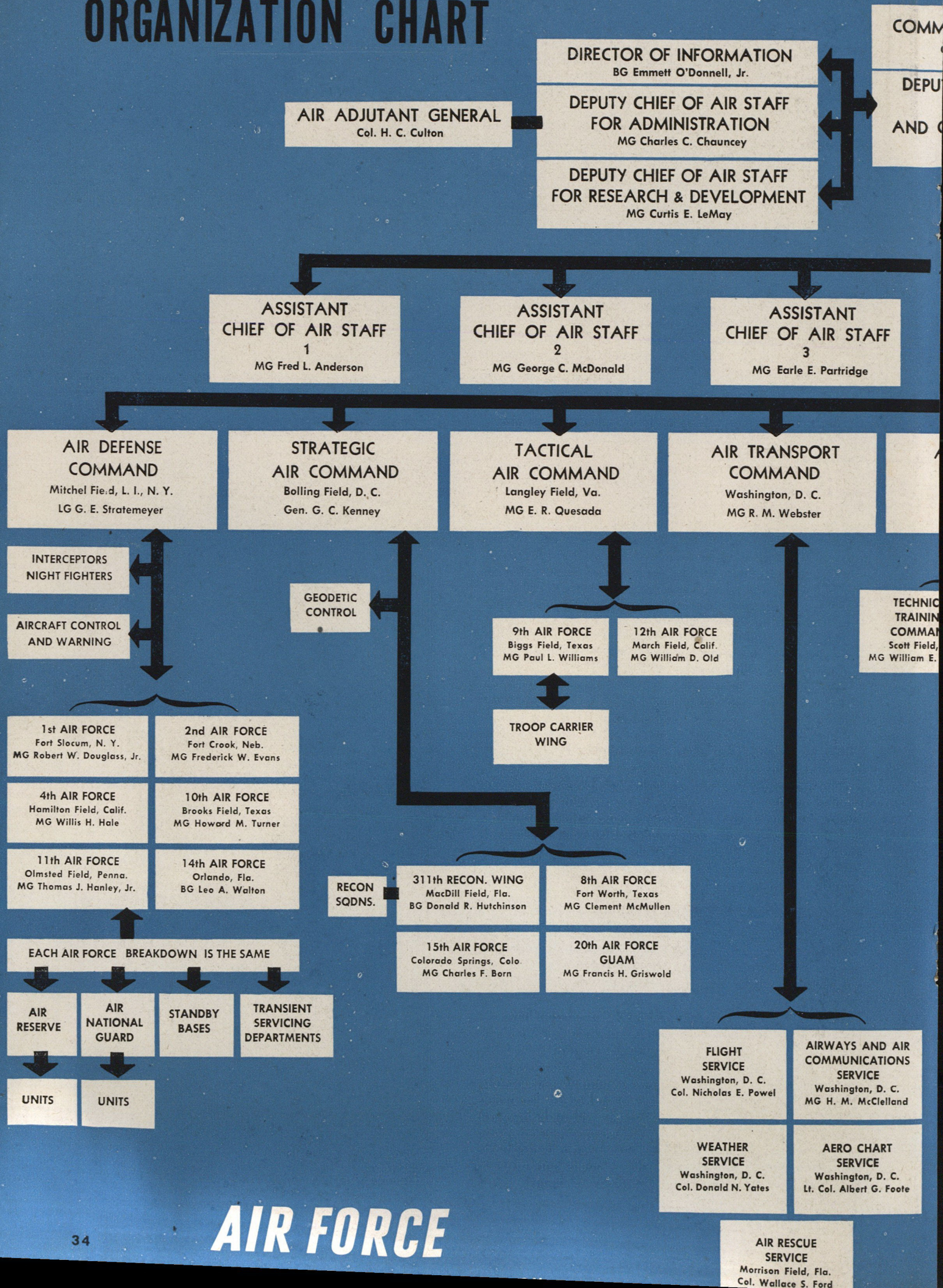


Actress Jane Russell christens a special Ercole which chair-ridden veterans of Birmingham General Hospital formed a club to fly. It is the first flying club in history made up of men who can't walk.



One of the features of the recent Paris air show was the SO-1100 helicopter which used jet power on the rotor blades for hovering and normal propeller power for forward flight and autogiration.

ORGANIZATION CHART



AIR FORCE

STANDING GENERAL
Gen. Carl A. Spaatz

**DEPUTY COMMANDING
GENERAL
CHIEF OF AIR STAFF**
LG Ira C. Eaker

ARMY AIR FORCES

[as of 20 Dec. 1946]

THE AIR BOARD
MG Hugh J. Knerr

AIR INSPECTOR
MG Junius W. Jones

FLYING SAFETY
Col. K. W. Schultz

AIR COMPTROLLER
BG E. W. Rawlings

SPECIAL CONSULTANTS

AIR STAFF

**ASSISTANT
CHIEF OF AIR STAFF**
4
MG Edward M. Powers

**ASSISTANT
CHIEF OF AIR STAFF**
5
MG Otto P. Weyland

**AIR TRAINING
COMMAND**
Barksdale Field, La.
LG J. K. Cannon

**AIR PROVING
GROUND COMMAND**
Orlando, Florida
BG C. A. Brandt

**AIR MATERIEL
COMMAND**
Wright Field, Ohio
LG N. F. Twining

AIR UNIVERSITY
Maxwell Field, Alabama
MG M. S. Fairchild

**AL
G
ND
III.
Kepner**

**FLYING
TRAINING
COMMAND**
Randolph Field, Texas
MG James P. Hodges

**ATLANTIC AIR
MATÉRIEL DISTRICT**
Newark, N. J.
BG C. C. Nutt

**803rd
SPECIALIZED DEPOT**
Park Ridge, Ill.
Col. P. L. Jacobs

**ROME
AIR MATÉRIEL AREA**
Rome, N. Y.
Col. B. G. Weir

**WARNER-ROBINS
AIR MATÉRIEL AREA**
Macon, Georgia
Col. R. V. Ignico

**OKLAHOMA CITY
AIR MATÉRIEL AREA**
Oklahoma City, Okla.
BG F. S. Borum

**PACIFIC AIR
MATÉRIEL DISTRICT**
Alameda, Calif.
Col. G. G. Lundberg

**AAF
TECHNICAL BASE**
Wright Field, Ohio
Col. J. T. Morris

**MIDDLETOWN
AIR MATÉRIEL AREA**
Middletown, Penna.
Col. D. R. Stinson

**MOBILE
AIR MATÉRIEL AREA**
Mobile, Alabama
BG C. E. Thomas

**SAN ANTONIO
AIR MATÉRIEL AREA**
San Antonio, Texas
BG G. H. Beverley

**OGDEN
AIR MATÉRIEL AREA**
Ogden, Utah
Col. R. G. Harris

**SPOKANE
AIR MATÉRIEL AREA**
Spokane, Wash.
Col. F. D. Hackett

**SACRAMENTO
AIR MATÉRIEL AREA**
Sacramento, Calif.
Col. A. W. Vanaman

**SAN BERNARDINO
AIR MATÉRIEL AREA**
San Bernardino, Calif.
BG H. S. Bartron

**AAF INSTITUTE OF
TECHNOLOGY**
Wright Field, Ohio
(No CG Appointment)

**AIR TACTICAL
SCHOOL**
Tyndall Field, Fla.
BG Joseph Smith

**AIR COMMAND &
STAFF SCHOOL**
Maxwell Field, Ala.
BG Earl W. Barnes

**AIR WAR
COLLEGE**
Maxwell Field, Ala.
MG Orvil A. Anderson

**SCHOOL OF AVIATION
MEDICINE**
Randolph Field, Texas
Col. Harry G. Armstrong

**SPECIAL STAFF
SCHOOL**
Craig Field, Ala.
Col. William B. Wright, Jr.



is for

FOTOPLANE

Successor to balloons and box kites, photoplanes pry into the enemy's secrets better than any Mata Hari

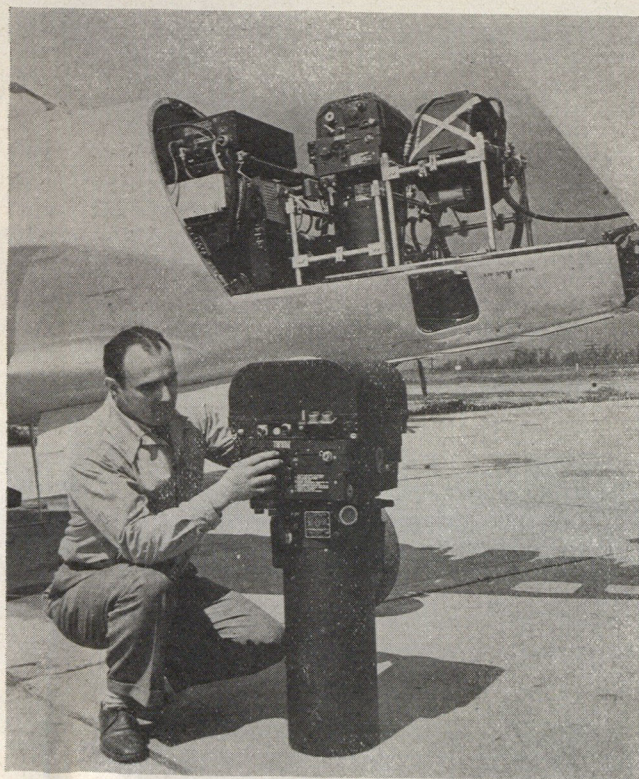
THE oldest military use for aircraft, as far as actual recorded history goes, was that of observation—finding out what the enemy was doing. At the Battle of Fleurus, on June 26, 1794, French forces under General Jourdan used a spherical balloon to observe the movements of the Austrian troops. The results were so important that balloon squadrons became more or less integral with the French military system. Napoleon used one in the early part of his campaign, but lack of interest on the Emperor's part caused the *Corps Aerostatique* to disintegrate considerably.

In the United States, balloons were used on both sides during the Civil War, with excellent military results despite the many setbacks that were encountered by such pioneer aeronauts as Lowe, La Mountain, and others. During the Spanish-American War, spherical balloons were employed with moderate success. Despite the development of some form of aerial photography, observations were man-made,

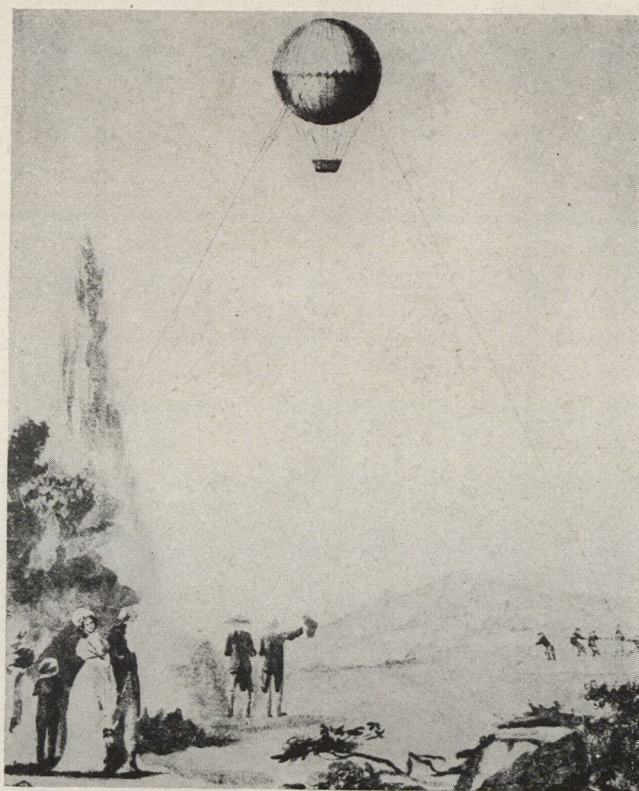
messages sent to the surface by either signal or telegraph.

The original military use for the heavier-than-air machine was reconnaissance. Aviation was the property of the Signal Corps when it first spread its feeble wings in 1908. It was in that year that the first official U.S. military aerial photograph was taken from an Army balloon. The photographer was a Sergeant Wood, who used a common folding camera of the period. Lacking filters and proper photographic knowledge, he achieved a photograph that was not too successful, although the first good aerial photo had been taken from a balloon in 1861, by the old wet-plate process.

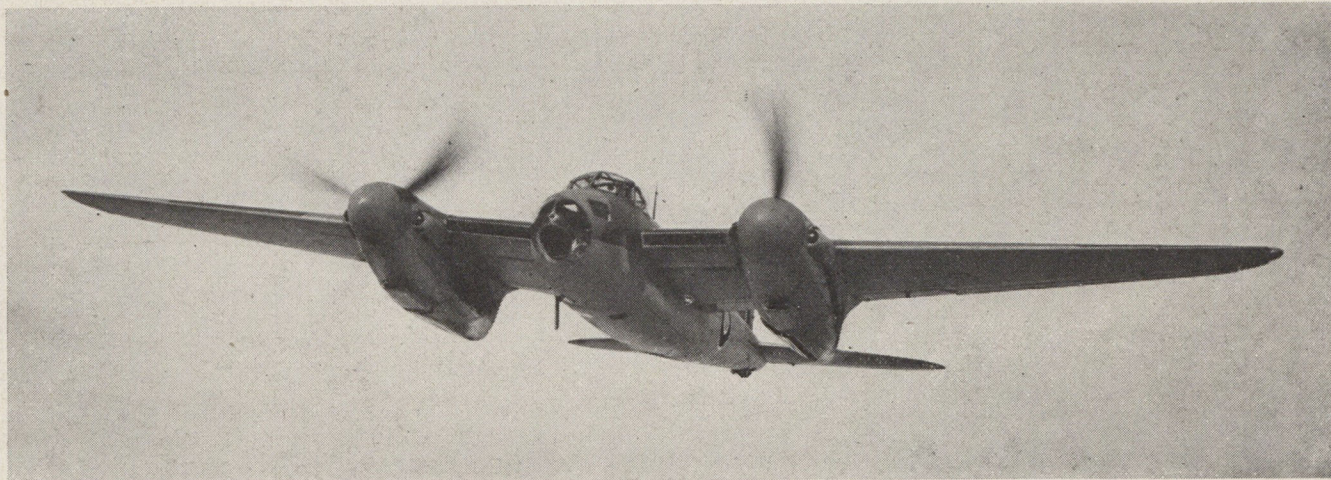
During World War I the airplane was used first only as a recon medium. As a matter of fact, airplanes often flew their photo missions without any armament. Although the fighter plane and the heavy bomber got most of the press-agentry, aviation's most valuable contribution in that war was in the field of intelligence. By 1916 the enemy High



Fastest of all photoplanes, Lockheed's Shooting Star converted to recon duty, carries three Fairchild cameras in place of its armament, as well as four-band automatic direction-finding equipment.



The first military use of aircraft was the reconnaissance done by Captain Coutelle of the French Army against the Austrians in 1794. This contemporary print shows him observing the siege of Mayence.



Only foreign design used by the AAF for photo-missions was the F-8 Canadian-built De Havilland Mosquito, powered by Packard-Rolls Royce Merlin engines.

Command even began withdrawing funds from its expensive espionage system because the aerial camera, used scientifically, furnished much accurate information.

By the end of World War I even the fussiest horse soldier, who regarded the bomber as a toy and the fighter plane as a joke, conceded the reconnaissance mission permanently to the airplane. During the period between wars the U.S. developed a whole line of observation planes based on the experience of World War I. They were usually slow, maneuverable two- (and later three-) place machines in which a skilled military observer flew over the terrain for on-the-spot observations. Occasionally he used a hand-held aerial camera, if he felt that what he saw merited permanent record. While the aircraft built satisfied certain conditions dictated by military theory of the time, they were likewise limited by the equipment of that period. There were two kinds of air maps: obliques, shot from hand-held cameras, and mosaic strip maps. Mapping was considered a long-range process, of secondary military value. Only one plane, the Fairchild F-1, was designated for this work. The top photographic job was done by the O-series, used not only by the AAF itself, but also by the National Guard system.

Immediately before World War II numbers of NG units were still flying O-46s and O-47s. Both the British and the Germans began the war with the old-fashioned theory of observation, the RAF flying the Westland Lysander and the

Germans the Fieseler Storch. Slotted and flapped, these could virtually stand still in the air. In line with this development, the U. S. produced the Stinson O-49, the Bellanca YO-50, the Ryan O-51, and the Curtiss O-52. All were built for short take-off, for the chemistry of war had begun to rob the O-plane of its photo mission. Its new job was liaison, and it was succeeded in the U. S. by hastily procured commercial light planes, which were succeeded by redesigned and modified types that carried the "L" for designation.

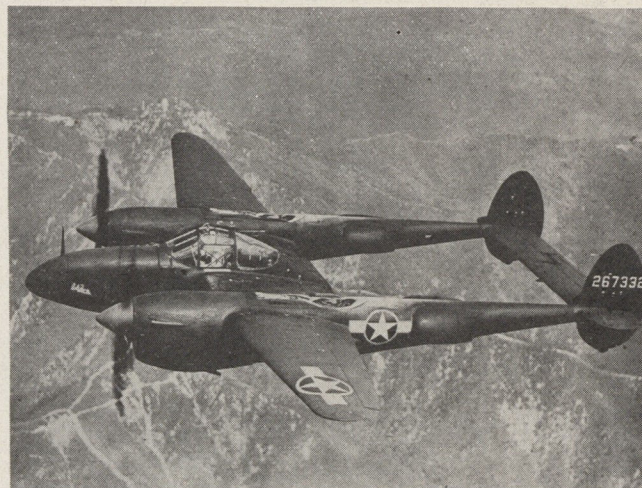
The U.S. entered the war with the F-2 as primary photographic plane. A military adaptation of the commercial Beech D-18 transport, it had been ordered in 1940 to serve the same purpose as the old single-engined Fairchild F-1. However, the British had learned that the old theory no longer worked. They were mounting cameras in Hurricanes and Kittyhawks, while Germany was mounting multi-directional cameras into Me-109s and Ju-88s.

Britain equipped Douglas Havocs with cameras, and the U.S. soon followed with adaptation of the A-20 as the F-3.

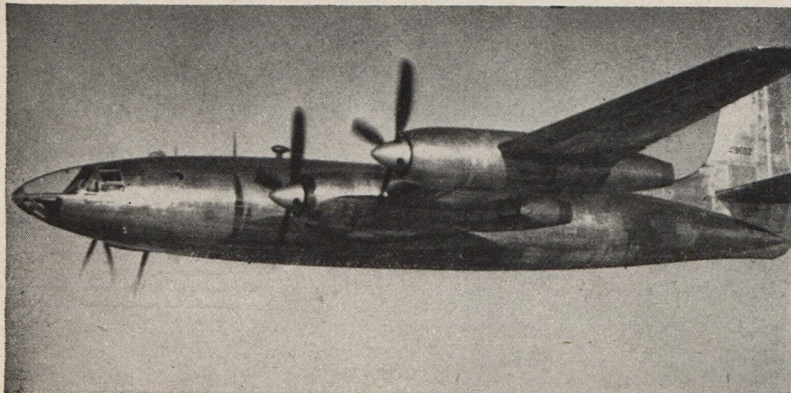
By 1942 the need for securing enemy information was urgent. Cameras, operating at high speeds, were developed and modern fighters were rebuilt for the sole purpose of photo reconnaissance. The F-4s were P-38Es and 'Fs rigged to carry four K-17 cameras. The F-5 series was later P-38s generally rigged to carry photographic equipment. The F-6 series was a photo version of the North American P-51.



Postwar plane procurement by the AAF included the F-15 Northrop Reporter, an alteration of the famed P-61 Black Widow. Changes were chiefly in the main nacelle, with guns and radar eliminated.



Established as a fighter, the P-38 was pressed into foto service early in the war. Production foto Lightnings, designated as F-5, served as camera bearers in both the European and Pacific Theaters.



Republic's F-12 was originally built for global photographic use, has been redesigned as the fastest aircraft in transport service.

For broad-scale survey work, camera-equipped bombers were used. The photo B-24, built in 1943 and 1944, carried as many as eleven cameras in strategic places. There were some setups with three in the nose and three in the bomb bay, and some handling six cameras amidship.

Various camera versions of the Boeing Flying Fortress were designated F-9, and a few B-25Ds were modified as camera trainers, F-10.

By mid-1944 it became obvious that, along with the fighter and bomber conversions, aircraft with greater range and speed would be necessary. The function of this kind of aircraft would be pre-operational reconnaissance on a long-distance basis. Two contracts were let. One was to Hughes Aircraft, for a giant twin-tail boomed two-place craft powered by 3000-hp Pratt and Whitney engines. It was in the prototype of this design, the F-11, that Hughes narrowly escaped death some months ago. The Republic Rainbow, currently the fastest transport in the world, started as the F-12, an ultra-long-range photog. Many of the best



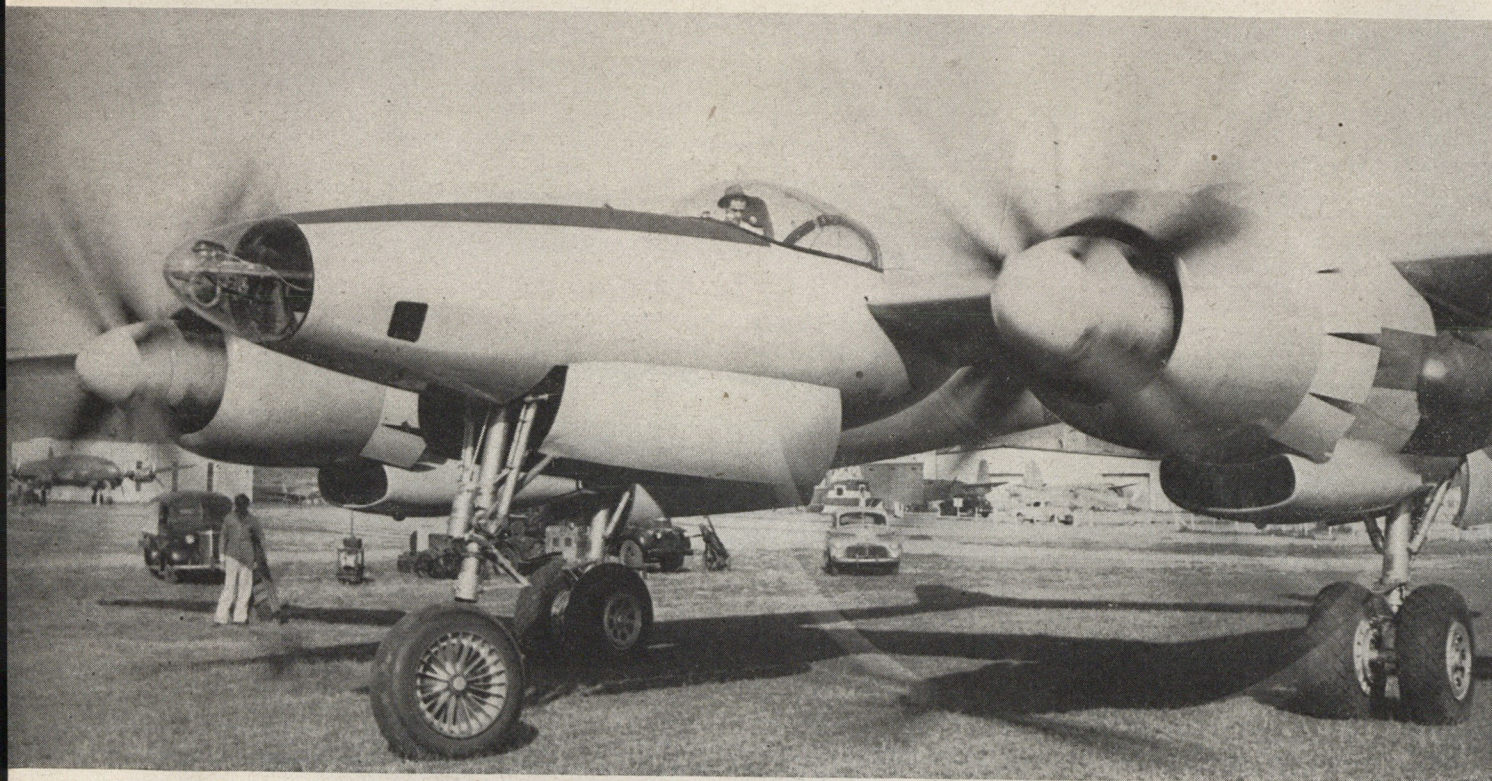
AAF's first photoplane was the F-1, a commercially built Wasp-engined Fairchild 71. It was used chiefly for making mosaic maps.

photos of Japan came from F-13s, modifications of the B-29.

Since the end of the war an early P-80 has been modified to carry a four-camera setup and labeled the F-14. Extensive modifications have also been made on the Northrop Black Widow, the recon version of which has a top speed of 440 mph. This F-15 is the last altered tactical airplane to be given a new designation. Hereafter, if a fighter or bomber is reregged for camera purposes, the "F" will merely be prefixed to its ordinary designation.

Future trends in military recon planes seem to be heading in two directions. One is the established pattern, that of putting cameras either into our best tactical aircraft or into special long-range stuff such as the Hughes special or the Rainbow design.

The second trend was made public recently when pictures taken from cameras set in a V-2 rocket were published. Future glass-eyed Mata Haris may ride out on their missions sans wings and sans photographer, taking general strategic photos from the ionosphere.



Most spectacular of the F series was Howard Hughes F-11 twin-engined twin-boom type, powered by 3000 hp P. & W. Wasp Major engines. Designed to cruise at over 400 mph at 40,000 feet, it spanned 101 feet. Plane cracked up during test, injuring the noted designer-test-pilot.



BY MAJ. GEN. LAWRENCE S. KUTER

U.S. Representative to PICAO Interim Council

ON the first day of August 1945, American transport airplanes made over 1,100 flights on the world's most hazardous and difficult air route, in a remote and isolated area, moving some 5,330 tons of air cargo from Northeastern India into China. That same month, after only 12 days' preparation 2,500 air crewmen, 1,000 ground maintenance men and 200 C-54 aircraft were assembled from all parts of the globe and were organized, equipped and ready to initiate sustained daily operations from a bare airdrome in Okinawa to move over 5,000 men per day all the way to Tokyo. But even while that was going on the eventual dissolution of our Air Transport Command's global network of airways became a matter of concern to the United States Government.

That vast American system and its RAF counterpart had focused the attention of the Allied Nations on the great possibilities and also on the great problems of mass civil air transport. It was becoming increasingly clear that air transportation was rapidly growing to adulthood.

It was apparent that the development of air transportation had to be accomplished in an orderly manner so as to assure that all nations would have a sound economic basis for airline operation. The history of rivalry for international air routes and air rights that had taken place prior to 1945 gave ample basis for believing that aviation was being projected into a political and economic battle. This state of affairs

would only hinder the development of international air transportation, increase the political friction and deny the peoples of the world the benefits of world travel that aviation made possible. In an effort to arrive at an international organization that would continue and accelerate the great advance towards uniformity in air navigation services, and that would help eliminate the strife inherent in competitive development of air transportation, an International Civil Aviation Conference was held at Chicago in late 1944. Fifty-two nations sent representatives to the meeting.

From this Conference at Chicago, the Provisional International Civil Aviation Organization was formed.

PICAO to Become ICAO

PICAO was created to aid the peaceful and orderly development of international air transportation so that aviation could become an instrument of international good will and meet the demands of the world's people for safe, regular, efficient and economic air travel. It came into being on a provisional basis for three years, on June 6, 1945 and 26 nations accepted the Interim Agreement. The organization will become permanent when 26 nations ratify the Chicago Convention on International Civil Aviation. By December, 1946, 14 nations had ratified the Convention. Fourteen additional nations have indicated the expectation that their ratifications will be de-

Forty-six of the world's leading states have joined forces under PICAO with the hope that a well-guided civil aviation program will "help to create and preserve friendship and understanding among all the peoples of the world"

posited by March 1, 1947. It is therefore anticipated that the Provisional International Civil Aviation Organization will drop the first word from its title and become the International Civil Aviation Organization by March 31, 1947, with its permanent seat located in Montreal, Canada.

The governing bodies of PICAO are the Interim Assembly, which meets annually, and the Interim Council, which is in continuous session during the greater part of the year. The Assembly is composed of delegates from Member States, each State represented being entitled to one vote and decisions being made by a simple majority of Member States present.

The Council is the executive body of the organization. It derives its powers and authority from the Assembly. It constitutes, in fact, an International parliament on civil aviation matters. It is composed of not more than 21 Member States, elected by the Assembly for a period of two years. The following States are now represented on the Council:

Australia	China	France	Netherlands
Belgium	Colombia	India	Norway
Brazil	Czechoslovakia	Iraq	Peru
Canada	Egypt	Ireland	Turkey
Chile	El Salvador	Mexico	United Kingdom
		United States	

Among the responsibilities assigned to the Council by the Interim Agreement was the establishment of agencies to handle technical matters, broad economic, legal and operational matters and the drafting of the structure and functions of the permanent organization. These agencies are respectively the Air Navigation Committee, the Air Transport Committee and the International Convention Committee.

Of these three permanent Committees, the Committees on Air Navigation and Air Transport are well advanced with their programs. The Committee on International Convention on Civil Aviation is scheduled to begin operation in January, 1947.

The Committee on Air Transport has the broad function of studying "any matters affecting the organization and operation of international air services."

The Committee on Air Navigation "studies, interprets and advises on standards and procedures with respect to communications systems and air navigation aids," and, in practice, all technical aspects; and "recommends the adoption of minimum requirements and standards." These Standards and Recommended Practices are achieving uniformity in international air operations.

Due to the amount of expert knowledge and detailed work that is involved in the drafting of Standards and Recommended Practices, the Air Navigation and the Air Transport Committees have been so organized that the initial work of drafting is assigned to various Divisions, which consist of the Aerodromes, Air Routes and Ground Aids, Rules of the Air and Air Traffic Control, Meteorology, Communications, Search and Rescue, Maps and Charts, Personnel Licensing, Investigation of Accidents, Operating Standards and Airworthiness and the Special Radio Technical Division.

The Air Transport Committee has, at present, one Division on Facilitation of Air Transport. This Division has prepared a report upon Customs, Procedures and Manifests, Public Health Regulations, Travel Documents, Facilities and Procedures for Monetary Exchange, and other related matters, with a view to removing and minimizing obstacles to air travel at international borders. The report was sent to the member states for their consideration.

Perhaps no activity of the Organization has received a more enthusiastic response from airline operators and individuals than its attempt to cut through the red tape that delays air traffic at international crossing points.

In addition to the permanent Committees and their Divisions, committees of Council Members have been set up to deal with Finance, Personnel, Publications, Credentials, Public Information and Aids and Financial Assistance, which in-



PICAO head is Dr. E. Warner, once Asst. Sec. of Navy. Maj. Gen. Kuter is the U.S. council member

cludes consideration of international support to international aids to navigation, air routes, airdromes, etc.

The Publications Committee advises on the printing of the Organization's publications, notably the organ of the Organization *PICAO Journal*, which is published monthly and printed in the three official languages of PICAO: English, French and Spanish. The names of the other committees adequately describe their functions.

Who Are The People

The membership of the Council and the organization includes a wealth of experience and talent in both civil and military aviation from many nations. Brief consideration of the personalities and interests represented in the Council of PICAO gives encouraging evidence that the advance equipment and techniques which the wartime airmen developed, are being introduced to the advantage of free and abundant global air travel.

The President of the Interim Council is an American, Dr. Edward Warner, who is an internationally known and respected aeronautical scientist, formerly U.S. Assistant Secretary of the Navy for Aeronautics and later Vice Chairman of U. S. Civil Aeronautics Board.

The Council has also elected from among its members three Vice Presidents: Dr. F. H. Copes van Hasselt of the Netherlands, Colonel C. Y. Liu of China and Dr. Guillermo E. Suarez of Colombia.

In addition to the permanently assigned members of the PICAO Council and Staff, there is an endless array of the world's best aviation talent constantly contributing technical "know how" and putting into the common pool the benefit of vast experience.

From the aviation components of the United States Army and Navy, the Coast Guard, Merchant Marine, Weather Bureau, Coast and Geodetic Survey, Civil Aeronautics Administration, Civil Aeronautics Board and many others come delegates to reach international solution to the knotty problems of their particular specialty. A glance at the lists of Division Meetings since the birth of the organization reveals that American air interests have been ably represented by the nation's finest talent. At the Chicago Conference; at meetings and conferences in Dublin, Paris, London and Cairo; at demonstrations in United States and United Kingdom and at the heavy schedules of meetings of the Divisions of the Air Navigation Committee at PICAO's Headquarters in Montreal, such names from the rosters of the AAF are found: Major General Muir S. Fairchild, Brigadier General Harold Harris, Colonel Sam Gates, Lt. Colonel J. Paul Barringer, Colonel J. K. DeArmond, Colonel J. H. Rothrock, Colonel C. P. Sandretto, Lt. Colonel John A. McCrary, Lt. Colonel A. S. Raudabaugh, Lt. Colonel John Sherman, Colonel Carl Swyter, Colonel Lawrence M. Thomas, Major General Robert W. Harper, Colonel Louis E. Hobbs, Brigadier General

Harold Huglin, Lt. Colonel C. P. Burton, Major H. Walker Percy and Colonel Raymond C. Maude.

Although there has been extensive AAF participation, it must be acknowledged that the RAF participates to a considerably more impressive extent. The United Kingdom delegations to the Division Technical meetings and to the Regional meetings have, in fact, been composed of a substantial number of RAF and former RAF personnel. Much of the finest talent of the U.K. in the field of electronics was evident at the meetings, many of the technical specialists having extensive impressive backgrounds of RAF service. For example, at the recent Radio Technical Division meetings in Montreal, Air Commodore G. P. Chamberlain, senior Signals Officer of the RAF Transport Command during the war, was deputy head of the U.K. delegation, assisting Sir Robert Watson-Watt, who was in the Air Ministry throughout the war and is still a technical adviser thereto. Air Vice Marshal Sir Victor Tait, whose wartime post was Director of Signals in the Air Ministry, was a member of the delegation. At meetings of the Search and Rescue Division, held in December 1946, the valuable experience of his service in the RAF was contributed by Squadron Leader N. V. Lindemere, who was Chairman of the Meeting and in its own Secretariat, the Organization can find war-trained and experienced personnel who once wore the uniform of the Royal Air Force.

What PICAQ Has Done

Since the activation of PICAQ in June 1945, when the Interim Agreement came into force, and the opening session of the Council in August 1945, much has been accomplished.

Four regional air navigation meetings have been concluded for the North Atlantic, European-Mediterranean, Caribbean and Middle East; and the South Pacific Regional Conference should be concluded in Australia in early February, 1947. Other meetings for South American, South Atlantic, Southeast Asia, North Pacific, African-Indian Ocean regions are scheduled for the coming year.

The Organization is also establishing permanent regional offices. One has been authorized for the North Atlantic, to be placed in Dublin, and another for the European-Mediterranean region is in operation in Paris. Additional regional offices, staffed by Organization secretariat, will be opened as

recommendations and decisions of the regional meetings are brought into effect. As a result of the regional meetings, extensive initial standardization and uniformity has resulted. PICAQ has undertaken the compilation of regional route manuals to provide aircraft commanders with data on procedures for international flights and with other material required by the captain of an aircraft flying on international routes in the region. A regional manual for the North Atlantic is now nearing completion.

Ocean Weather Ships

The regional meetings frequently find that certain air navigation facilities and services required for safe navigation within the region are lacking and that measures must be evolved to correct the deficiency. Typical of this is the recommendation of the North Atlantic Regional Meeting that a network of 13 Ocean Weather Observation Stations should be provided for the North Atlantic.

Under the aegis of PICAQ, a group of states interested in flying in the region met in London in September, 1946 to consider what measures could be agreed upon to provide a network of weather ships across the Atlantic, to augment or replace those that had provided indispensable meteorological information during the war. The result of the meeting was an agreement whereby nine states will cooperate in the maintenance of the vessels, which will be arranged in a pattern to provide accurate data and forecasts of weather conditions on all air routes throughout the region.

Other cases where international action is required in the joint operation of services and facilities are under consideration. Some, of course, will be located outside national territory, such as weather reporting stations in polar regions. It will be the Organization's responsibility to bring about some mutually satisfactory means of sharing in their establishment and maintenance. Some states, particularly those that have suffered most from war, are presently unable to build or maintain proper air navigation facilities and services. The Organization is empowered to consider appeals from these states for financial and technical assistance and now has under consideration such requests.

Another field of international cooperation which PICAQ

(Continued on page 58)

Delegates from Czechoslovakia, Colombia, and China sit at the PICAQ assembly table in Montreal to plan for the expansion of international commercial aviation on sound economic basis.





I l a m a of the air

BY STEPHEN WILLIAMS

Good airplane, but it's no substitute for a llama!" That was a South American's critique on one of the finest twin-engined, low-winged retractable landing-gear transports ever built. He had discovered that, for flying the Andes, for getting in and out of mountainside airfields, and for general bush flying, a 300-mph cruising speed is no great advantage if landing speeds rise in direct proportion. The back-country airplane must compete not with the truck, bus, and train but with the pack mule and the llama.

The original bush airfreight lines were opened with Ford and Junkers trimotors, with Fairchild 71s and with Bellanca Airbuses. Old Fokker F-10s that pioneered Pan American original routes are still in service with remote operators. These work horses are about worn out. Many of them, long overdue for replacement, were patched up and kept at work because the newer types, built for the highly refined intercity and intercontinent trade, were just no substitute for beasts of burden.

To fill this gap, several companies made trial designs. De Havilland of England built the Dragon Rapide for such a market before the war, but its 13-foot cabin lacked capacity. Bristol has presented its Freighter, which is currently leading the market. The U. S. entry in the field is the Northrop Pioneer, a high-wing trimotor, which strongly resembles the noble old Ford, but which puts to work the latest structural and aerodynamic improvements applicable to the peculiar tasks of backwoods operation.

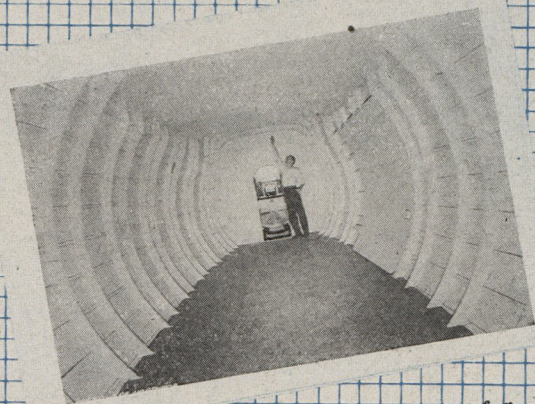
The Pioneer is designed as an all-metal cantilever high-wing monoplane, powered by a choice of two types of single-row radial air-cooled engines. The high-wing monoplane configuration was used because actual practice shows that, in the semi-developed and undeveloped landing fields of back-country stations, it is essential that the wing be high enough to overreach bushes and shrubs. The fixed landing gear was dictated by the fact that the average back-country flight is 38 minutes in length. Besides the trouble and expense involved in retraction, the pilot could just about get his landing gear up by the time he would have to lower it again.

In the face of a marked trend toward tricycle landing gear, the Pioneer retains the conventional arrangement. This system was chosen because, in rough fields, it is better to have the main weight-bearing sections ahead. The fuselage sits at a six-degree angle in landing position, an unusual feature for a design with a conventional gear, which makes loading quite easy.

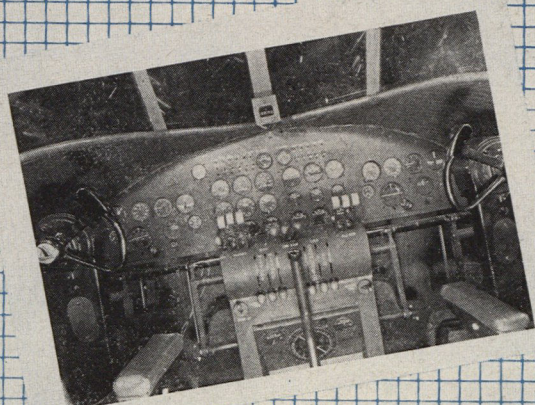
The Pioneer has a wingspan of 85 feet and an over-all length of 60 feet 7 inches. Standing height to the top of the tall single rudder is 17 feet 10 inches. The fixed landing gear tread is 21 feet 3 inches. It is powered by a choice of 800-hp Wright Cyclone or 600-hp Pratt & Whitney engines, which are interchangeable with minor modifications.

The fuselage is a long, well-rounded structure, incorporating several novel features. It is built watertight to allow hosing down without flooding the structure. The interior can thus be cleaned thoroughly after dusty materials, such

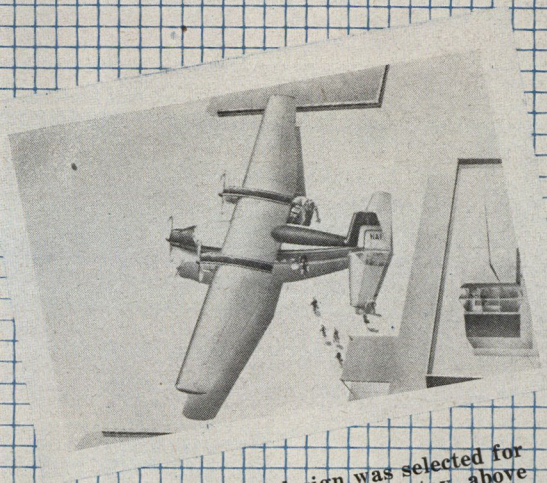
(Continued on page 65)



The Pioneer's cabin was designed for loading and for space. Note the large cargo doors and forward loading hatch.

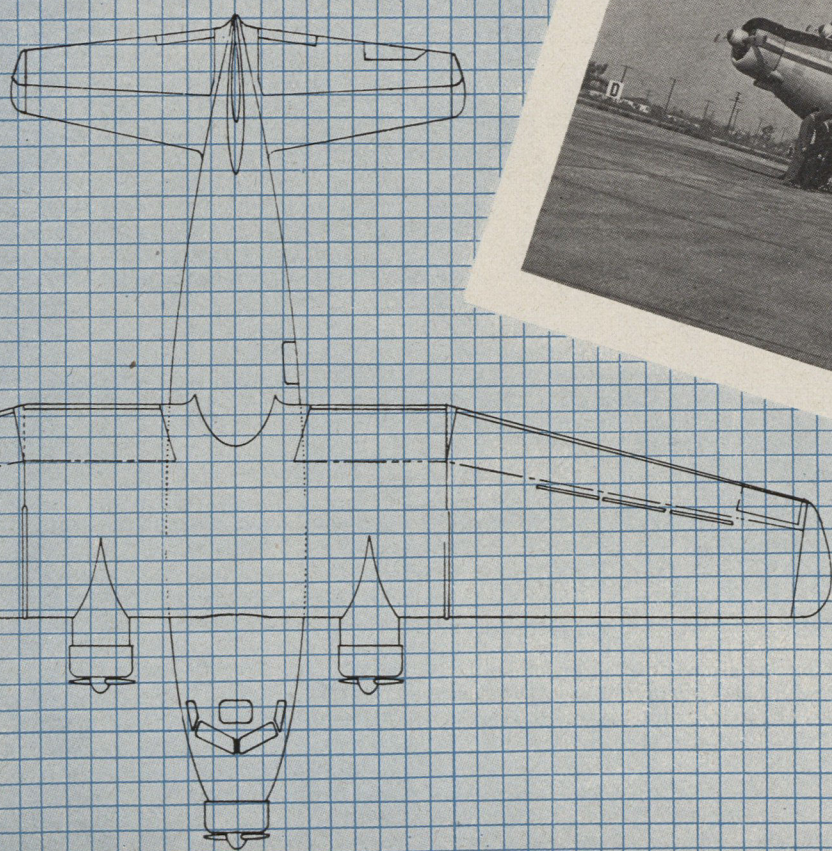
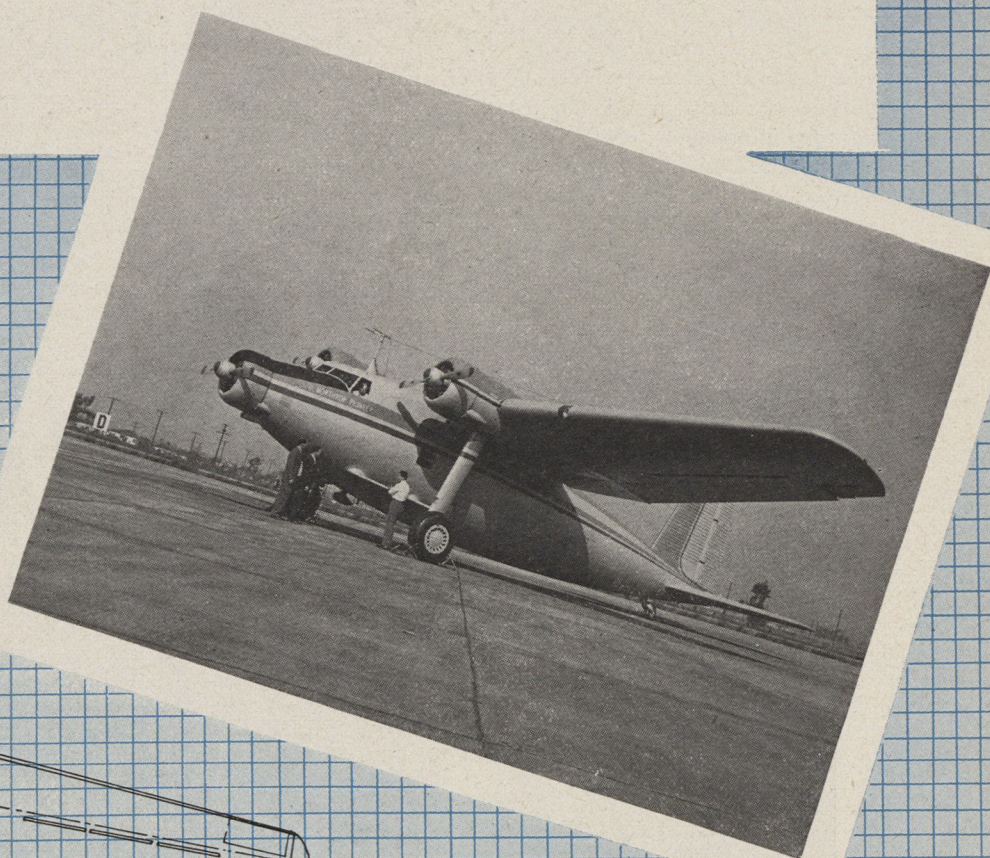
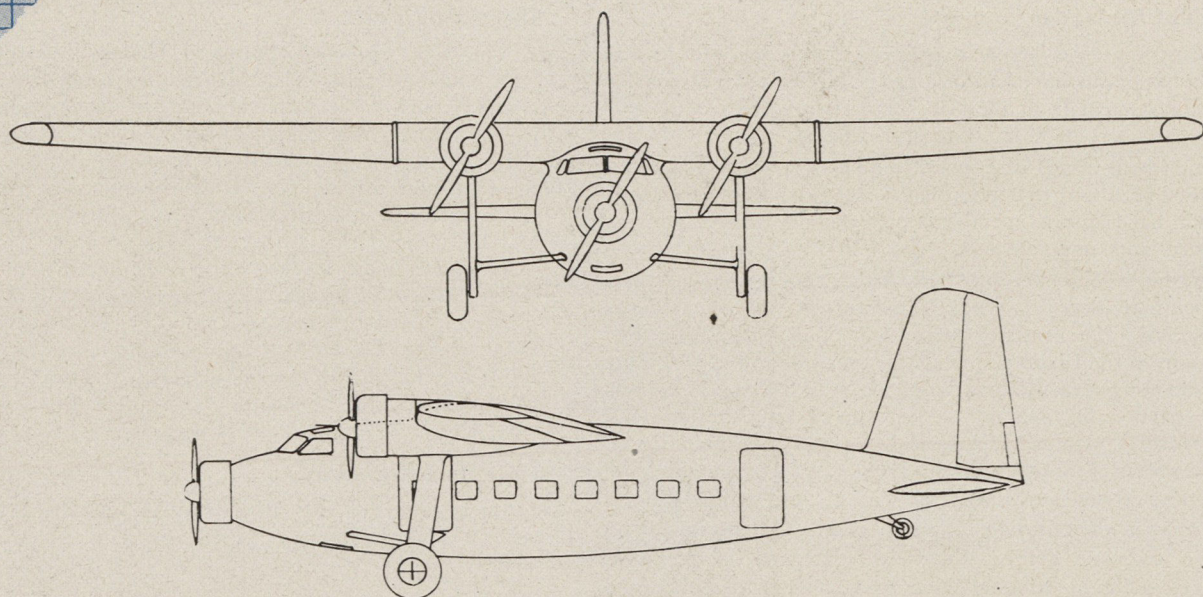


The cockpit is laid out for pilot comfort, putting all controls within either of the pilot's reach for solo operation.



The high-wing design was selected for ease of loading, also to stay above bushes and back-country obstructions.

After the Flying Wing Bomber, Jet Prone Fighter and the Black Widow, Northrop comes up with a trimotor



Northrop's Pioneer sits at a six-degree angle on the ground, making cargo handling as easy as it would be with a tricycle landing gear craft. The same retractable aileron as used on the P-61, allows application of full-span flaps.



Jack of All Trades

Bringing wives home, expediting flight pay and finding out what outfits have had histories published are a few of the tasks that stem from the Air Force Association's daily mail from members in every state and overseas.

Each mail brings its quota of requests for personal services by members, and in rendering all the aid possible the Association has found its membership service department growing in size and importance.

Recent weeks have seen the Association engage in these service activities: Provide information on Reserve activities throughout the country; assist individuals in getting commissions in the Reserve; provide information on the possibility of activating new Reserve bases; assist in having AAF provide needed information to Veterans Administration with reference to various types of claims; assist in expediting repatriation of prisoners of war; provide information on published or in-process histories of various AAF units; provide information on re-rating of pilots; assist AAF personnel on active duty in getting themselves assigned to technical schools; assist in bringing wives and fiancées to the United States; provide information and assistance in expediting payment of claims for flight pay and for property not returned to owner; provide information and assist individuals in being admitted to aeronautical schools and to military schools which provide courses required for regular Army commissions; provide information on provisions concerning National Service Life Insurance; obtain AAF photographs from Headquarters AAF for members requesting them; provide information to members concerning jobs available in aviation; and arrange for proper presentation to individuals (either the individual himself or his family) of medals due them and not received.

Direct Approach

The direct approach appeals to Thomas E. Walkey, AFA state leader for New Mexico. "As you know," he wrote recently, "our problem in this state is distance, so to lick the problem I have undertaken a tour of our state, hoping that a personal contact will give us better results." He made the tour, and now reports, "I was exceptionally pleased with the cooperation and enthusiasm I received in all my contacts and feel certain that we in the state of New Mexico have a fine start." Mr. Walkey's trip took him to Albuquerque where Arthur Gatewood accepted responsibility for organization of a local Squadron; Santa Fe, where the Pulitzer Prize winner, Oliver La Farge, will head up the Squadron activation; Clovis, Horace W. Hudson, Squadron organizer; Hobbs, Henry M. McAdams; Carlsbad, James Powell; Roswell, Douglas Orr; and Las Cruces, Bruce Leak.

Little Rock Getaway

Organization of the Arkansas Wing has been completed with Joel Y. Ledbetter of Little Rock as temporary Commander.

Operation Rhode Island

Operation Ohio appealed to John C. A. Watkins, AFA leader in Rhode Island. At a second meeting of the Wing, the group divided the state into eight districts, centering in the following localities: Warwick, West Warwick, Woonsocket, Westerly, Wakefield, Newport, Bristol, Pawtucket, and Providence. Woonsocket kicked off with the initial report to national headquarters of a Squadron organization meeting. Watkins is Commander of the State Wing; Paul L. Smith, Woonsocket, Deputy Commander; Robert Earnshaw, Pawtucket, Secretary; Clarke Simonds, Providence, Treasurer; and Francis J. Forloney, Providence, Chairman of Membership Committee.



Part of the committee of AFA members who designed, built and manned the AFA booth at the National Aircraft Show at Cleveland in November with General Doolittle who visited show with Col. Willis Fitch, Exec. Director on the 23rd. L. to r.: Col. Fitch, Paul Cornell, William Schorwerth, James Soeder, Ann Lathe, General Doolittle, Clifford Pearson, Erwin Cooper, and Clyde Carder.

Casey at Bat

Casey S. Jones, in addition to sparking a series of Squadron organization mass meetings in upstate New York, set up AFA membership facilities at Mitchel Field's open house for Reservists on a recent Sunday and recorded 128 new members. Ed Dibrell, member of Jones' executive committee on organization, told the open house visitors: "The peacetime Air Force should be maintained in sufficient strength to strike immediately. It took nearly two years to put 1,000 American bombers over Germany in this last war. We won't have anything like two years if another war comes."

The Grand Manner

Baltimore, out in front with the biggest Squadron in the country, continues to do things in the grand manner. Wing Commander Marshall Boone writes of the most recent get-together: "The affair last night was certainly a howling success. As a matter of fact, I would say it was almost super-colossal. We had a turnout of over 300 and it was unquestionably the finest meeting we have had over here so far." Brigadier General H. G. Thatcher, Chief of Staff of the Eleventh Air Force, was the guest of the Squadron.

New Wings

Meeting at the call of T. B. Herndon, the Louisiana execu-



Governor-elect Thomas J. Herbert of Ohio became an AFA member recently when Arman L. Merriam, Group Commander of Cleveland District, pinned button on his lapel at Columbus headquarters.

tive committee organized the state Wing and mapped plans for the activation of local Squadrons. Executive Director Willis S. Fitch joined with the Louisianians at Baton Rouge for the meeting. Elmer D. Conner of Jennings, who served for two years as a flight instructor with the Army Air Forces at Tulsa and Wichita Falls, was elected commander of the wing. Other officers chosen at the meeting include Joe Hamner, deputy commander, and Jack A. Abadie, secretary-treasurer. G. T. Owen of Lake Charles was chosen to head the state wing's executive board. Herndon estimated that potential AFA membership in Louisiana was approximately 12,000. Squadrons will be organized in Shreveport, Baton Rouge, Lafayette, Monroe, Lake Charles, Alexandria, New Orleans, and other substantial-sized towns. In Florida, Edwin M. House, former major general, accepted the invitation of President Doolittle to take the lead in organizing a Wing.

Coast to Coast

Squadron activation is proceeding with an increasing tempo. Cambridge and Salem in Massachusetts; Columbia, South Carolina; Spokane, Washington; Florence, Alabama; Washington County, Ohio; Santa Monica, California; York, Lancaster, and Erie in Pennsylvania; and Tusculum College,

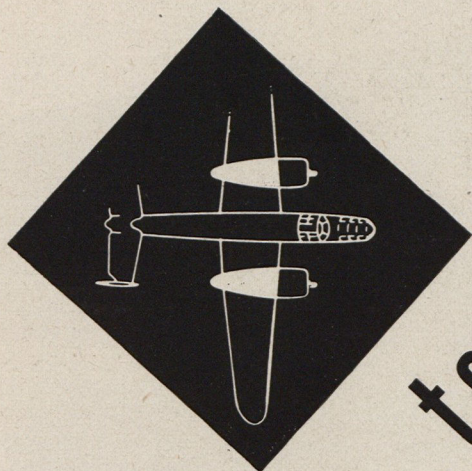


Lt. Gen. George E. Stratemeyer, C.G. of the Air Defense Command, pins Legion of Merit on AFAer Sol A. Rosenblatt.

Tennessee were the scene of organizational meetings. Buffalo, New York, completed its Squadron formation with the election of Graydon Bower as Commander; Maurice Fitzgerald, Vice Commander; William J. Keeler, Treasurer; and John D. O'Neil, Secretary. Council members are J. Frederick Schoellkopf, Roland L. O'Brian, Leroy Sutton, and Earl T. Robinson, Jr. Dudley Clark, holder of the Distinguished Flying Cross, was elected Commander of the Salem, Massachusetts, Squadron. The Vice Commander is Warren J. Hayes; Secretary, Richard L. Jones; Treasurer, Charles T. Wright. The Council is composed of Peter S. Russell, William I. Lee, Jr., Edmund B. J. Mroz and Edward R. Tufts. The Florence, Alabama, Squadron selected Edgar E. Patterson as Commander; Hal H. Gist, Vice Commander; John R. Weaver, Jr., Secretary; and Olin T. Mefford, Jr., Treasurer. Councilmen are Lake E. Tate, Jr., Nolan Phillips and Robert L. Voorhies. Officers of the Spokane Squadron are John Neil Lavin, Commander; W. Marsden Rogers, Vice Commander; Francis A. O'Leary, Secretary; William H. Schoen, Jr., Treasurer; and William H. Truman, Eugene P. Roberts, Marshall B. Shore and William R. Morton, Councilmen. In Washington County, Ohio, the Squadron elected Joseph G. Merriam, Commander; Richard C. Jacoby, Vice Commander; John M. Penrose, Secretary; F. Leonard Christy, Treasurer; and James R. Gray, John E. Trader and William M. Summers, Councilmen. The Cambridge, Massachusetts, Squadron has the following leaders: Elmer F. Walsh, Commander; Maurice R. Rabinowitz, Vice Commander; Charles S. McLaughlin, Secretary; Paul F. Bartel, Treasurer; and Edward H. Haverty, Margaret McCormack and Sally B. Cohen, Council members.



Lt. Col. E. C. Lock (Right) head of AFA membership committee at Craig Field, Ala., signs Col. W. B. Wright and Louie P. Turner on the dotted line. Craig Field is out to get 100% AFA membership.



tech topics

Sidelights on the technical progress of the month and the people who made them possible

Bottom Fueling

In a recent paper delivered before the Society of Automotive Engineers, H. O. Olson of Douglas Aircraft revealed that fuel could be loaded into the integral wing tanks of a modern transport four times as fast through the lower side of the wing as through the upper. Olson, a servicing engineer, revealed that 230 gallons of 100 octane gas had been pumped into the tanks of a DC-4 by means of an easily attached nozzle and poppet valve. Since the flow is controlled at the nozzle, it is possible for one man to fuel the airplane, or for two to work simultaneously without having to climb up on the wing.

Normal topside rate of fueling is about 60 gallons per minute. The engineering problem, Olson indicated, is by no means settled. An absolute system for securing the fuel when the tanks are filled must still be developed.

World's Biggest Shooting Gallery

A United Kingdom equivalent for the AAF's White Sands testing grounds was revealed recently when the Australian Federal Cabinet approved a plan for the establishment of the world's largest long-range rocket testing setup, to be established in Australia.

According to fragmentary releases, the object of the tests will be to develop pay load, range and directional accuracy, and to improve radio control.

Rockets are to be launched at Eucla on the southern coast. A chain of radar stations will trace the course of the missiles across the Great Victoria Desert and Indian Ocean to Christmas Island, a submerged mountaintop, 12 miles long and

nine wide, off the Dutch East Indies. Experimental rockets will be built at a huge munitions plant at Salisbury, Victoria. Nomadic natives will be moved out of the path of the missiles.

Supersonic Aileron

During the business of developing remote control planes and missiles, Fairchild Engine and Airplane's pilotless plane division produced a retractable aileron which may lead to a solution to future high-speed control problems. As the speed of aircraft increases, the forces acting on conventional ailerons become more and more unpredictable. The amount of physical force required to move the control comes closer to being impossible as operational speed presses Mach's decimal point.

Fairchild's approach is exactly opposite to Northrop's. The latter's retractable aileron, as used in the P-61, in effect, "spoils" the lift on one side of the wing, lowering that side. Fairchild's system calls for a small airfoil that retracts into the wing tip, moved out by a pneumatic ram and recovered by spring pressure. This provides additional lifting surface, thereby picking up the wing.

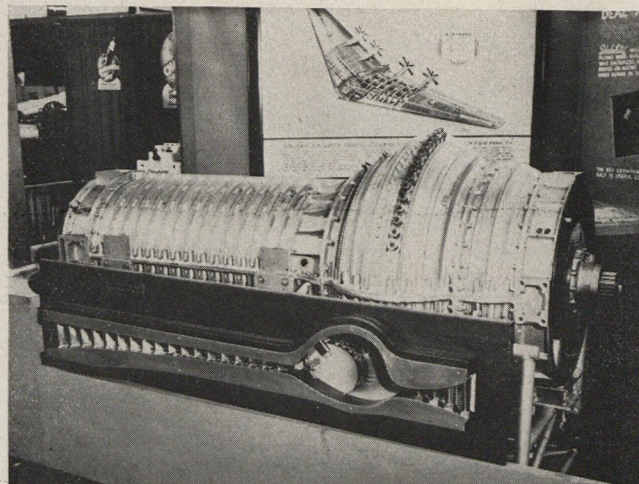
These pilotless aircraft frequently use the V-tail similar to that applied in the Beechcraft Bonanza, where the "ruddevator" surface system eliminates the need for one whole airfoil. When one surface is moved, it acts as a rudder, when two move it can raise or lower the ship's nose.

Map Case

One of the ticklish jobs, particularly in cockpit aircraft, is reading a map. The standard sectional map has to be pre-



Mexican native watches American Airlines freighter taking off with a record load from Mexico City using JATO (Jet Assisted Take Off).



Northrop Turbodyne, presented to the Navy before Pearl Harbor but never produced, appears at Cleveland's National Air Show.

folded so that the flight line can be followed constantly, and if one has to make a cross reference, getting at the right section of the map is a task for a contortionist. A solution to this problem is offered by Rolaire Engineering Products of Los Angeles in the form of the Rolaire Map Case. It consists of a metal container 12½" by 10" by 1½" fitted with a plastic face. Inside the container is a roll rack, similar in design to the roll-film transport system on an aerial camera. Onto this transport arrangement a 22-foot roll map can be inserted and moved along as the flight progresses. The case can be equipped with a light, which illuminates the map from the back, making night reading easy. The light is fitted with a rheostat to control the degree of illumination.

The edges of the open plastic surface at which the section of the map is displayed incorporate a conversion scale for all size maps. Roll maps for the case are in Sectional (1:500,000) Regional (1:1,000,000) Direction Finding (1:2,000,000) and planning (1:5,000,000) sizes. Rolls covering the entire U.S. are available.

Martin Mockup

One of the most exciting exhibits at the recent National Aircraft Show was Glenn L. Martin's exhibit of the interior mockup of the Martin 202-303 transport. A full-scale mockup which included cockpit cabin and lounge, it was the only exhibit that allowed vicarious experience—let the spectators come in, sit down in the Warren MacArthur seats and enjoy at least part of the luxuries of air travel.

The exhibit was designed and executed by a couple of young fellows who have been specializing in the peculiar problems of aircraft interiors: Kenneth D. Randall, aged 28, and Arthur Fitzpatrick, a patriarch of 30.

About six weeks before the show opened, the Martin company assigned the two youngsters to the job of designing and executing the entire exhibit. There wasn't a line on paper, a bit of material purchased; nothing but a piece of space at the show. It had been determined that the Martin 202-303 interior should be featured. But that produced a new diplomatic problem. There were some sixteen air transport companies using the Martin transport, each with its own interior, seating, color scheme and lounge arrangement. The exhibit could not use any one of these without appearing to play favorites. Randall and Fitzpatrick had to start from scratch and get up a totally new layout and a color scheme that would be pleasing to look at and yet totally dissimilar to any of the 16 customers' designs. All this in six weeks. They made it, with a little time to spare.

Randall and Fitzpatrick are no newcomers in the business. Randall worked for Dreyfuss in Los Angeles, whose studio has been responsible for some of the best known West Coast

interiors. Fitzpatrick started in Detroit. His best known aviation interiors were created for Convair and Stinson. During the war, Fitzpatrick was with Navy special devices under the Bureau of Aeronautics.

They are currently doing something new in the business, designing and executing custom interiors for transport type aircraft for individuals and companies who are using aircraft as flying offices, sky yachts and executive air vehicles.

JATO Airfreight

Jet Assisted Take Off was used on a commercial airplane for the first time in history when Flagship St. Joseph, American Airlines Airfreighter, took off from the airport at Mexico City with a record load of ten tons of bananas, flying the perishable cargo to New York. Originally, the flight was supposed to have been made nonstop, but adverse winds made the intermediate stop for refueling necessary.

The airport at Mexico City is 7300 feet above sea level. The four-engined Douglas DC-4 would not have been able to get off with the pay load and fuel necessary for the flight. The four JATO bottles added 1500 hp to the 5800 normally available.

'Copter Radio

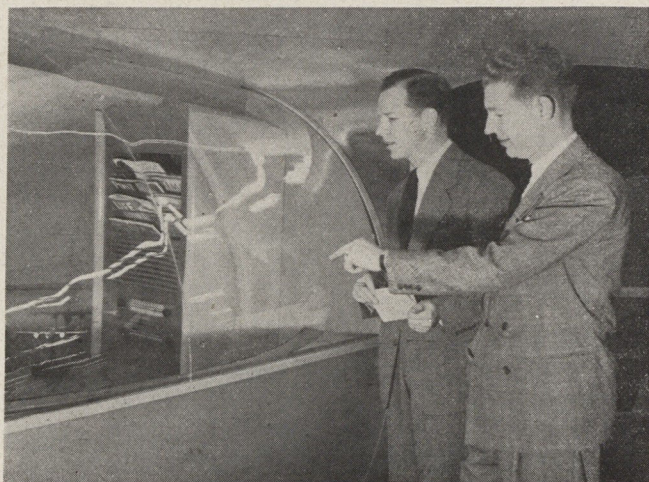
One of the features of the Sikorsky S-52 two-place helicopter which was recently premiered at the National Aircraft Show in Cleveland was the Bendix Flightphone. Because the S-52 has a 650-lb. useful load, care had to be taken in selecting radio equipment that would serve all the normal functions and still not reduce the limited pay load to any great degree. The model exhibited at the show had the Bendix Flightphone VHF transmitter and MF Receiver, with built-in speaker.

More Thunderjets

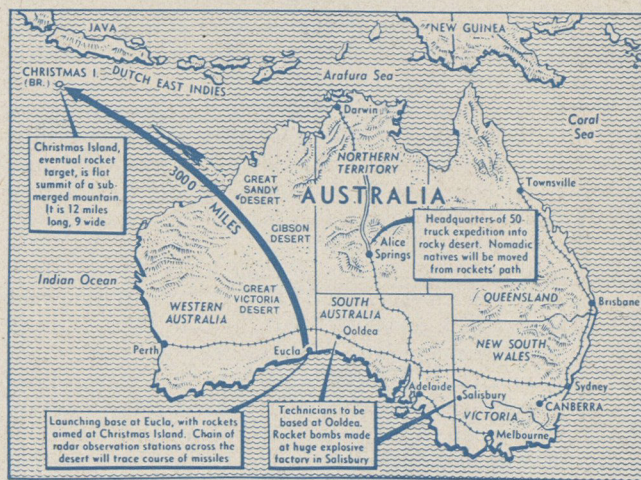
A recent announcement by the Air Matériel Command has revealed that additional contract with Republic Aviation Corp. will, on completion, bring the number of P-84 Thunderjets up to 500. The new contract totaling \$25,000,000 is one of the largest postwar commitments. The Thunderjet is considered the fastest U. S. military airplane. Its proved top speed is 611 mph.

Skyburgers

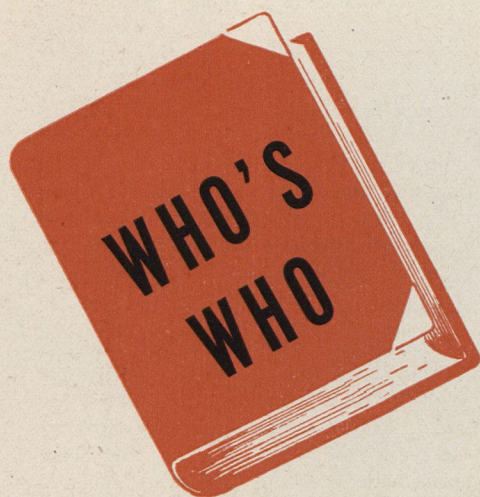
Raytheon, one of the major wartime supplies of electronic equipment, announces a new application of ultra-high frequency equipment in the Raytheon Range. This instrument, developed chiefly for airline use, harnesses penetrating ultra-high emanations to the task of preparing meals in flight. The console can grill a hamburger in 35 seconds, bake a cake in 29 seconds and cook a complete meal in less than a minute.



Designers of the Martin exhibit at the National Aircraft Show Arthur Fitzpatrick and Kenneth Randall examine mockup 202 transport.



Locations of the various installations connected with Britain's proposed long-range controlled rocket installation in Australia.



in the AFA

INTRODUCING

Meryll Frost

BEGINNING this month AIR FORCE introduces a new series of what might be called miniature profiles of the Officers and Directors of the Air Force Association. The department is being inaugurated at the request of a substantial number of readers who have expressed a desire to know who the men are whose names appear at the top of the contents page each month. On the whole, the officers and directors of AFA are men who were selected because they were typical of the three million G. I.'s who made the Army Air Forces the greatest and the proudest team on earth. Their rank, or the lack of it, was not a consideration in their appointment. The only prerequisite was that they have a genuine interest in the Air Forces and in keeping the gang together.

In a way, Meryll Frost of Wellesley, Massachusetts, is an excellent subject to begin the series with. When you know Meryll and are familiar with his personal story, you are proud to be able to say that you played ball in the same club. He's a man's man. He has enough courage and spirit for ten men. Like a lot of people who have suffered deeply, he is also humble and gracious.

"Sergeant" Frost entered Dartmouth College in September, 1940, after graduating from his home-town high school with glowing predictions for his athletic career. He didn't disappoint his backers. In his freshman year he copped a first team berth with the ease of a colt being exercised at the end of a halter before the gallop. In his sophomore and junior years he proved to be the spark plug of an otherwise undistinguished varsity eleven. In 1942 he rated All-America Honorable Mention.

Shortly after completing his junior season, Frost entered the Army Air Forces as a Private. He took his basic training at Miami Beach, and then went to Las Vegas to become an aerial gunner. In December, 1943, he left the United States for duty in the European Theater of Operations.

On his fourth mission Frost's plane cracked up. In the crash, the bomb load exploded, the plane was destroyed, and he was miserably burned.

The next eighteen months of his life were spent in army hospitals from Bari, Italy, to Phoenixville, Pennsylvania. For a year and a half the Army's doctors worked over him patiently and hopefully. Meryll himself doesn't recall how many skin and cartilage grafts they made. He only remembers that there were a "great many."

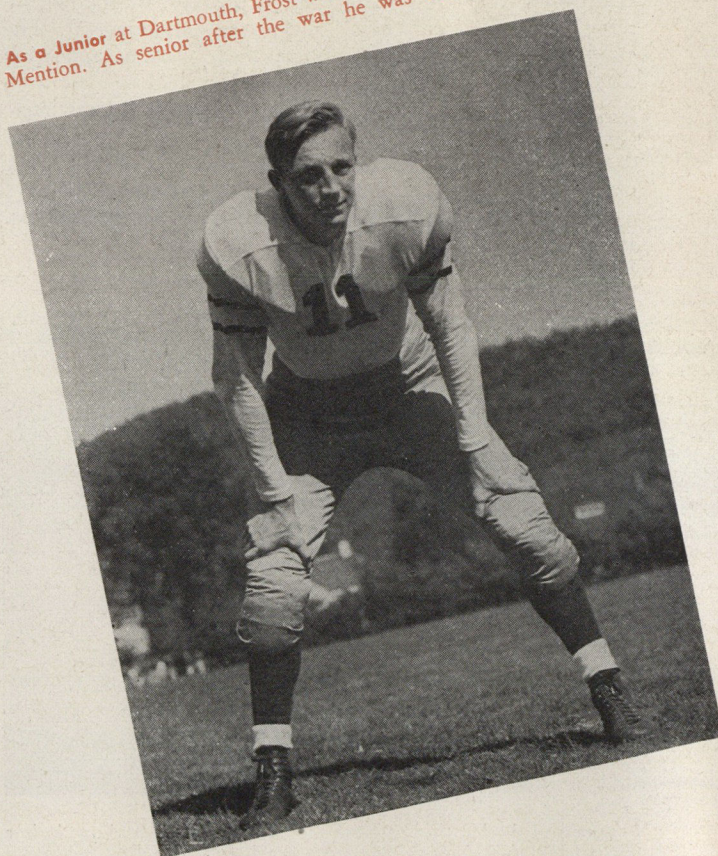
The time people spend flat on their backs in pain often has one of two effects on them. Their minds may turn toward serious introspection in which event they are quite likely to become remorseful and bitter, or something quite the opposite may happen. Through their suffering they may acquire new character, dignity, and humility. Meryll Frost was one of the latter group. There must have been many long agonizing hours in those hospitals at night when he wondered about the days of his life that lay ahead—if indeed there was a life ahead. The prospects he saw couldn't have been very encouraging at best. Yet with a courage given to few men he

took the odds at what they were and faced the test. He won.

In July of 1945, after receiving his medical discharge, Frost returned to Dartmouth to be elected president of the veterans' group, vice president of Green Key, an honorary society, and captain of the football team. His football awards, including the All-Eastern Quarterback nomination, and All-America Honorable Mention, would fill a trophy room. Among the most prized are the Philadelphia Sports Writers award for the most courageous athlete of 1945 and the Sportsmanship Brotherhoods award for outstanding sportsmanship. It was the first time the latter award was ever given to an undergraduate.

After graduation, Frost was appointed to the Dartmouth football coaching staff. When he is not occupied with these duties, however, he plans to devote his energies to a new job which he accepted December second. It's the kind of job you'd expect him to take—he's the new Assistant Executive Director of the "Bay State Society for the Crippled and Handicapped."

As a Junior at Dartmouth, Frost won All-America Honorable Mention. As senior after the war he was team's captain.



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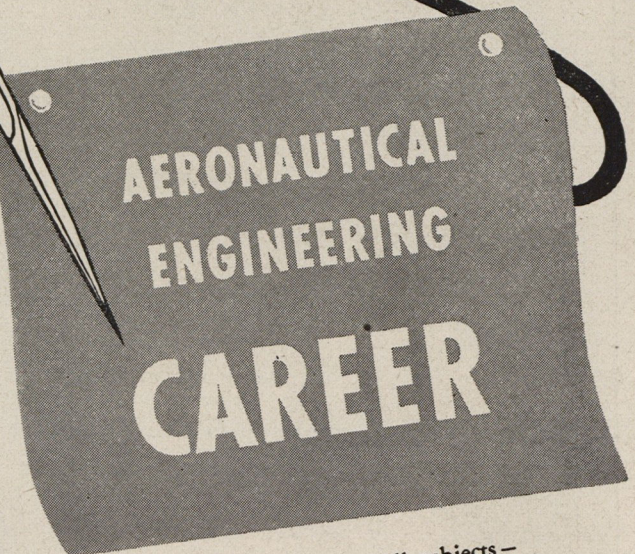
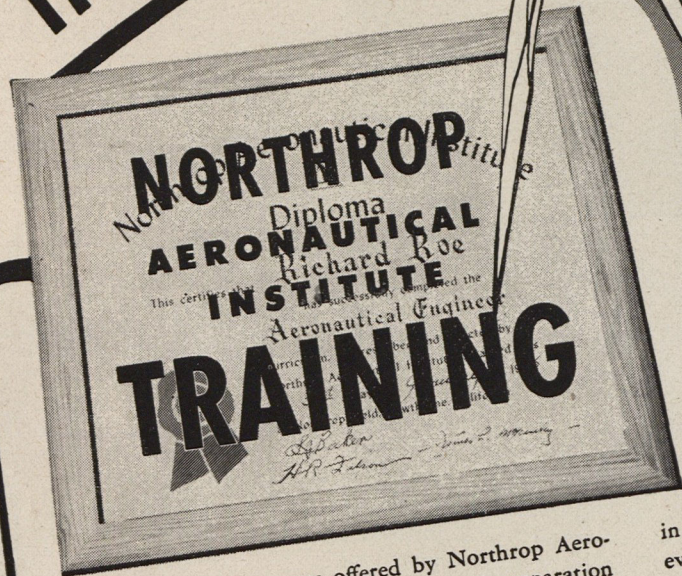
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Once used for stability and for control, sweptback wings return to dare the mysteries of supersonics.



Delta Design

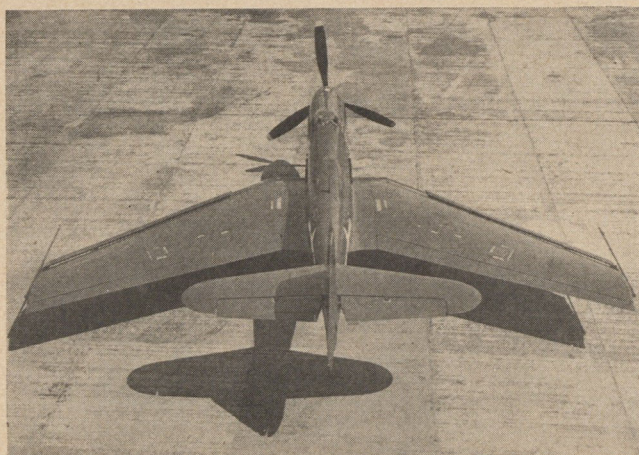
BY WILLIAM S. FRIEDMAN, Sgt. AC, Res.

SWEEPBACK wings on many of the modern transonic speed ships have caused little more than a ripple of excitement among the average airmen. To the unpracticed eye, the new trend to create a wing planform not unlike the Greek letter Delta harks back to the old Curtiss Falcon and even earlier, and appears strongly related to the shape of the Northrop Flying Wing.

While there seems to be a general jumble of ideas on the subject, there are, if the facts are carefully examined, three entirely separate functions for sweepback, none of them related aerodynamically. Because of the total departure from established aerodynamic theory necessitated by the problems of transonic flight, these three functions should be more clearly delineated, before the science moves further along.

Sweepback was originally a method for producing directional stability. It was used in aircraft such as the Curtiss Falcons and Helldivers where the military function called for an exaggerated ability to hold a true line. The wings (in these two cases, the top wing), being set at an angle to the center section, held the ship on true course because of the fact that when one wing yawed out of line, it offered more resistance and was pushed back. A more efficient form of this feature was incorporated into the shallow Delta wing of the

Bell Aircraft built the L-39 for study of sweepback for high-speed operation. It was a P-63 airframe, fitted with slotted and flapped main panels, constructed after Busemann's Delta-wing theory.



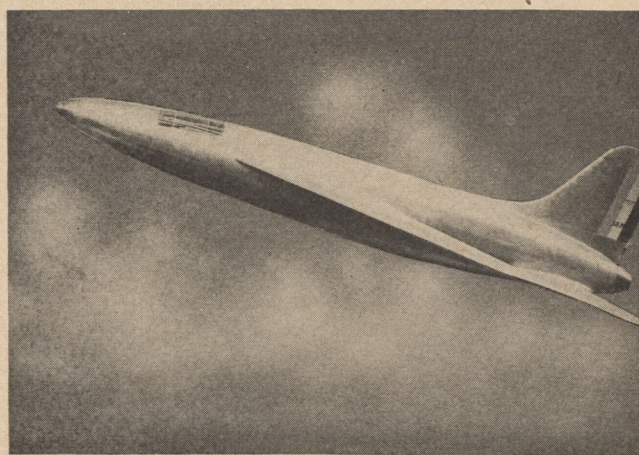
work horse Douglas DC-3 which is conceded to be one of the most flyable airplanes on record.

In the Northrop flying wing, the German Horten glider, England's Westland Pterodactyl and other tailless designs, a sweptback wing was used in order to displace the elevators or whatever other control system was used to raise or lower the nose, to the rear of the center of gravity for the purpose of achieving adequate control moment.

These are the established uses for the sweptback wing. In the past, they have always meant giving up speed in order to achieve a more desired characteristic. Now, as man approaches the sonic barrier, many things are being tried that may mitigate the effects of excessive drag at the speeds around that of sound.

In 1935, a German scientist named Prof. Adolf Busemann read a paper before the Volta Congress in Rome. It dealt with experiments conducted at the LFA laboratories on the almost hopeless manner in which lift decreased when velocities increased past the speed of sound. At that time, the world's speed record was 440 mph, so the discussion was purely academic. However, the perfection of jet and rocket power has made certain alterations in planform theory necessary, and possible solutions are offered by Busemann's work.

Several jet designs featured the recent Paris Air Show, including this Delta-wing and stabilizer proposal. Careful spacing keeps tail out of shock-wave created by the main lifting surfaces of the aircraft.





Sweepback on Germany's prewar Diesel-engined Junkers Ju 89 gave directional stability, the original use for that wing configuration.

Just how a Delta-shaped wing manages to stave off the point of increased drag at high speeds is not easy to explain. A rough explanation is that sweepback reduces the effective thickness-chord ratio in the line of flight. However, the critical speed or velocity at which airflow breaks down appears to be raised by a much greater amount than can be accounted for by this simple explanation. In these wingforms, a peculiar span-wide flow seems to be superimposed, which may make flight at supersonic speeds possible. Virtually every scientific agency concerned with aerodynamics is investigating these forms.

In a lecture given in Berlin in 1943, Professor Busemann tried to explain the complicated phenomenon by showing a picture taken in a supersonic wind tunnel showing supersonic airflow around a high-speed wing profile. He indicated that the nose wave or shock wave created by the entering edge of the wing travels back at an acute angle, diminishing in intensity as the angle opens. The same phenomenon oc-

curs spanwise, but at each individual portion of the leading edge, which appears to act like a separate lifting unit. By staggering the units of lift along an acute angle, the interaction of these lift-losses is minimized. The end result is that, by yawing the wings, the critical Mach number or the speed relative to sound at which the wing shock-stalls (stops lifting because of the resistance of air piling up on its leading edge) is raised considerably. While this method is merely postponing the inevitable facing of the question, it is indicative of the fact that something can be done about shock stall.

The sweptback wing is not without its own particular problems. Experience with existing high-speed Delta-wings shows that, while high-speed characteristics appear satisfactory, low-speed performance leaves much to be desired.

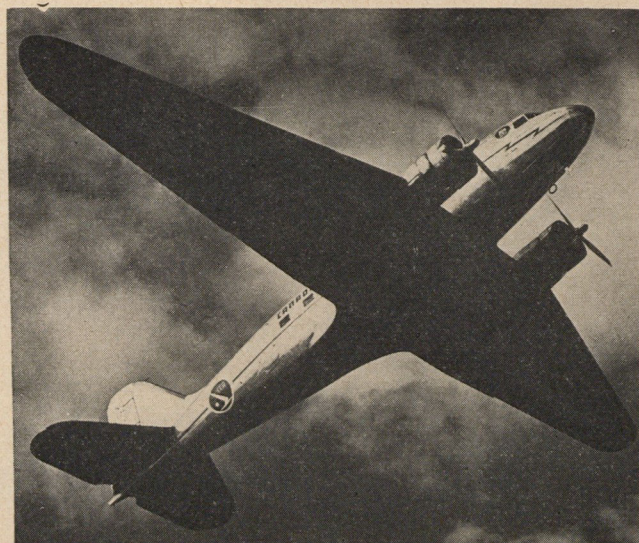
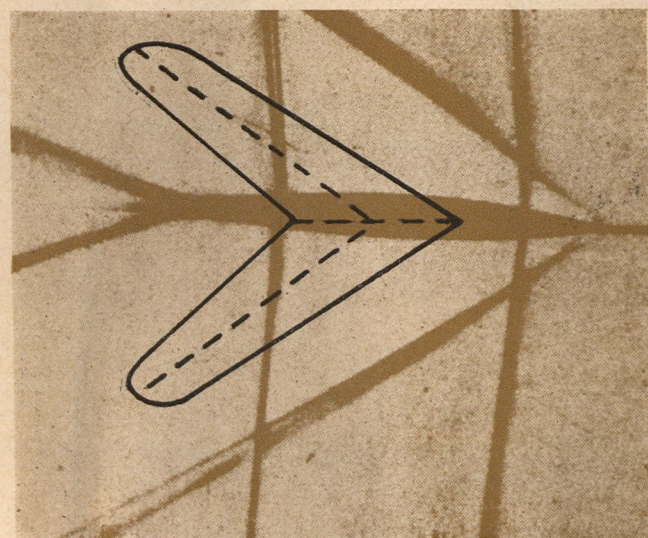
Sweepback puts a greater load on the wing tips which, although it tends to increase stability at low angles of incidence, promotes tip stalling when the nose goes up. It should be noted that nearly all swept-back wings in current use have either a fixed or a movable slot to minimize the tip stall. Thus far, many of the sweepbacks have exhibited a marked tendency to drop a wing and to incipient spinning. The lack of fore-and-aft stability may not only produce an exaggerated spinning characteristic but the loss of lift may be followed by "tumbling" or continuous rotation around the spanwise axis, from which recovery is quite difficult. Control characteristics in other directions appear quite normal.

Investigators for the de Havilland company in England working on the jet-powered tailless Swallow discovered that the effect of high-lifting devices on the 40° Delta-wing is much smaller than on normal planforms. Thus far, normal

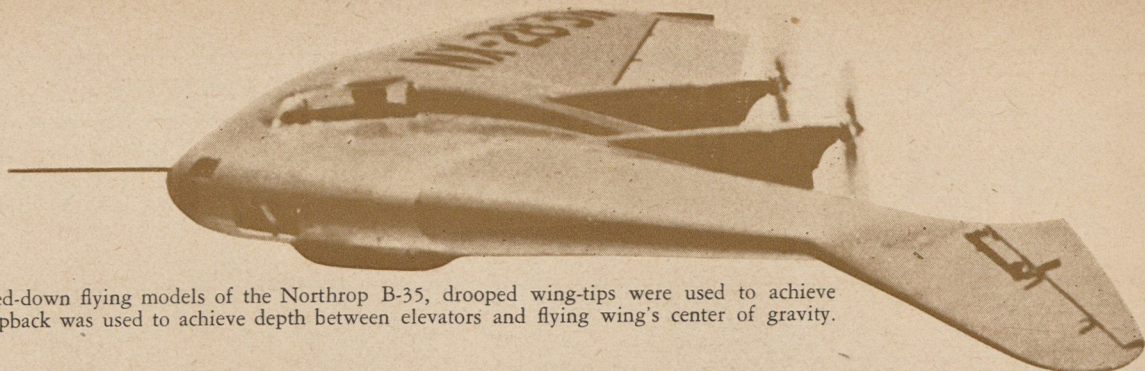


When original tests were conducted on dive-bombing, directional stability was important for accuracy. For that reason, sweepback was incorporated into the original Curtiss Helldiver, the O2C-1. This function differed from its later application for supersonic flight.

Picture of shock wave moving back from nose of an airfoil section in supersonic wind tunnel. The wave moves spanwise as well as chordwise, so that by shaping wing to stay behind the wave, its effect can be decreased and the critical shock-stall point raised.



Famed old work horse of the airways, the Douglas DC-3 achieved much of the "flyability" which made it popular with airline pilots from sweptback leading edges of the Delta-wing, a compromise between the stable sweepback and the efficient straight airfoil.



On one of the scaled-down flying models of the Northrop B-35, drooped wing-tips were used to achieve control. Here, sweepback was used to achieve depth between elevators and flying wing's center of gravity.

flap arrangements have failed to contribute the usual increase in lift at slow speeds. However, the drag necessary for deceleration before landing is still a factor.

Even the structure of the sweptback wing offers some new problems. If we are to consider the yawed wing as a normal airfoil, bent back, the bending moment and therefore the weight will be increased. The wing will, of necessity, have to be longer, and such high-lift devices as slots will add to the weight penalty.

With a virtually "built-in" tip stall problem, aileron (or elevon—combined elevator and aileron, in the case of the full flying wing) reversal at high speeds is a major consideration. If the aileron is displaced downward, it causes a lift and a nose-down torque or rolling tendency. This torque twists the wing-nose down and reduces the lift at the tip. As the speed increases and the torque mounts, the nose twist-down will increase until at a "reversal speed," the lift loss caused by the twist effect will cancel out the effect of the aileron. This effect is common to both straight and sweptback wings. However, there is one important difference. The

bending along the line of the spar causes a change in the angle of incidence in the line of flight. This means that this flexion will introduce aerodynamic problems and problems in flutter not present in the normal wing.

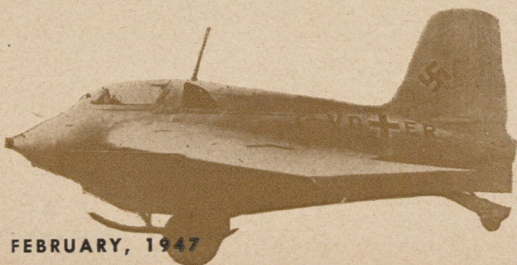
Up to very recently, aerodynamics was a pretty safe science. The general formulas were determined, and things like building the North American P-51 by pure mathematics in an even hundred days were quite possible. Now that the science is daring Mach's decimal point, new concepts have to be created. The problem of airfoils for this work is totally new. For the time being, Dr. Busemann's Delta-wings are a possible method for pushing the effect of shock-stall farther back. For the purposes of fighter aircraft, the recently liberated French aerodynamic science has come up with a new solution to the poor slow-speed characteristics. They exhibited, at the recent Paris salon, a jet fighter with a steep sweptback wing, that is to be carried pickaback on a parent airplane. The mission completed, the craft rendezvoused with its carrier and landed in mid-air. Thus, the poor slow-speed characteristics of the Delta-wing were circumvented.



England's pioneer tailless, the Westland-Hill Pterodactyl. Deep sweepback was used to get the elevators a greater distance behind the engine and weight mass. Like the supersonic Delta-wings, slots were needed to prevent low-speed tip-stall in this craft.

Like other tailless designs, Germany's prewar Horten III glider swept the wing back for elevator control. Note how the entire trailing edge is devoted to elevators at the tip, ailerons in the center and flaps inside. No rudders were employed in the design.

Lacking stabilizers and elevators, the rocket-powered Messerschmitt Me 163 used the sweptback wing for control. However, its planform was influenced by the Busemann report and design is a compromise between sweepback for control and for subsonic speeds.



"quote"

"By necessity, by proclivity—and by delight—we all quote. Next to the originator of a good sentence is the quoter of it"

RALPH WALDO EMERSON.

"We must not lose interest in defending this country. We lost interest after the last war. If we lose interest again, we have only to look at the tangled wreckage of Hiroshima to see what price we will pay.

We are an idealistic nation. We must remain that way. Idealism is not something to be ashamed of. Without ideals we would stagnate. With ideals we continue to be a thinking, living, progressive and driving force toward a better world; a better world for ourselves and a better world for all mankind.

But we must guard those ideals; we must be alert and prepared to defend them. To defend them we need a strong, well organized, modern, intelligent and effective military establishment. We need it just as this city or any city needs an effective police force to maintain order and respect for law and the rules of common decency.

I can almost hear some of you saying, 'Who is it that we must defend ourselves against? Whom are we going to fight?' I don't know. I don't know that we are going to fight anyone. We didn't think we were going to fight anyone ever again in 1919, in 1925, in 1935, and even as late as 1940.

But if we do have to fight again, we will fight people. Where are these people?

Turn to the north. There on the other side of the Polar Basin are four-fifths of the people of the world in Europe and in Asia. There is where the attack will come from if some future Hitler makes a bid for world dominion."

General George C. Kenney, Commanding General of the Strategic Air Command, before a veterans luncheon at St. Louis, Missouri.

"It is safe to hazard that, counting money spent for special services and the indirect loss of plane time, red tape costs any airline with substantial international operations at least \$1,000,000 a year.

Such heavy costs are both circular and vicious. As the international airlines have, through IATA, espoused the principle that rates shall bear a reasonable relationship to the cost of operation, the money that is spent on red tape is bound to be reflected almost directly in the cost of the ticket. And because red tape itself discourages travel and helps keep costs high, fewer tickets are sold.

Most of this red tape is completely outmoded, completely unnecessary, bad in intent and fumbling in execution. And Americans have never been prone to put up with a lot of damn foolishness."

Sir William Hildred, Director General of the International Air Transport Association in a Saturday Evening Post article.

"Military expenditures in peacetime are simply premium payments on insurance—of national security. The nation maintains armed forces first, to prevent war, second, to win wars we cannot prevent. We understand well, from recent and terrible experience, what it costs to win a war we could not prevent.

We won World War II. It cost us well over a million casualties. More than a quarter of a million Americans died. That loss we cannot measure. But we can measure dollar loss. The total cost to the nation's capital structure has been

estimated four hundred billion dollars. That amounts to approximately three thousand dollars for every man, woman, and child in the United States.

If America had followed the recommendations of General Billy Mitchell and General Hap Arnold back in 1925 and had, at that time, bought an insurance policy in the form of the world's most powerful Air Force, this loss could never have occurred.

Our appropriations in 1925 for the Army Air Corps were less than fourteen million dollars. In the fourteen years from 1925 to 1938 inclusive, the total appropriations made available to our Army Air Forces were less than a half billion dollars. That was an average of only thirty-five million dollars per annum.

An annual rate of only two-tenths of one per cent on the four hundred billion dollar capital loss (the cost of World War II) would have amounted to eight hundred million dollars total annual premium. However, if we had paid this premium each year for the fourteen years, 1925-39, we still would have spent only two and eight-tenths per cent of the total cost of the war."

General Carl A. Spaatz, Commanding General AAF, at an insurance luncheon in New York.

"The peacetime Air Force should be maintained in sufficient strength to strike immediately. It took nearly two years to put 1,000 American bombers over Germany in this last war. We won't have anything like two years if another war comes."

Edwin R. Dibrell, Executive Committee member, New York wing of Air Force Association at Mitchel Field Open House ceremonies.

"Within a year it will be possible to circle the world in one hundred hours on scheduled flights of luxury flagships."

Croil Hunter, president of Northwest Orient Airlines at a press meeting in Washington.

"We are at the stage when this branch (supersonic aerodynamics) of aviation should cease to be a collection of mathematical formulas and half digested, isolated facts."

Dr. Th. von Karman, Director of the Daniel Guggenheim School of Aeronautics, in a lecture before the Institute of Aeronautical Sciences.

"I cannot stress too emphatically that it is my desire that all questions by men who are interested in the Air Reserve Program be answered as completely as possible. I have not and will not permit any 'brush off' of individual inquiries by members of the Air Defense Command."

Lt. General George E. Stratemeyer, Commanding General of the Air Defense Command, addressing the Air Reserve Association convention in Memphis, Tennessee.

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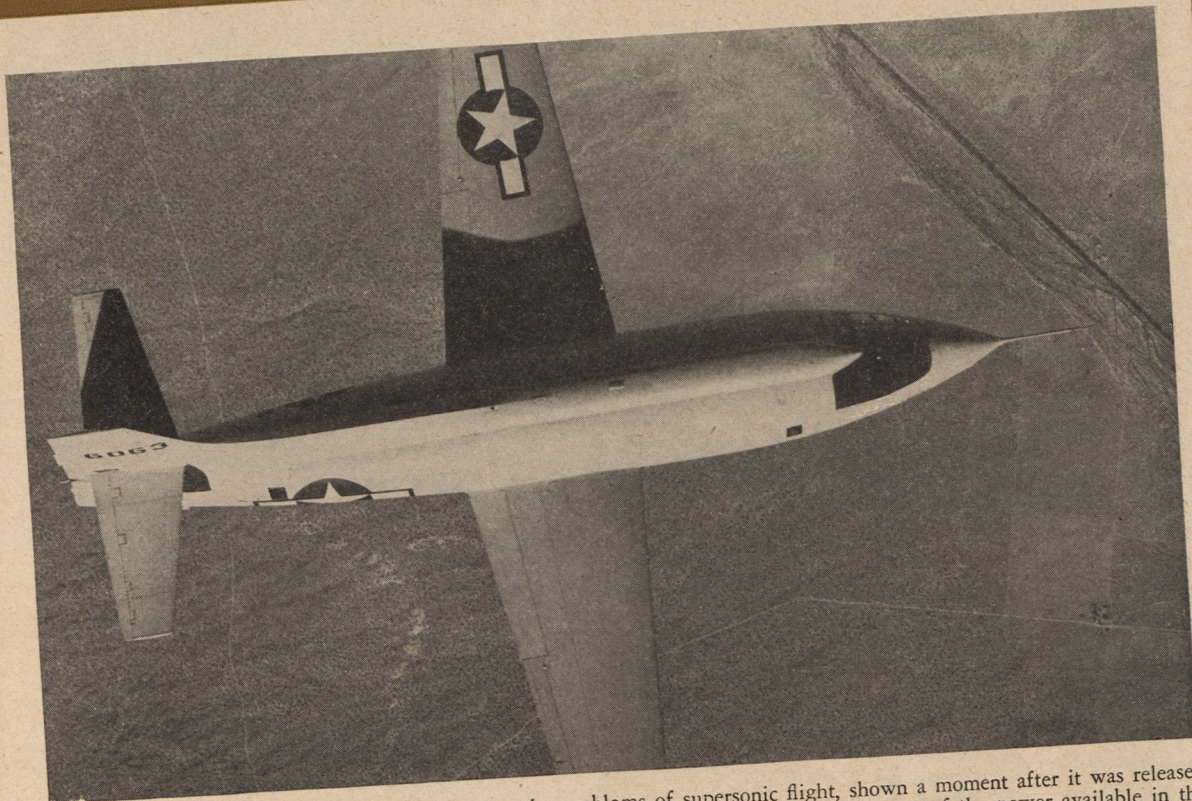


Air News Yearbook Vol. 2 . . . combines tersely told histories of aviation by nations and an exquisite array of photographs that stand out like finished portraits.
—Montgomery (Ala.) Register.



It is a large volume, crammed with magnificent pictures—and if there is anything missing as to the history, development and use of tanks, I can't imagine what it could be.
—Springfield (Mass.) Evening Union.

BULLETIN BOARD



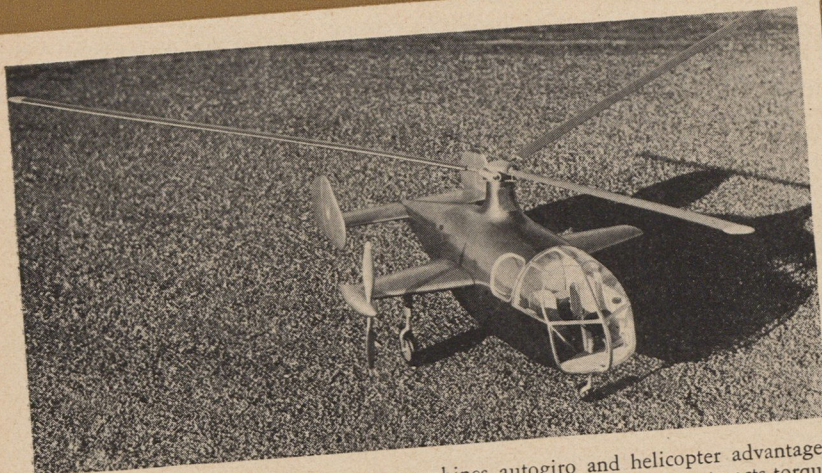
The Bell XS-1, AAF rocket plane built to explore the problems of supersonic flight, shown a moment after it was released from the B-29 mother plane for its initial trial under power at Muroc, California. Only part of the power available in the Reaction Motors bi-fuel engine was used on this flight, an easy 7-minute run to test the rocket's flight characteristics.



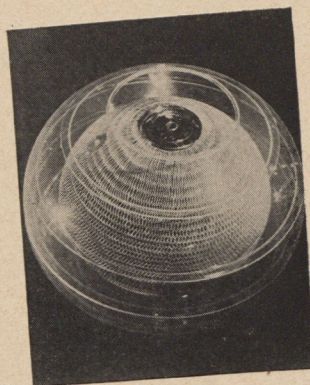
Looking up at the B-29 carrying the XS-1 aloft. Only a quarter of the available power was used on the initial flight.



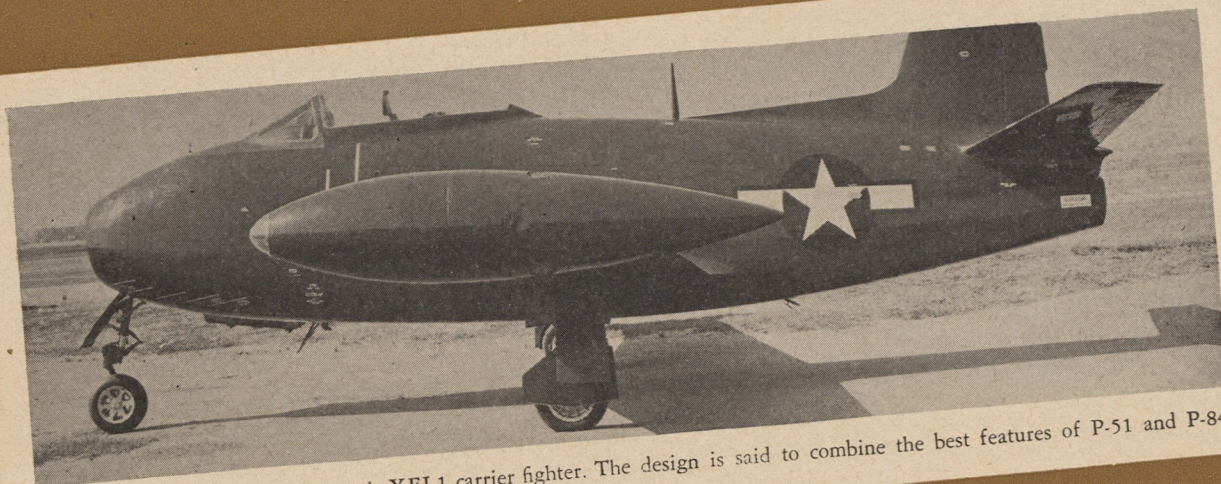
Chalmer (Slick) Goodlin, Bell test pilot, flew the XS-1 at 550 mph using a fourth of its power.



Fairey Gyrodyne, new English rotary, combines autogiro and helicopter advantages. Power is supplied to propeller and main rotor. Off-center propeller counteracts torque.



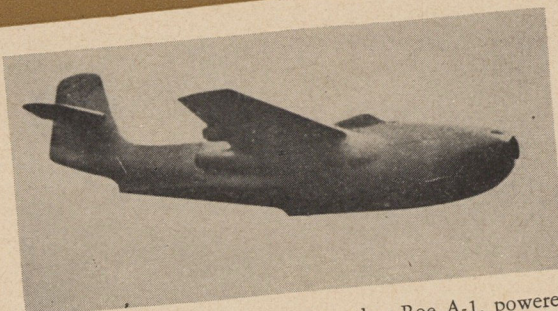
New British design for atom-power interplanet space ship.



New Navy jet bid, North American's XFJ-1 carrier fighter. The design is said to combine the best features of P-51 and P-84.



Flight view of the new Martin 202 transport, which has been ordered by many domestic airlines to replace DC-3s.



Model of first jet flying boat, Saunders-Roe A-1, powered by two axials, now nears completion in England.

has been sponsoring is the exchange of information on development and research work. Typical of this function are the demonstrations which the United States and the United Kingdom held in the Fall of 1946 to display the most modern electronic devices available for air navigation. The Radio Technical Division met in Montreal in November, 1946 to consider the equipment that was demonstrated and to make recommendations for the standardization of air navigation systems and equipment. Attainment of such standardization would resolve many of the difficulties of profusion of systems and equipment in use on international air routes. Unless a reasonable degree of uniformity is achieved, considerable confusion would result. An American operator, for example, might have to carry in its planes several different kinds of electronic navigational equipment in a service between the United States and Europe. The result would present technical difficulties and be a heavy financial burden on operators and governments.

As a result of these meetings, which lasted far beyond the date originally set, agreements were reached by experts from 28 nations regarding the adoption of uniform equipment for air navigational aids. These fall into four categories: instrument approach and landing aids, short range navigation aids, long range navigation aids, and aerodrome aids.

The Division found that the best equipment currently available for instrument approach is an improved version of the localizer-glide path system largely used during the war under the name of SCS51. The Division recommended that the approved instrument landing system be installed on all airports used for international air traffic as soon as possible, and in any event not later than January 1, 1951; and that it be kept in operation at each airport at least until January 1, 1955. Distance-measuring equipment is to be added as soon as possible, and GCA is to be provided wherever traffic is great enough to make this useful. In the meantime, development work is to be continued with the object of producing an instrument landing system to control aircraft automatically during approach and landing.

The Division found that there is no device sufficiently proved at this time to justify universal adoption as the sole aid for short range navigation purposes. It recommended that the very high frequency omni-directional range, together with distance measuring equipment, be installed as soon as practicable on international trunk routes where short range navigational aids are required, and be kept in operation at least until January 1, 1955. The specific locations of such installations are to be decided by PICAO regional meetings. Development of other short range navigation equipment is to be continued, with particular reference to their use in areas of high traffic density, and every opportunity taken to secure large scale operational experience with these systems. The Division also recommended that an international commission be established to maintain a continuous review of further developments and to guide and assist those developments.

In the Division's opinion, low frequency Loran is the long range system which most nearly meets present operating requirements for Long Range Navigational Aids among those now available. Standard Loran installations are now operating in important ocean areas, and the Division believes that the existing stations should be retained, as well as all other long range navigation systems now in operation, until such time as one standard system can be adopted. A priority list was drawn up for the installation of LF Loran equipment (developed and tested in Operation "MUSKOX") in the international air routes of the following regions:

North Atlantic to be installed by	January	1949
Southeast Asia-Australia	" "	1951
Africa	" "	1951
Pacific Area	" "	1951
South Atlantic Area	" "	1951

Aerodrome Zone Aids are designed to expedite the ground travel of aircraft and surface vehicles in poor visibility on the movement areas of airports. At busy airports the speed of clearing runways is a limiting factor for the amount of traffic that can be handled. The Division recommends the use of high discrimination radar as the best solution for determining the position of aircraft, vehicles and obstacles. It suggests that research be continued on inductive signalling systems, but that in the meantime communications with aircraft and vehicles continue primarily by radio-telephone.

The Broad Problems of Air Transport

The most satisfactory solution of all technical problems, however, would not be the complete fulfillment of the aspirations of the creators of the International Civil Aviation Organization. Far and beyond these technical considerations is the vast field of economic, legal and political questions that unfold when planes travel from one nation to another. The Chicago Conference was not unmindful of these questions and attempted to erect the framework of an agreement that would govern the relationship of the nations in air transport. The advantages of a general code on the commercial privileges that one nation would grant to another are apparent. But the conference was unable to reach such a general agreement and established instead two separate agreements, known as the "two freedoms" and "five freedoms" agreements, to which the nations could adhere as they wished.

It was left to PICAO to develop further studies on the general or multilateral agreement. At its First Interim Assembly meeting in May-June, 1946, a proposed agreement was presented to Member States. The States agreed that "a multilateral agreement on commercial rights in international civil air transport constitutes the only solution compatible with the character of the International Civil Aviation Organization" but that such an agreement could not be reached at that time. The Council was instructed to continue its work on a general code, incorporating the views and experiences of Member States, which would be presented to the next Assembly Meeting. The consideration of a suitable multilateral convention, not necessarily incorporating the confusing "Free-dom" is the principal task now under way in The Air Transport Committee.

The collection of economic and statistical and legal information on air transport, charged to the Organization by the Chicago Conference, becomes an increasingly important aspect of its work. All factors relating to competition in international air services are being studied; analyses and studies are being made on the general problems of air transport to the end that international aviation will not become a source of distrust and friction among nations.

The role of arbiter has been given to the Organization. It is provided in its charter and arbitral functions may be exercised in the event of differences between states on air transport matters. An advisory report or compulsory decision may be made if all parties to the dispute desire.

Relationship With Other International Organizations

Many of the activities of an international aviation agency relate directly or indirectly to the work of other international organizations. A close association is therefore maintained with other international organizations: with the International Technical Committee of Experts in Air Law, the International Air Transport Association, the International Chamber of Commerce, the International Meteorological Organization, the International Telecommunications Union, the International Hydrographic Bureau, the Federation Aeronautique Internationale, the International Labor Office, the Universal Postal Union, the World Bank and others.

The Convention on International Civil Aviation states that "the future development of international civil aviation can greatly help to create and preserve friendship and under-

standing among the nations and peoples of the world, yet its abuse can become a threat to the general security." Because it has as its prime purpose the preservation of peace, it has a common objective with the United Nations. In recognition of that fact, this Organization has entered into negotiations with the United Nations, which would, while preserving its autonomy, bring it into a close working relationship with that Organization. It is now anticipated that ICAO will eventually become the autonomous but generally subordinate specialized civil air agency of the United Nations.

What PICAQ Still Has To Do

Although much has been accomplished in the past, much remains to be done. The tasks ahead of PICAQ, or its successor, ICAO, can best be pointed out by a summary of its objectives. The aims of PICAQ are to develop the principles and techniques of international air navigation and to foster the planning and development of international air transport so as to:

- (a) Insure the safe and orderly growth of international civil aviation throughout the world;
- (b) Encourage the arts of aircraft design and operation for peaceful purposes;
- (c) Encourage the development of airways, airports and air navigation facilities for international civil aviation;
- (d) Meet the needs of the people of the world for safe, regular, efficient and economic air transport;
- (e) Prevent economic waste caused by unreasonable competition;
- (f) Insure that the rights of contracting states are fully respected and that every contracting state has a fair opportunity to operate international airlines;
- (g) Avoid discrimination between contracting states;
- (h) Promote safety of flight in international air navigation and
- (i) Promote generally the development of all aspects of international civil aeronautics.

These principles are agreed by the 46 member States as sound guides for the proper development of all aspects of international civil aeronautics. If national interest or greed or selfishness in any other form forces the deviation from those principles, the economical, easy intercommunication of the masses of the people of our various nations and mutual understanding is prejudiced. With that prejudice come national misunderstandings and the road to war. With friendly and easy intercommunication of peoples come international understanding and the way to peace. Sincere national support to the principles around which PICAQ is built will be a material contribution to a healthy, growing peaceful international understanding.

ORDER OF FIFINELLA

(Continued from page 21)

from coast to coast. They traveled at their own expense—some of them considerable distances. Not a one of them received a penny for her work. They were glad to have a chance to contribute to the advancement of aviation.

Our first big reunion was occasioned last August when over a hundred WASPs descended from all corners of the U. S. on the Piper factory at Lock Haven, Pennsylvania. For several days we shot the breeze and talked over old times. Many of us had married since we last met. Some had had babies. But all of us were still as enthusiastic about aviation as ever. On the 28th, after we had talked ourselves out, we took off on the largest mass formation delivery of airplanes on record. Mr. William Piper had invited us to ferry a hundred Piper Cubs to dealers all over the country. He didn't need to ask more than once.

It is our intention to keep the Order of Fifinella as colorful as we can. But more important, we are determined to keep it purposeful. Our record is not closed.



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THE GANG
TOGETHER"**

Dear Former Member of the AAF:

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4. The opportunity to continue service friendships, perpetuate AAF traditions, and commemorate those who did not return through the formation of state Wings and local Squadrons.

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J. H. DOOLITTLE,
President.

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Book

The World's Wings by *Lucien Zacharoff*. Duell, Sloan and Pearce, New York, \$3.00.

Because every man's home touches the shore of the air ocean, the diplomacy of air control is a top-rate consideration in international politics. Americans are well informed on the mechanical phases of aviation. Yet the average American is more interested in reading about what is delaying delivery of his new automobile than about the diplomatic struggle for future control of the commercial sky. In *The World's Wings*, Lucien Zacharoff gives the background to the subject of air imperialism which, lacking the drama of a Pacusan Dreamboat flight, misses public inspection.

The struggle between the U. S. and Great Britain in this regard is among the bitterest in history, yet the public hardly knows about it. Britain enters the arena with BOAC, a monopoly virtually owned by the government—a British Flag airline in the best marine sense. The U. S., on the other hand, has given over the international transport business to a number of competing airlines, over the protest of Pan American Airways, which feels that the U. S. should be represented in the struggle by a “chosen instrument.”

Probably the most interesting single revelation in the book is the fact that Britain's Labor Government has approved a Tory plan for domination of the world's airways.

Zacharoff, who for twenty years has been among the nation's top researchers in air economics, makes a fascinating presentation of some of the less dramatic facets of the struggle which is designed to drive the U. S. out of the international air transport business, much as she was reduced to a fourth-rate marine power in the years preceding World War II.

U.S. Army Aircraft: 1908-1946 by *James C. Fahey*. Ships and Aircraft, New York. \$1.00.

Have you ever wondered what the XB-1 was or why you can't ever remember seeing an XP-34 around? Do you know the difference between XP-60s, or do you know that they were a line of improved P-40s which never got beyond the Y (service test) stage? All the questions on the mysteries of AAF aircraft evolution are answered in this little booklet. It is probably the first authoritative list of all AAF aircraft, from the first Wright Brothers' contract for a twin-prop pusher to the P-87, on which all data are still hush-hush.

The compilation begins by explaining designation terminology by type, classification, manufacture, and modification. This is followed by a listing of all power plants used by the AAF from its Signal Corps days to jet power; aircraft procured by the Army from 1908 to the outbreak of World War I; World War I aircraft, both U. S.-built and those procured abroad. Aircraft are listed by builder, order date, number procured, dimensions, power, top speed, with other general comment, including modifications of wartime designs and special designations for rebuilt U. S.-built de Havilland DH-4s.

Original official numbering of aircraft started in 1919. The book lists them by function giving pertinent data on the aircraft thus labeled from 1919 to 1924. The classification system currently used was introduced in 1924. Aircraft dating from that time are listed under the modern system by general function, model and modification number, date

Reviews

ordered, number procured, builder's name, dimensions, power plant by builder, number, and output, top speed of the craft. The illustrations include not only the important types, but such less-known models as the XB-28.

This reference should be a part of every well-organized aeronautical library.

Jane's All The World's Aircraft, 1945-46. Edited by Leonard Bridgman, The Macmillan Company, \$19.00.

This year's Jane's, like the ones that followed World War I, is of better-than-usual historic interest. The editors of this thirty-four-year-old annual have had a year to digest the information emanating from the war.

The volume is divided into the usual sections, first the history of the last year's operation, then a summation of the actual military significance of air events that led to the downfall of the Luftwaffe.

As usual, the power-plant section is quite complete, and for the first time, gas turbines and jet engines are reviewed. The customary study of the air ministries and transport pictures is presented. Then the work wades into its weightiest section, the study of aircraft in every country that actually produced planes last year and this. Germany and Japan are represented with the aircraft that was in use or production as of the time of their defeat.

The German section includes some of the spectacular and less-known aircraft that was being primed for air counterattack just before the collapse of Germany, both in reciprocating and turbine power.

As usual, the U. S. is not represented by its newest and best aircraft, either in the commercial or the military field. Whether this is caused by the proximity of material sources or whether it is editorial technique to report U. S. types in many cases a full year older than parallel British designs is a matter of opinion. Jane's is, undoubtedly, the world's standard aviation reference book. For the sake of U. S. representation in future air markets, an American counterpart is needed.

Gas Turbines and Jet Propulsion for Aircraft by G. Geoffrey Smith M.B.E. Aircraft Books, Inc. New York, \$5.00.

The new American edition of this book differs little from the British, with the exception of preface and foreword. Considering the fact that paper is still a scarce commodity in England, a U. S. edition of this authoritative work by the editorial director of *Flight*, pioneer British aviation weekly, is a genuine service to the industry.

The volume is an expansion of previous editions. However, the contents include a thorough study of British progress during and after the war. German procedures are given a complete going over for the first time in book form. The greatest visible change is the movement of the center of importance from gas turbines for pure jet propulsion to propjets for possible commercial and transport use.

It must be remembered that Smith is a British editor, and that the book was created originally for a British engineering audience. The terminology and style are foreign to the average U. S. reader. However, in the absence of more authoritative studies, Smith's latest edition will serve well as U. S. text.

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WAR BELOW ZERO

(Continued from page 29)

piloted by Lt. Pritchard took off from the bay, and managed a successful landing on floats in a snow-filled valley near the B-17. We flew over the Grumman and dropped snowshoes and ropes to Lt. Pritchard, and he made his way over the ice to the scene of the wreck, reaching the stranded crew on the afternoon of November 28th, twenty days after the crash. One look at O'Hara's frozen and blackened feet told him there was no time to lose. Since neither O'Hara nor Spina, the other seriously injured man, could make the journey back to the plane on foot, it was decided to get medical help, and Pritchard took two other men who were walking casualties and flew them back to Comanche Bay.

Late that night Demarest and Tetley brought their loaded sleds to the edge of the crevassed area where the B-17 lay, and made their way with flashlights the rest of the distance. They found the crew in high spirits: their ordeal seemed to be over, and they celebrated the approaching rescue with a dinner of canned chicken and ice cream made of compressed chocolate mixed with snow. Demarest put new dressings on Spina's broken arm, attended the other frostbitten members of the crew, and that midnight he and Tetley headed back to get the sleds and bring them to the plane.

The trail was broken now, and Demarest did not bother to feel his way ahead on skis. The crew of the plane, waving to them eagerly as they headed over the last lap of the trail, saw Demarest make a circle to swing his sled around so it would be headed in the right direction. Without warning the crust beneath him gave way, and sled and driver plunged into a crevasse. Far down at the bottom of the crack, the shocked crew could see the tail of the shattered tow-sled; but there was no sign of Demarest, no answer to their frantic shouts. After hours of effort, they were forced to give up hope.

The Arctic is a relentless enemy; it follows up an advantage without mercy. Lt. Pritchard returned that same afternoon in his Grumman; just as he arrived, a message was received from the *Northland* that bad weather was closing in again, and he would have to start back immediately. With two other members of the B-17 crew who could walk, he headed back to the amphibian. It was the last anyone ever saw of him. Some days later the wreck of his plane was located from the air; evidently he had flown into a mountain in the fog, and all three men had been killed outright.

Lt. Monteverde and his crew received the news in stunned silence. One minute their rescue had seemed to be only a matter of hours; the next minute their hopes were dashed utterly. O'Hara tried hardest to keep his courage up: his frozen feet were rapidly growing gangrenous, and he guessed what this additional delay would mean. Day after day the storm penned them in; there was no hope of moving out with the remaining motor sled. At the first break, a week later, we sent a B-17 with Captain Turner of the Air Transport Command to drop supplies. For weeks and months, "Pappy" Turner kept up this hazardous routine, going over the wreck whenever possible and dropping fresh food and medical items and cheerful messages to the crew; in all, he made thirty-four trips across the Cap that winter. The crew came to look on his plane as a symbol of hope, a proof that somehow, sometime, their comrades in the Air Forces would find a way to get them out.

On December 7th O'Hara's feet were in such bad shape that it was decided Tetley should make a run for it, taking the sick men and two members of the crew, Lt. Spencer and Private Wedel, an assistant engineer, of Clinton, Kansas. Tetley took along sleeping bags, a tent and three days' rations; they made O'Hara comfortable in his sleeping bag

on the sled, Spencer went ahead on snowshoes to test for crevasses, Tetley drove the sled and Wedel followed on foot. A couple of miles from the wreck, they halted to make an adjustment in the sled and Wedel came alongside to speak to O'Hara. Suddenly O'Hara heard Wedel exclaim, felt Wedel's mittened hands clutch the sleeping bag, then slide helplessly over his legs as his grip weakened. Tetley gunned the sled, ran it off the crumbling crust in the nick of time. They ran back and peered down the crevasse into which Wedel had plunged, but there was no sign of life.

Now they appreciated more than ever Wedel's mechanical ability. The sled began to give trouble as they progressed; the lubricating oil froze and broke a fuel line, the motor quit, the sled came to a final halt. The drifting snow piled high against their tent that night; by morning the sled was completely buried. They made the injured man as comfortable as possible, and crouched at the bottom of their burrow to wait.

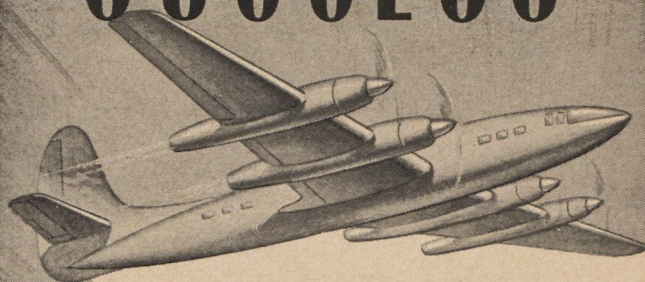
In the Arctic you learn to wait. Hours run to days, days into weeks and even months; and still you wait, and still the snow gets deeper and the winds howl in the twenty-four-hour darkness. From time to time, after he located their isolated tent, Capt. Turner dropped food, supplies, and even mail from home; Spencer received a Christmas present late in January, a sweater from his wife knitted for him in Dallas. Said it came in quite handy. Despite the agony of O'Hara's condition—later both his legs had to be amputated at the knee—his courage wavered only once: he had a birthday coming, and the thought of celebrating this event so far from home weighed on his mind. When the day came, his two comrades managed a surprise. With due ceremony, they presented him with a pack of cigarettes which Spencer had kept hidden in his sleeping bag all those months.

Meantime the best efforts of the Army Air Forces, not only in Greenland but back in Washington, were turned to the problem of getting out the stranded men at the two camps. The Royal Canadian Air Force also lent a hand; two experienced Canadian bush-pilots, flying a Barkley Crow, made a rescue attempt at the end of December, but lost their plane when it landed on thin ice off the shore of southern Greenland during a snow squall. Although they were only 400 yards from shore, it took the pilots three and a half days to work their way in a rubber boat through the ice-choked waters to the beach. They were picked up by a band of Eskimo hunters and made their way to an air base by dog sled a week later.

Early in February the constant gales let up a little, and I decided to attempt a belly-landing on the Ice Cap near the motor-sled camp. On February 5th, in a Navy Catalina with Lt. Dunlap, we circled the area, and concluded it was worth a try. With wheels retracted and wing-floats down, we struck the snow and slithered and slipped over the sheer white field, our hull plowing two feet deep in the drifts, the wash of our propellers sending great clouds of snow like spray in the air. For the first time in sixty days, the three men at the motor-sled camp saw a human being. O'Hara had lost more than 100 pounds; but the other two men, thanks to Capt. Turner's faithful efforts to drop them supplies, had actually gained some ten pounds each.

The injured man safely aboard, we gave her the gun. The plane stood stock still. In the freezing cold, the metal hull had frozen fast to the ice. We placed a couple of men on each float, and ordered a couple more to run back and forth along the wings, rocking the ship from side to side until we broke the grip of the ice and started the plane. She froze fast again the moment we halted to take the crew aboard. Once more we rocked her until she broke loose, and this time we started up and taxied slowly in a large circle in the snow. One by one, as we passed them, the men jumped onto a metal ladder hanging from the door of the port gun-

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AF-1

(Continued from page 63)

blister; the crew inside the plane grabbed each new arrival.

We knew we could not get to them by air. Our only chance was to land again at the motor-sled camp, bringing a dog team and drivers who would make their way to them by foot. On March 17th, with a 50-mile gale and visibility of fifty yards, the Navy PBV sat down successfully and we



Rinsky, Sergeant Healey's lead dog, sleeps undisturbed in an 80-mile an hour Arctic gale. Rinsky was born in Little America in Antarctic.

unloaded three men, nine dogs and a month's supply of food.

All that day and the next, the three men at the B-17 peered fixedly at the horizon, sweating the rescue-party in. At last they could make out the tiny dot of the sled and the line of straining dogs, creeping through the drifts and over the sharp sastrugi with agonizing slowness. Their progress was so imperceptible that Monteverde stood two skis in line in the snow and sighted on the rescuers to make sure they were actually moving at all. Gradually they drew nearer; now the sound of men's voices could be heard for the

THE BEAR HAS WINGS

(Continued from page 19)

to find some other type of power which can be thus projected with decisive results. It is clear that the sea offers neither a satisfactory means of projecting the power of the Red Army nor a second type of force to function on its own. Russia lacks personnel experienced in the design, building and operation of naval power. Moreover, the last war has demonstrated that surface shipping of any kind is at the mercy of land-based aviation.

The air offers both the means of projecting Red Army power and an independent striking force. Moreover—a major consideration—a hugely expanded Red Air Force can be built up in secrecy behind the Iron Curtain. Whereas the building and training of any considerable naval force could not be done in private, the vast land distances and air spaces of Russia plus Moscow's control of communications make it possible for diversified air power on a scale yet unknown to be developed, constructed and trained without anyone outside the Kremlin knowing the scale of the enterprise: very long-range bombers to implement the atomic power Stalin has announced he would seek and find, mass transport for land forces and their supplies, and escort for both. The logic of the situation is inescapable. This is what they *must* have. This is what they *will* have.

Occasionally a corner of the Curtain is lifted, and there is disclosed exactly what you would expect. For example, on April 7, 1946, Radio Moscow announced that planes are taking off daily from Moscow for the Arctic regions, that an airline is being established to link remote stations on the Kara Sea and on islands in the Barents Sea, and that a flight had just been completed covering more than 15,000 miles along

first time in one hundred and eleven heartbreaking days. On March 18th the stranded crews bade farewell to the broken section of fuselage in which they had lived on the Ice Cap for five bitter months; on April 5th they reached the motor-sled camp, and that afternoon we landed again in the PBV and took them aboard.

Our difficulties were not over. Due to lack of wind, the overloaded plane could not get off the ground. In the effort our starboard engine caught fire, and was extinguished with difficulty. There was only one thing to do. I unloaded the dog team and necessary supplies, and while Lt. Dunlap took off with the three rescuers in the PBV, the rest of us struck out across the ice toward the coast. We navigated by dead reckoning with a prismatic pocket compass and a protractor drawn in pencil on a page of my notebook, clocking off our mileage by a distance-gauge fastened to the wheel of the sled. Ten days later we arrived at Beach Head weather station.

Our war in Greenland was not a big war, as wars go. There were no major battles, no epic encounters of planes or tanks, no headlines in the home-town papers. Loneliness doesn't rate a citation; they don't give medals for waiting.

But it was an important war: for the knowledge of the Arctic that we gained, at the cost of these men who gave their lives on the Ice Cap, will insure the safety of tomorrow's aerial travel in the North. The bases and weather stations they fought to maintain, amid the darkness and silence and cold, will be future stops along the new air route to Europe. Some day our whole conception of geography will be changed; the earth itself will be rolled over on its side, and the spindle of the globe will run, not from Pole to Pole, but from one side of the equator to the other. Then the Arctic will be the very center of our new world; and across Greenland and northern Canada and Alaska will run the commercial airways from New York to London, from San Francisco to Moscow to India. Today's highway of war will be tomorrow's avenue of peace.

Arctic stations on the mainland. Note the preoccupation with "stations" in that region of the Soviet Union which alone offers access to all the United States.

This gives reason for careful and courageous planning on our part, but not for despair. We must have the *instrumentalities of defense* to repel any aggressive move and the *instrumentalities of retaliation* to discourage its inception. Where national power depends upon scientific discovery, technological progress, and the skillful handling of intricate machines we are in our element. In the basic fields of aircraft design, guided missiles, electronics and atomic energy there is reason to believe that we are at least two years ahead in development and know-how. This is a precarious lead which can be maintained only by constant vigilance and no inconsiderable expense. But keeping ahead in scientific development is not enough. As weapons are conceived we must produce them in quantity, must equip a current force-in-being and must train men in effective tactical employment. We must be prepared to face the awful waste of obsolescence in a situation where yesterday's Buck Rogers miracle is tomorrow's museum curiosity. In statistical terms the Air Force obsolescence rate is likely to reach 25%—which means that, in addition to operating expense, we must face the construction cost of a full-scale air arm every four years.

The danger is that we will shrink from recognizing these realities, that we will prepare for wars that are over and enemies who are dead, that we will cling to the traditional eye-filling embodiments of power. If we do, we will get licked—and getting licked in this century by this adversary is a prospect not to be taken lightly.

AIR FORCE

(Continued from page 42)

as bagged minerals, have been carried. Quick-removing seats permit mixed cargoes of passengers and freight, common in back-country operation. Two doors, at truck-tail height, are set in the side of the fuselage: one in the conventional rear position, the other forward, right at the center of gravity, to allow the direct loading of concentrated weight without having to shift it around in the fuselage.

A nose hatch at the upper end of the fuselage permits loading of pipes and other "length cargo" up to 36 feet long. This is more room than even oil well casings require.

The wing is a standard multi-cellular structure of the most modern design, incorporating the famed retractable aileron system used in the Northrop P-61 Black Widow night fighter. This makes possible the use of a full-span wing flap, which accounts for a large part of the craft's unique performance.

The trimotor power theory, long in disuse among U. S. designers, has been popular in rough-country operation, where power failure is a serious matter. The fact that the failure of one engine is only a one-third loss is an important consideration in taking off from a field situated high above sea level. The three power plants are grouped as close together as possible, so that failure of any one power plant causes a minimum of yaw.

Performance of this craft, despite the fixed gear, is surprising. It has a cruising speed of 185 mph and a service ceiling of 21,000 feet. Carrying a useful load of 10,600 pounds, it can take off in a 700-foot run and land in 750 feet—a unique performance for a 25,000-pound airplane.

The two-place cockpit has been rigged for maximum crew comfort. Instruments are arranged for easy view, and all engine controls are placed within easy reach of both seats. Full automatic engine controls have been incorporated into the Pioneer.

(Continued from page 16)

brought the war over their very homes. In many cases, their willingness to cooperate with and to befriend their conquerors is gratifyingly evident.

There have been some minor incidents between G.I.'s and Jap men, frequently growing out of the latter's indignation over the affection many Japanese women show the American soldiers. A fact presumably unappreciated by the Jap male is that many of his countrywomen prefer the company of occupation troops simply because they have discovered the Occidental practices of common courtesy toward womanhood to be a novel deliverance from their traditional subservience.

While some unpleasant incidents are inevitable, no one can deny that general feelings in Tokyo between the conquerors and the conquered are ostensibly good, and that the U.S. Army has set a precedent of model military occupation. Today any American soldier who conducts himself with decorum and who respects human rights and dignity can roam unarmored through the city with little fear of experiencing antagonism from the Japanese people.

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IF YOUR AIR FORCE IS LATE

Or if you have missed an issue, it may be that your address is incorrectly listed in our files—or perhaps you've moved without letting us know—or maybe the address you gave us is incomplete. Of course, if any of these things have happened to you chances are that you won't be reading this notice, but if you know of a fellow AFA member who is having such difficulties won't you please tell him to drop us a postcard containing such pertinent information as his name and present address as well as the address from which his membership application was made. And speaking of addresses, ours is:

Business Department

AIR FORCE

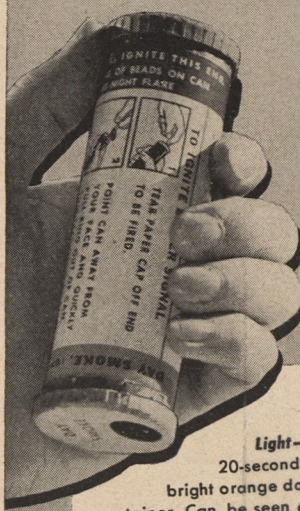
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NAME

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CITY AND ZONE

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Rendezvous

Lost Buddy Department

Gentlemen:

Congratulations on starting the Rendezvous column. It should bring a lot of old buddies together.

I have lost track of a buddy who was stationed with me at Rapid City Army Air Base, Rapid City, S. D. His name is S/Sgt Joseph Dworkin and his home is in San Francisco, but I don't know his address. If he reads this, I wish he would contact me.

William J. Nichols
3 Philip Street
Dorchester, Mass.

Transferred Crew

Gentlemen:

I'm a member of the Air Force Association and would like some information if possible. While I was overseas, the rest of the crew I was with was transferred to another squadron. I wonder if it would be possible to locate them through Rendezvous. We were the 465th Bomb Group, 782nd Bomb Sqdn. in the 15th Air Force. My buddies' names were: Lt. John Koenig, 2nd Lt. William Carron, 2nd Lt. Edward Schmidt, 2nd Lt. Robert Cox, S/Sgt. Carl Dudeck, S/Sgt Wayne F. Hertzler, Sgt. William Blosser, Sgt. Raymond Lumley, Sgt. Carl Franklin.

James E. Stephens
14920 Camarillo St.
Sherman Oaks, Calif.

Where's the Captain?

Gentlemen:

I am interested in learning the whereabouts of a fighter pilot who was a close friend, but we have lost contact. In September, 1945 he was a captain assigned to the 407th Fighter Squadron, 372nd Fighter Group, Alexandria (La.) AAB. His name is Donald P. Taylor and his home was either in or near Los Angeles. Can you help me locate him?

Capt. George W. Brunson
Ward 216, Moore General Hospital.
Swannanoa, N. C.

One Each M/Sgt Missing

Gentlemen:

I'm interested in locating a very good buddy of mine and will give his last known address in the hope that you can locate him for me. I have reason to believe that he is still in the Air Forces. He is M/Sgt. Arthur L. Scifres, ASN 14029648, 19th Bombardment Squadron, 22nd Group, APO 922, c/o PM, San Francisco. His home then was Griffin, Georgia.

Anthony J. Ruddy
56 Hazel Court
Brooklyn 28, N. Y.

40-G Men

Gentlemen:

Twenty-one Air Corps pilots, who as flying cadets of the class of 40-G got their wings on November 15, 1940 at Kelly Field, formed a permanent class organization at a reunion dinner held Friday, November 22, at the Gunter Hotel, San Antonio, Texas.

Lt. Col. Timothy O'Keefe, Randolph Field, Texas, was chosen Acting Secretary for the coming year. All members of 40-G, whether in civilian or military status, are urged to send him their address. As soon as the addresses have been received a class directory will be compiled and sent to all members.

The next reunion dinner of the class will be held Saturday evening, March 1, 1947, at the Gunter.

Major R. C. LeCompte
Press Section, PRD
Pentagon Building
Washington, D. C.

Irate P.R.O.

Dear Rendezvous

What I'd like to know is where was my boss in your two-page spread on Air University? He is Colonel William B. Wright, Commandant of the Special Staff School at Craig Field, and we have all noticed that his picture was inadvertently left out of the portion of the page allotted to the various heads of the University's subordinate schools. How come?

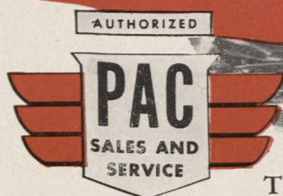
Eugene D. Minietta
Captain, Air Corps
Public Relations Officer
Craig Field, Ala.

Colonel Wright's picture arrived too late to be included in the layout. The editors of AIR FORCE certainly had no intention of minimizing the importance of the job Colonel Wright is doing. His picture is published herewith.





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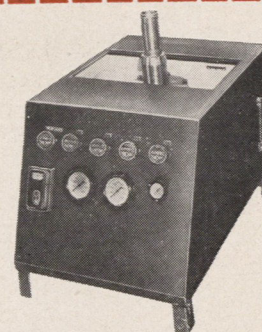


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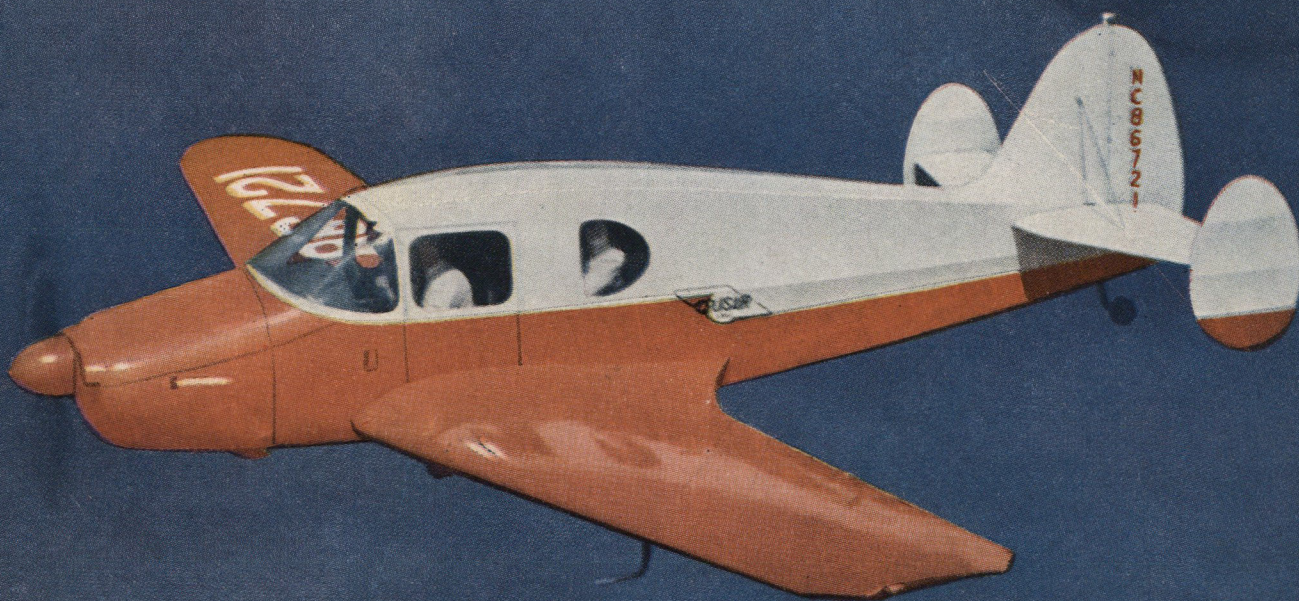


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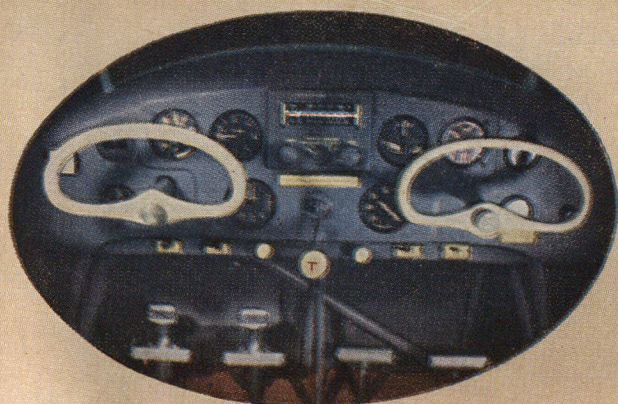
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MR W HECKATHORNE
ROUTE 3
BEAVER FALLS PA

Hans Greenhoff Photo

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