

AIR FORCE

THE OFFICIAL JOURNAL OF THE AIR FORCE ASSOCIATION, SEPTEMBER, 1946

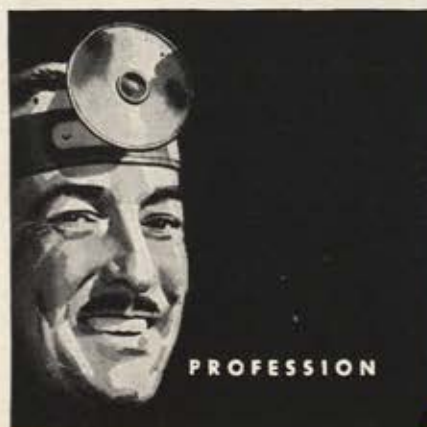




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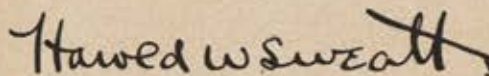
Before the war Honeywell was taking up this challenge. We saw where Minneapolis-Honeywell controls could serve in the Age of Flight, just as they brought comfort, safety and economy to the home and industry when all of us were still earth-bound.

Minneapolis-Honeywell Control systems have become established in the air. The needs of the Air Forces in wartime accelerated our research and development and advanced our Aeronautical program by many years, over the pace it might have taken in its normal growth.

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Aviation tomorrow will be even more dependent upon automatic control. That is a science Honeywell has pioneered since 1885. We welcome the challenge that aviation's need presents to the Honeywell organization. We like our wings. They are a part of Honeywell and will be a continuing factor in its future.



HAROLD W. SWEATT, President.

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CONTENTS

Rendezvous	6
In This Issue	8
Wing Tips	10
Unification Cannot Wait	13
There Were Giants in Those Days,	19
By William Friedman	19
White Elephants for Sale	24
By Floyd B. Brinkley	24
Air Force Future	27
By James H. Doolittle	27
Grass-Roots Airliner	28
Hot Rods and Hop-Ups	30
By Burgess H. Scott	30
Strictly Personal	32
By Harvey Hayden	32
AFA News	36
Silent Flight	38
By Sanford A. Wolf	38
Mach 1	44
By H. L. Keeler	44
Air Power by the Pound	46
By John Paul Andrews	46
Doodles for Destruction	50
By Eric Friedheim	50
Bulletin Board	54
Books	58

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HANGAR FLYING



The Whaleboat

In Building 82 at Burbank, engineers have been fussing over a remarkable object that looks like a dural whaleboat on wheels. It's the *Constellation's* new Speedpak and it's a lot more useful than a whaleboat, except maybe to whalers.

With the Speedpak, fast handling of air cargo is made possible for the first time.

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belly, full of over four tons of additional cargo. At any stop the Speedpak can be lowered, loaded and lifted in a matter of minutes.

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The Speedpak is a new solution to the cargo problem. But new ideas are old stuff at Lockheed—ideas that make good hangar flying and better air transport.

L to L for L

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Rendezvous

Flight Officer (jg) Roger Wilco
Kilroy, USAAF

WHO IS KILROY? It is unthinkable that a member of the Army Air Forces would be so audacious as to deny knowledge of one of the great heroes of World War II. A pioneer pilot, he hastened the war's end by brilliant contributions to the advancement of aviation. Aviation's Hall of Fame has long listed such able pilots as the Wright brothers, Rickenbacker, Lindbergh, Post, Doolittle, Arnold, etc. Now, Kilroy—Flight Officer (jg) Roger Wilco Kilroy, USAAF—will be added.

Kilroy was the first and only pilot to hold a roving commission in World War II. Some pilots have resented "this everlasting insult to their globe-trotting reputation." Yet they express no resentment toward Doolittle and his firsts. So they should be proud to follow in the prop-wash of Kilroy, another pilot of many firsts.

Kilroy was operations officer at an important base in Smackover, Arkansas, a town named for one of his many accomplishments, when war was declared. He immediately hit the breeze, with his roving commission, for the fronts. Kilroy was always in front, far in front, Kilroy was always first. Presumably, when the first Allied airplane landed in Japan after VJ day, Kilroy was already there. He was standing beside his airplane, giving the Jap pilots a lesson in radio communication by showing them how to talk correctly into a relief tube.

Kilroy, the first man to solo a Link trainer with only one hour of instruction, was also the first to fly a Fortress back to base using only the putt-putt with all four props feathered. It is needless to say who made the first carrier take-off in a B-29.

Kilroy was the inspiration for the first jet-propelled job. He had been getting by on hot air for years. He coined the word "Raunchie," a self-description.

Kilroy saw action in every theater, including some rare action in Piccadilly Circus. His decorations include the Good Conduct Medal with three battle stars, the Pre-Pearl Harbor ribbon with two raisins glued thereto, and the Purple Shaft of Arkansas.

F/O (jg) Kilroy was the first veteran discharged from the Air Forces under the point system. Kilroy had many points, all bad. Unfortunately, he retired from aviation due to a terrible attack of airsickness, suffered in a cable suspended whirl-around airplane at a carnival, and is now playing first base for the Smackover Ground-Loopers. He is a bitter, disillusioned man. When Kilroy returned to the States, after his brilliant career of informing his fellow airmen that "Kilroy was here," he rushed to the home of his childhood sweetheart to claim her for his bride. She had promised to wait, but alas, her love had cooled, and she had married a

"gravel cruncher" from Camp Polk. Her only explanation for the breach of promise was in an envelope handed to Kilroy by her mother. The brief message was appropriate. It read: "KILROY WASN'T HERE!"

LT. JOHNNIE FITCH, ORC.

A Few Direct Hits

Gentlemen:

Where was the picture taken that adorns the front cover of your July 1946 issue? Several of the fellows look very familiar to me—think I knew them in Corsica or in training.

Since its "discharge" and subsequent change to civvies, *AIR FORCE* is a much better magazine, both in looks and content. Keep up the good work. My only gripe so far is the lack of cover write-up. Best of luck and happy landings!

FRED H. GAINES,
Richmond, Virginia.

Unfortunately, the cover photograph used in July was taken under wartime regulations which prohibited identification of places and personnel in photos destined for public reproduction. All we know is that it was taken "somewhere in England" by our former associate (Major) Bob Isear.

Gee Thanks!

Gentlemen:

Congratulations! Received my copy of *AIR FORCE* yesterday and I must say it's superb. Truthfully, I was rather pessimistic when I learned that *AIR FORCE* would no longer be mothered by the Air Corps, but its civilian status has certainly added to its general content.

May I make a few suggestions? I believe a page of letters to the editors would be extremely interesting and informative and would serve to foster reader interest. Also I'd like to see complete coverage on local AFA squadrons, their activities, and suggestions in regard to forming new units.

During the war I'd always felt the Air Corps had sifted the cream of the Army crop into their ranks. Therefore an organization with members of such a relatively high character must certainly have a voice in veterans' affairs and in general policy with regard to the betterment of a national air arm. Your fine organ has furnished us with the tools. Now it is up to us to see that our ideals and desires are brought to the front. Front, that is.

In closing, may I wish you the very best of luck in your new and worthy venture.

JACQUES F. JACOBSON,
Brooklyn, N. Y.

Rather than fake our own letters for the first civilian *AIR FORCE* or use memos from deactivated AAF units, we omitted *Rendezvous* from the July issue. However, you will find the column in every issue from now on.

(Continued on page 60)

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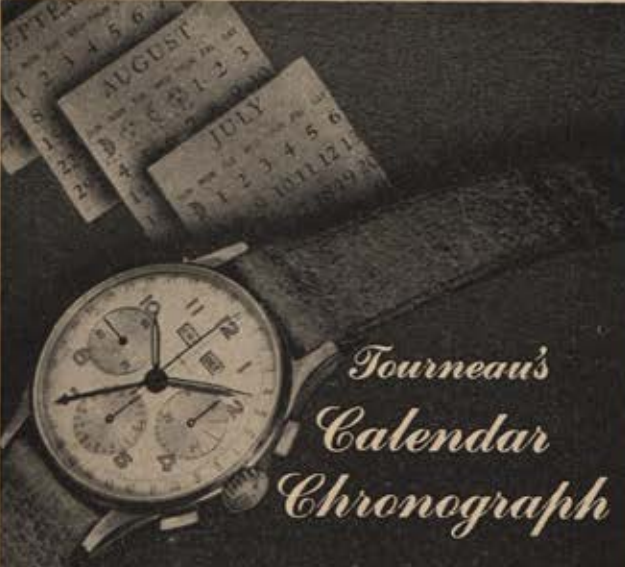
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In This Issue

The Cover this Month

Reminiscent of the post-Pearl Harbor period when U. S. had little more than a handful of available glider pilots, this full-color photograph was made at Twenty Nine Palms, California, just after one of the Army's first glider pilots completed his first successful solo. The sail-plane is a two-place Schweizer trainer but the pilot must remain anonymous until his family or friends provide us with an identification.

The Autonomous Air Force

Outspoken champion of aviation in all its phases, the Honorable Jennings Randolph of West Virginia stands today as the strongest Congressional supporter of unified defense and an Air Force sharing co-equal status with the Army and the Navy. In "Unification Cannot Wait," Randolph presents a carefully documented case for military reorganization that packs all of the fire of his Congressional forensics—but cannot simulate the histrionics with which Randolph has advanced every aviation development bill of the 78th and 79th Congresses.

A Generation of Big Planes

One-time employee of the Gates Flying Service and long-time intimate of aeronautical engineers from de Bothezat to Kartveli, William S. Friedman challenges current clamor over the new giants of the air in "There Were Giants in Those Days." His chronicle of outsize airplanes, which antedate the Convair B-36 and the Hughes Hercules by more than a decade, tells of eight-engine behemoths in 1921, of a twelve-engine giant circa 1929, of coupled power plants driving one or more props as early as 1916.

Hot Rocks Into Hop-Ups

When the A-bomb brought an end to subsonic speeds for thousands of AAF pilots, a substantial number turned their talents to an obscure prewar vehicle called the *hot-rod* and made the souped-up stock car a Number 1 problem for West Coast highway patrols. In "Hot Rods and Hop-Up Kids," Burgess Scott tells the story of GI-ingenuity which gives ordinary motor cars the speeds of a low-wing airplane, of speed talents which give AAF pilots the majority vote in "hot rod" clubs which operate just a few miles from the AAF jet plane proving grounds at Muroc Dry Lake. Mr. Scott modestly soft-pedals the fact that most of the 125 mph stock cars were created originally by the Ford Motor Company—which employs Mr. Scott as a "wandering reporter" in the motor world.

Of Men and Miscellany

For the personal-plane enthusiast, and especially the corporations planning company-plane ownership, Harvey Hayden recounts the features of the Beechcraft Bonanza. In more technical vein, H. L. Keeler reports on the new N.A.C.A. transsonic tunnel at Moffett Field, California, while John Paul Andrews presents the case for JATO as an accessory to aviation progress. And Sanford A. Wolf, who knows every glider site in all of the forty-eight states, pays tribute to Elmira as the capital of silent flight.



Bonanza

Airplanes have been named after stars, galaxies, constellations, animals, fish, birds, and natural phenomena such as hurricane, lightning, and thunderbolt. For the new Model 35 BEEHCRAFT we sought to find a name that would be descriptive of the extra value offered in the way of economy, performance, and pleasure to the owner. We examined the word "Bonanza" which in English has the common meaning of a rich source of profit or gain, or an unusual value. We found that it had the same general meaning in other languages and also had an additional meaning of fair weather in certain foreign languages. This seemed to us to be consistent with the fact that the Model 35 BEEHCRAFT BONANZA has a "built-in tail wind." To a pilot fair weather obviously implies a tail wind and the BEEHCRAFT BONANZA has it as "standard equipment." The literal translations of "Bonanza" are as follows:

Spanish	BONANZA.	Translation: prosperity, success, fair weather.
Portuguese	BONANCA.	Translation: prosperity, success, calm, fair weather.
French	BONACE.	Translation: calm, smooth sea, tranquility.
Italian	BONACCIA.	Translation: prosperity, welfare, calm, tranquillity.

Since we have given a great deal of attention to soundproofing in the airplane and have provided mufflers for the engine as well as a slow turning, quiet propeller we feel that the translation of tranquility or calm tranquility in French and Italian also applies to the comfort of the occupants of the Model 35 BEEHCRAFT BONANZA while in flight. Summing up all the meanings of "Bonanza" in English and in other languages we feel that "Bonanza" is a fit name for our new airplane. We have designed it for the prosperity, success and pleasure of its owners and we are certain that it will fulfill those requirements.

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RADIO EQUIPMENT

Wing Tips

The Popular Martin

Already ordered by a half-dozen U.S. airlines and by several foreign operators, the Martin 303 now has been selected by Northwest Airlines for service to all of the company's domestic route cities. Powered by the same Pratt & Whitney R-2800s which Martin used on the B-26 Marauder, the 303 carries 38 passengers at speeds of 300 mph and over. The cabin is pressurized and trailing edge venting gives a certain amount of exhaust jet power. Northwest has added several variations on the basic 303 theme with a semicircular lounge in the aft section of the fuselage, built-in loading steps at the rear hatch. The transport also has a forward passenger hatch, though no one has explained why a double-width main door wouldn't produce an equivalent loading speed-up without putting passengers up around the props.



Cutaway of Northwest's Martin 303 shows pressurized cabin for 38 passengers, lounge.

Low Cost Flyaway

With major production of small planes concentrated in the industrial cities of Ohio and Pennsylvania, announcement of a new flyaway service based at Detroit should interest a great many AAF veterans who are buying personal planes and shuddering at long-distance delivery costs. Manned by ex-GI pilots from ATC, Skyways Transport Service has facilities for 150 flyaway deliveries each month, quotes rates averaging only 12½¢ per airline mile on all of the popular small planes. Rates include complete insurance, a bonded ferry pilot, fuel for the delivery flight—with costs for pilot return transportation trimmed to a minimum by "return trip" ferry contracts with other manufacturers. Only eight months old as this is written, this AAF veteran enterprise is logging 100,000 miles monthly while delivering aircraft valued at \$250,000.

The Flying Pancake

Various described as the XF5U-1 and the V-173, the flying pancake has been an ultra-secret project at Vought for nearly three years. Now the Navy has authorized release of performance

figures which may or may not substantiate its promise as top contender for "fastest propellered design" honors. Powered by a pair of Pratt & Whitney R-2000 radials driving one or both of the props through a transmission system, the new flying wing boasts a speed range from 40 to 425 mph. Water injection broadens this range to permit operations at 20 or 460 mph according to the manufacturer. Conceived in 1933, the new Vought has a geometric aspect ratio of less than 1, apparently challenges every aerodynamic rule and refinement. But if test performance proves out on service prototypes, the Navy may have a modern scout plane even though the XF5U-1 never justifies its fighter designation.

Atomic Power for Planes

With a primary contract going to Fairchild Engine & Airplane Company, the AAF has undertaken a research program to ascertain how atomic energy can be harnessed as the propulsive power for future military aircraft. Although Maj. Gen. Curtis Le May has said nothing beyond the fact that research will be conducted at Farmingdale, N. Y., he has inferred that preliminary results prove that atomic air power is "not impracticable" even though the engineers are still seeking a final method for utilization of nuclear energy in aircraft.

More G.I. Ingenuity

Stationed at the Greensboro AAF base during the war, Pvt. Harold Rhodes of Los Angeles saw the effects of war upon the fingers of hospital patients. In some cases, post-operative adhesions produced stiffened fingers, in other cases minor frostbite left the digits in a semi-paralyzed state. So Rhodes built a pint-size piano from scrap aluminum and plywood, substituted alloy rods for the traditional piano strings, and came up with a device which gave patients some finger exercise while simultaneously teaching them to play the piano. Subsequently adopted in eleven AAF hospitals, the Rhodes "pre-piano" is now headed for the civilian market with some Chicago and Denver schools already scheduling the instrument for classroom use.

Size of Lockheed Constitution (outline) effectively dwarfs Constellation, 1946 giant.



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BY JENNINGS RANDOLPH



UNIFICATION CANNOT WAIT



SEPTEMBER, 1946



UNIFICATION CANNOT WAIT

BY JENNINGS RANDOLPH

**Representative Jennings Randolph of West Virginia has long been among the leading exponents of aviation legislation in the House. Year after year he has introduced and championed measures for a separate Air Force, including a unification bill as early as 1940. Now he is backing the President's unification plan which gives air power the autonomy it must have as America's first line of defense.*

SINCE EVERY MEMBER of the Air Force Association is a veteran of the AAF, I know I am talking not only to a representative group of the men who won the air war, but to those who, by continuing their fellowship

into civilian life, have shown that they intend to fight for the air power which they created.

You have seen the destruction of your Air Force by demobilization. Perhaps in your mind the shock of it has been tempered by the belief that the Air Force soon would be rebuilt to a compact but hard-hitting organization, armed with the most modern weapons for the guarding of the peace.

But at this very late day, nearly a year after you blasted Japan into submission, your Air Force is barely the shadow of what you know it should be and must be. We rank no better than third among the great powers. When the

public goes to an air show and sees the P-80s flash through the sky, everyone thinks that America is still supreme in the air. You know it isn't so. If you have been to an Army field recently and seen the struggle to keep a few planes flyable with our half-untrained force, totaling only 400,000 men or only a fifth of what we had last August, you can understand that something is terribly wrong.

Those of you who are in the Air Reserve have received no instructions as to how, when, and where you will get a chance to keep up your flying or even to receive ground training. Those who want to join the Air National Guard are aware that this component is little more than on paper in most States.

The Air Force generals are working as best they can. But the more you examine the situation, and the higher you go, the more you will find action blocked, while the various services argue over what is to be done and who is to do the job.

The Air Forces know exactly what they want to do. Though working with inadequate funds, they are developing new bombers of 10,000-mile range; new rocket and jet planes and guided missiles. They are about to cross the threshold of supersonic flight to speeds upwards of 1,000 miles per hour for aircraft and more than 5,000 for rockets. They know by what a narrow margin we built up air superiority in the last war, just in time to smash the rocket launching sites across the Channel. Every person who reads the newspapers has been warned that other nations can develop weapons as powerful as those we have on the drawing boards. An adequate air power could have prevented the last war; it is our hope for future peace. If war comes, our only defense will be in a quick counter-attack.

Yes, the Air Forces know what they must do, and you know. But the generals are stymied while the armed services struggle with each other for the control of new weapons. There is only one answer and that is to place all the armed forces under a unified department with one head who can make decisions NOW.

"What has stumped us," in the words of W. Stuart Symington, Assistant Secretary of War for Air, "is the controversy over the unification of the services into a streamlined single department. Until that is settled, it is hard for the Air Force to know where it is going or where it can go."

Perhaps you have not been enthusiastic over unification. Your first love is the Air Force. Eager as you may be to render every possible service, the unification idea may have seemed too broad and general. You may have wondered why the drive for a separate air force, for which the friends of air power fought for so many years, has not again been championed.

The answer is that the main feature of the unification plan is autonomous air power—the same autonomy which has been the dream of every friend of aviation through the years. But with autonomy there must be teamwork too; teamwork between all our defense forces. So the President, the War Department, the Army Air Forces, a majority of Congress and a majority of the people, as shown by opinion polls, are united in their insistence that all our services be integrated in one great fighting team.

In brief, the plan provides for a single department of national defense headed by one civilian secretary who will be a member of the cabinet. Under this department will be three co-equal branches of Air, Land, and Sea—the Air Force, Army, and Navy—each headed by a civilian secretary.

For full integration, there will be a Council of Common Defense, composed of the Secretary of Defense, the secretaries of the three services, the Secretary of State, and the chairman of the National Resources Security Board. The Security Board, under the Council, will plan the maximum use of the nation's resources for security.

There will be a Central Intelligence Agency, such as already has been established by executive order. The President recommends an agency to coordinate Procurement and Supply, to eliminate wasteful duplication; one

Douglas transports typify inefficiency of three-way national defense. Army, Navy, Air Forces placed separate contracts for identical DC-3s.

Proposed unification plan would put carrier-based planes under Navy direction, would cut conflict between Army, Navy suppliers.





on Scientific Research, of crucial importance in developing new weapons; and one on Education and Training, to combine the systems in the various services into an integrated program.

The Joint Chiefs of Staff will continue to function. A proposal to appoint one over-all military Chief of Staff has been dropped. To meet Navy contentions, the Marine Corps has been left intact. The Navy will retain ship, carrier, and water based aircraft and Marine aircraft, plus land aircraft needed for transportation and training.

I need not explain the need for unification to Air Force veterans who understand far better than I. During the war, each one of you has been in a position to observe the waste, the disharmony, and the duplication which have resulted from separate services under no common head. Too many of you have seen your friends killed for reasons which, if you could trace them back, have stemmed from this cause.

Kingpin of the air on VJ-day, AAF now ranks third among world powers. Even Swedes top us with purchase of Vampires (above).

Backers of a big Navy have fought the unification plan fanatically. Well organized in all parts of the country, they have spread propaganda to the effect that unification is dead. They have delayed action in Congress while vast sums have been appropriated for the Navy, to include a vast Navy air force.

I wonder if you realize that the Budget Bureau has approved for the next fiscal year more money for Naval than for Army aviation. The Navy's aviation budget is \$385,000,000 for 1,359 planes as against an Army Air Force budget of \$369,000,000 for 1,020 planes.

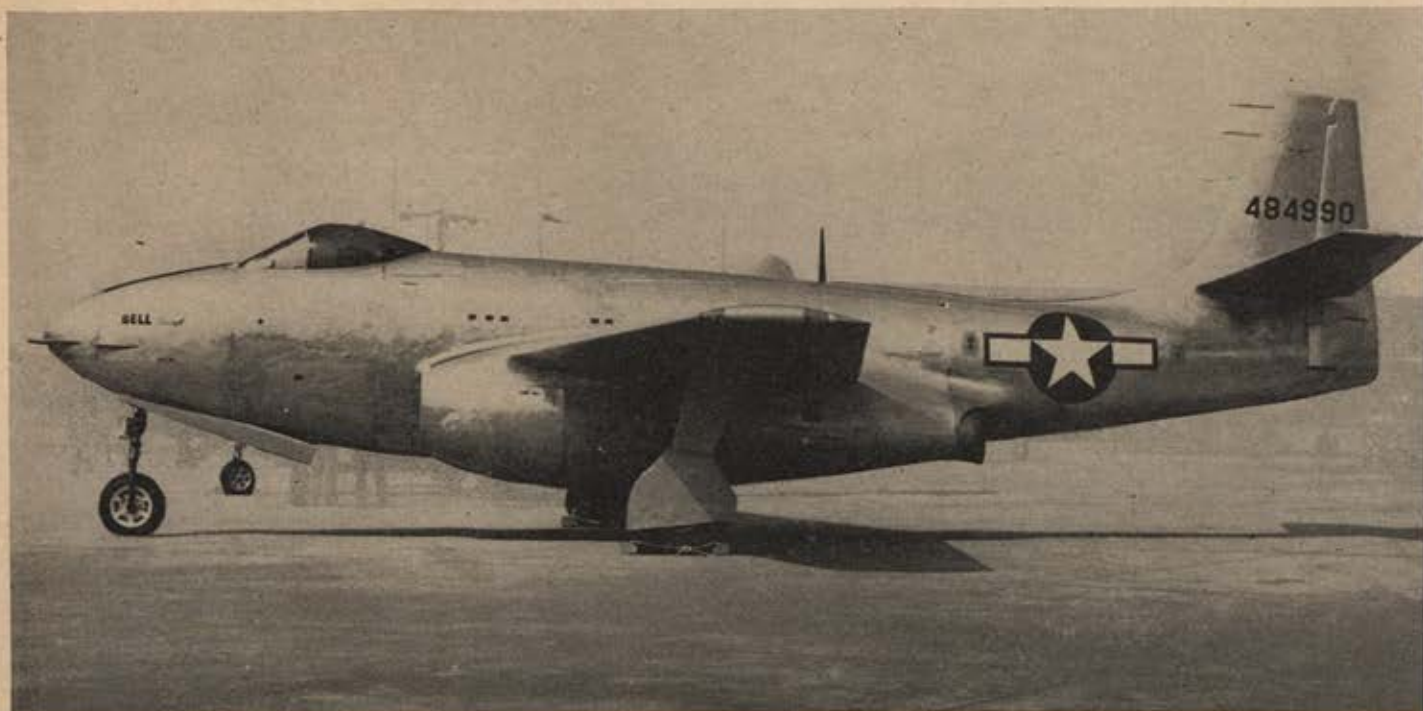
Yet the Admirals, who did so much to block the development of air power before the war, are still denying the lessons of the war which could have been averted by air preparedness. As late as last April, the Vice Admiral in Charge of the Bureau of Aeronautics said, "Very large planes will not in the future be of primary interest for military purposes." Though, as Mr. Symington says, it may be that in some future war such planes will be obsolete, they are today the only known means of dropping the atomic bomb.

Unification has long been blocked and the AAF pushed into a secondary position because the Navy backers are organized. A small minority as compared to the friends of real air power, they have used every conceivable means of working their will.

Do you, as an Air Force veteran, intend to remain inactive? Have you placidly accepted the propaganda that has been so carefully planted against unification? Or are you ready to get in and fight for your Air Force?

Congress wants to act intelligently. In planning our future air defense, every member will heed the men who built our wartime air supremacy. It is up to you to tell what you know. Tell your friends; tell everyone you meet; tell your local newspapers; and tell Congress. It is your right as an American citizen. It is your duty as an air veteran.

With autonomous air force, mutual Army and Navy aid would replace secrecy, wasteful duplicity in research. This is Bell XP-83.





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HOW A FERRIS WHEEL helped make PIPER CUB the World's Most Popular Plane

A FERRIS WHEEL used in making airplanes? Sounds strange . . . but when Piper first revolutionized airplane manufacturing by setting up mass production methods, the "ferris wheel" was one of the factory's exclusive developments. Similar in design and action to the regular circus wheel, this ingenious device speeded up wing and fuselage finishing, helped Piper turn out more planes than all other light plane manufacturers combined!

Many such modern plane-making methods saw their first use in the Piper factory. Today, as always, new



and more efficient Piper production skills bring you a Cub that costs less than any other airplane—only \$732 down. It offers better gas mileage than the average car. And it's so easy to fly that most of today's pilots won their wings in Piper Cubs!

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PIPER

SEPTEMBER, 1946



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If your plane boasts "Power by Franklin," it's not going to need much engine service, for Franklin engines are outstandingly reliable and trouble-free. Even so, it's reassuring to know that wherever you may fly, there will always be a Franklin service station nearby, ready to care for your engine quickly, economically and expertly.

Franklin service stations, strategically located throughout America, have the parts and equipment necessary for emergency overhaul or parts replacement. Franklin engines have been designed with service needs in mind. Standardization provides interchangeability of parts and critical points can be reached easily.

When factory overhaul becomes necessary you can bank on Franklin's modern facilities and 46 years of air-cooled engine experience to give you a craftsman-like job.

Good engine service is one more reason for choosing "Power by Franklin"!



AIRCOOLED MOTORS, INC.

SYRACUSE 8, N. Y.



By William Friedman

THE PRACTICAL LIMIT of aircraft is 400,000 pounds gross weight, the greatest practical span is 250 feet. This dictum has been circulated and even accepted for the last decade by some fairly competent authorities. Now, as the giant Hughes flying boat and the six-engined Convair XB-36 prepare to move skyward in California while Britain's giant Brabazon transport moves from dream to metal, one remembers that sky-giant history has been milestone by arbitrary limits on size and weight which have been passed. Engineering history, however, tells us that there is a practical limit in the size of vehicles. In locomotives, the fixed breadth of standard-gage track limits locomotive design. In surface vessels, experience in the *Queen Mary-Normandie* class liner proves that these giants are too large for their markets.

Giants in aircraft are not new. Since the day when wings first dared span a hundred feet or more, someone has always been saying they were too big. Some of them were operational failures. Many were privately financed and brought spectacular bankruptcy. Yet they all proved the efficacy of big planes and thereby contributed to general improvement of the aeronautical breed.

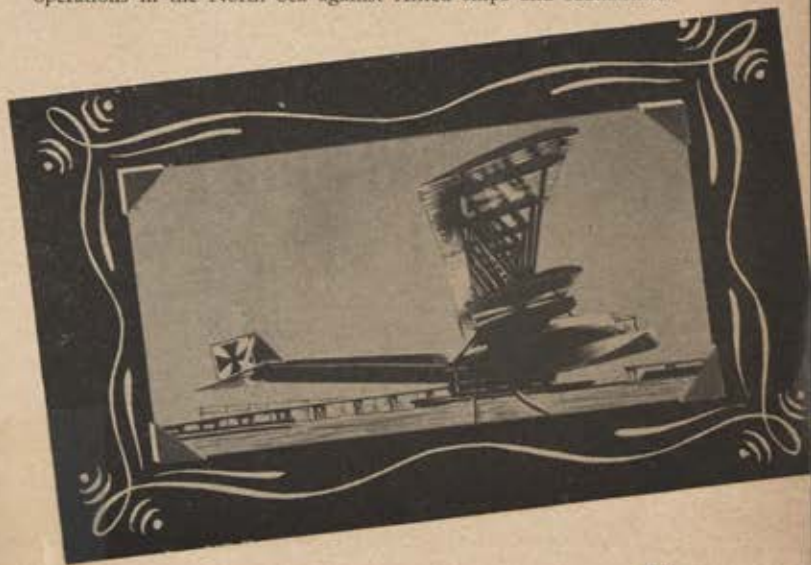
The gentle Igor I. Sikorsky was, beyond doubt, the father of the air giants. In 1912, when it was enough for most airplanes to just fly, Sikorsky built a four-engined biplane called the *Grand*. Measuring less than 100 feet in span, it hardly qualified as a true "giant." But it was the progenitor of all large aircraft, proving first that there was safety in number of power plants and secondly that ton-mile efficiency of aircraft increases with size. The *Grand* had a splendid safety record. As a matter of fact, it had to be retired only because another airplane fell apart and dropped its power plant through the wing of the *Grand*, which was parked on the ground. The *Grand* was succeeded by the *Ilya Mourometz*, first of the true giants. It spanned 102 feet, had more than 1,700 square feet of lifting surface, and mustered a total of over 1,000-hp on its four Renault engines. The *Mourometz* was an undoubted success. It made the first real intercity flights in Russia, where the rapid conquest of space meant something. None of the Sikorsky giants sustained injury in operations, and their records stood for many years in both distance and endurance.

Nor was the world slow to take up Sikorsky's leadership. In England, C. H. J. MacKenzie-Kennedy built a direct Sikorsky copy, powered by 300-hp Salmson engines. Farman and Bleriot's original bombers were built under Sikorsky inspiration, while the Germans, polite as ever in their larceny, ordered unauthorized four-engined bombers from A.E.G. (Allgemeinen Elektricitäts Gesellschaft) called the AEG-Sikorsky even in their correspondence.

During the early years of the war, the Zeppelin was considered the major distance-weight vector. England, however, was faced with the submarine menace, and the business of overseas patrol was urgent. Early in the war, Britain acquired the *America*, a multiengined Curtiss flying boat, originally built for Rodman Wanamaker for a flight across the Atlantic. The pioneer marine giant was sold to the British for overseas patrol. Useful, but limited in value, the *America* pointed up the need for bigger craft that could get off in rough water, could stay out for long periods, and could carry wireless equipment, armament, and enough explosives to handle a submarine.

The 1916 Gosport flying boat got into the giant class.

Father of the giants; Sikorsky's 102-foot *Ilya Mourometz*, which flew in 1914. Below, Dornier's R-1 all-metal flying boat, built late in 1916. Powered by three 240 Maybach engines, it was designed for operations in the North Sea against Allied ships and submarines.



Powered by only two 360-hp Rolls-Royce engines, it had a 103-foot span. As a patrol bomber, it was succeeded by Short Brothers' Cromarty flying boat, a 113-footer powered by two 700-hp Rolls-Royce engines which endured as the flying boat standard for almost a decade.

In Italy, the military problem was blasting the Austrians out of fixed mountain positions. This called for ceilings and payload, and the reply was the Caproni series of triplanes. By 1916, they got into the giant class, with a 120-foot design that carried two fuselages and a center nacelle. Three 500-hp Fiat engines were carried, with two tractors at the head of each fuselage, and a pusher at the end of the center nacelle. Beardmore of England built copies of this design, and the Curtiss Caproni Corporation tried it in the United States.

Clamor for reprisal against the Zeppelin raids produced most of Britain's giant landplanes. The most famous of these was the thick-winged Handley Page twin-engine design. This did most of its work from bases in France, paying the Germans back for the Gotha damage. This design was succeeded, toward the last days of the war, by the four-engined 126-foot heavy, weighing 30,000 pounds and cruising at 103 mph on 500-hp Rolls-Royce Eagles.

German Giants

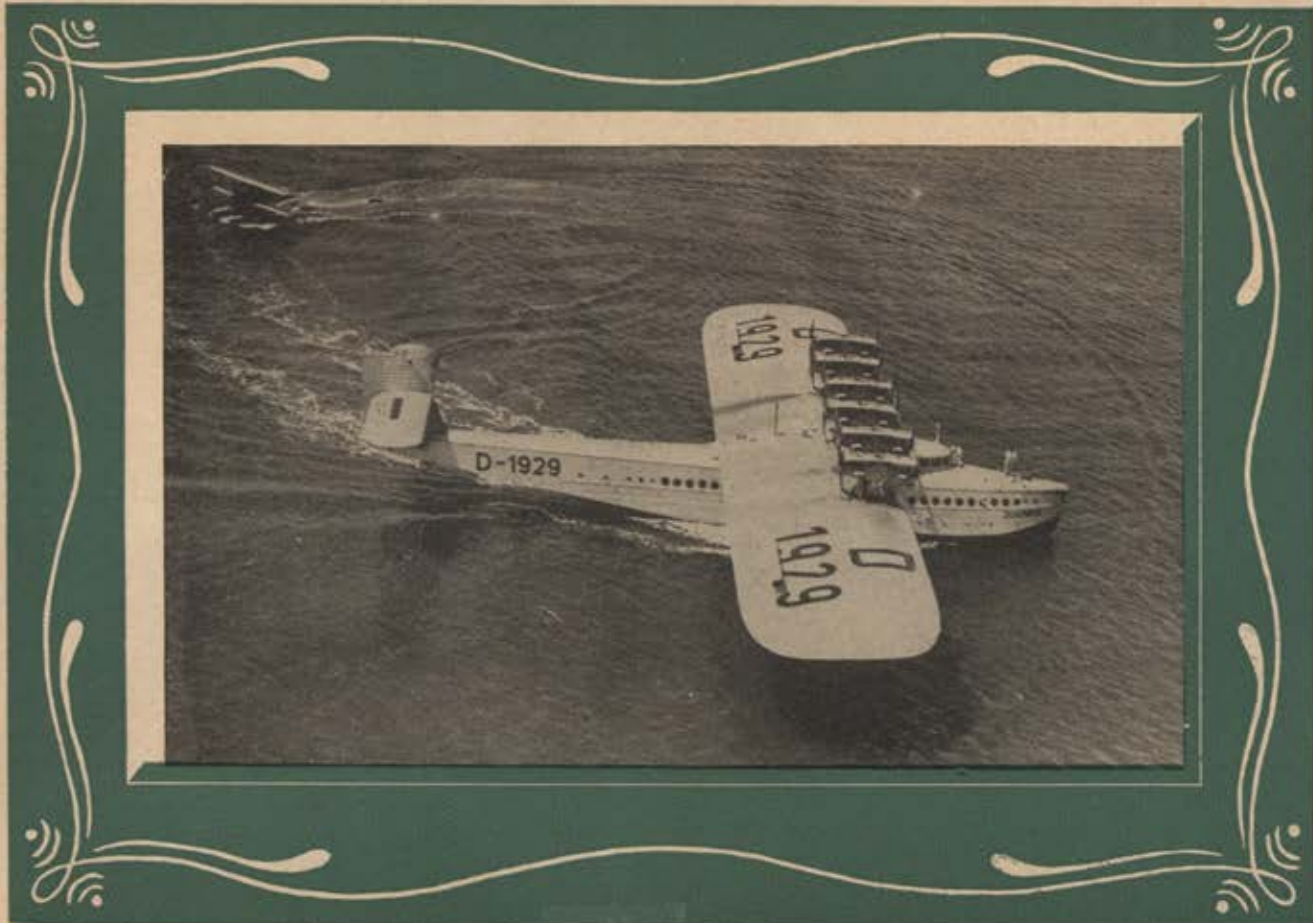
When the Zeppelin failed to destroy British morale by 1917, German protagonists of the giant airplane were given an audience. Claudius Dornier built a series of all-metal flying boats, most of which got into the giant class. The group began with the R-1, a conventional looking bi-

plane flying boat which spanned a little under 100 feet and was powered by three 240-hp Maybach engines. This was succeeded by a tailboom sesquiplane, powered by four two-in-tandem Maybachs. Spanning 112 feet, this design proved to be a successful Baltic patrol type, but lacked speed and marine characteristics offered by the R-3 and R-4 designs in the 120-foot class. Powered by tandem power-eggs with 260- and 270-hp engines, they experimented with combination boat and fuselage setups to produce a weird but efficient design whose long-range effect on Dornier boat design was apparent for ten years.

Many of the German landplane designers recognized unreliability in contemporary power plants as a menace to large plane success. The Linke-Hoffman group pioneered the theory of hitching a number of power plants together, locating the motors inboard, on the center of lift-and-load, and delivering the power to the strategic places by means of gearing and shafting. The original Linke-Hoffman biplane bomber, flown in 1917, spanned a little under 112 feet and carried four 160-hp Mercedes-Benz engines. This unit distributed the power to two propellers installed on either side of the fuselage, rotating in opposite directions. The same company, at a later date, produced a 133-foot biplane, powered by four 260-hp Maybach engines, multi-gearred to turn a single giant two-bladed propeller.

The remainder of the German giants came from four sources in the Zeppelin Corporation—Rohrbach, Dornier, Baumer, and Hirth. However, this company's production facilities were so limited that brain children of the big

The twelve-engined Do-X was the world's largest airplane when it visited the U.S. in 1931. Originally powered by air-cooled Siemens-Halske engines, these were replaced by U.S.-built Curtiss Conqueror engines in an effort to achieve adequate power for the giant.





While only a few G-38 Junkers transports were built by Germany, the ship proved among the first financially successful gargantuas of the early '30s. Powered by four 800-hp Diesel engines, it weighed nearly 60,000 pounds and cruised at better than 125 miles per hour.



Fairey's Titania, built in 1923, spanned 136 feet. Powered by four 600-hp. Rolls-Royce Condor engines and designed to succeed the veteran Cromarty boats, this patrol bomber was built for long-range deep-water operations. Loaded, it weighed over 31,000 pounds.



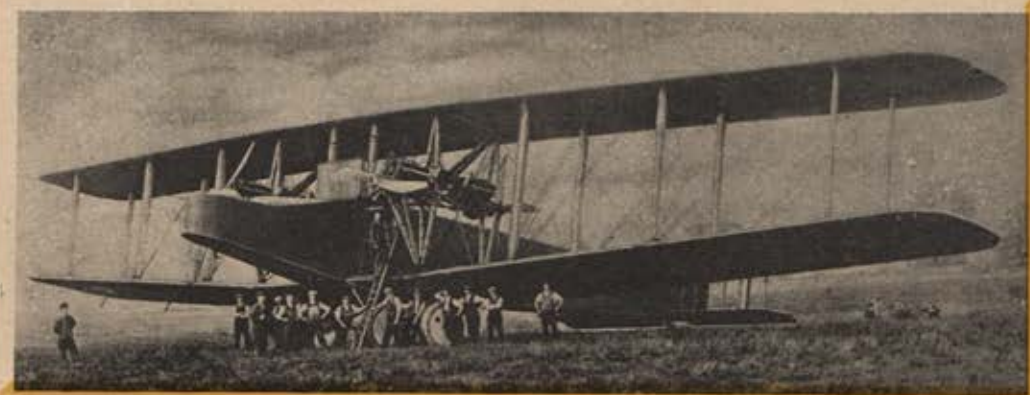
Coproni built the triple-triplane in 1921. It was supposed to carry 100 persons 5,000 miles. The boat was 70 feet long and power was provided by eight 420-hp U.S.-built Liberty engines. This giant cracked up on its first landing after a flight to an altitude of 200 feet. The conventional tail was totally absent from the design. Rear wing hinged surfaces on the back set of airfoils acted as elevators. Flat vertical surfaces between the rear triplane's members acted as rudders. Triplanes declined after this failure, chiefly for structural reasons.



The Handley-Page was one of England's earliest giants, and the first successful Allied heavy bomber of World War I. Built in 1916, it spanned over a hundred feet. It was the first of the heavy bombers to achieve a top speed of over 100 mph. Note the thick airfoil used.



The twin-engine Lawson, completed in 1919, was the first successful luxury airliner in the U.S. Designed by Vincent Burnelli, it toured the country, trying to rouse interest in the establishment of commercial air transportation. It was succeeded by larger craft.



This 126-foot four-engined Handley-Page, designed to bomb Germany out of World War I, was not finished until after the Armistice.

four appeared under various names. The Zeppelin giants, frequently referred to as the Staaken class, spanned over 130 feet and were built from 1917 to the end of the war, powered by various engine combinations, including power-eggs containing two six-in-line engines and engines placed one behind the other. In one power unit an upright engine was placed above an inverted unit and geared to a single propeller. However, most Staaken giants had six to eight inboard units powering four in-tandem props.

The struggle to cut down weight in the gear system, and the lack of proper materials held up research on the German giants. AEG's version broke up in the air in 1918, when the gearing system failed. Built along the general Zeppelin lines, this craft could have carried almost four tons of explosives over England. The DFW, which went into a little higher wing loading on the premise that its eight engines offered power reliability, actually made flights over England in the fall of 1918, but the weather reduced its operational efficiency. With a workable gear-distributing system, this ship used a 110-hp engine driving a centrifugal supercharger which supplied all eight of its 270-hp engines. Aviatik built a 150-foot version of the Staaken class, which flew in the days just before the Armistice. It was powered by two tandem units, with four 530-hp Benz engines. In a postwar civil conversion of this giant, two decks were equipped to carry over 80 passengers, but the Inter-Allied Commission forbade sale or use of the big plane.

Seimens-Schukert, who also built the Forsman-Sikorsky in 1915, began construction of a six-engined design in 1916. Carrying six 300-hp Basse and Selve engines in-board, and mounting two tractor propellers, this all-German prototype fostered a four-propeller design of 1918 which was the top giant of the war—156-foot span, eight power plants.

At war's end Allied production included the British Fairey F-276, a twin tandem flying boat with 139-foot span and 700-hp Rolls-Royce Condor engines, and U. S.

boats of the NC class which later crossed the Atlantic. This type, powered by three 420-hp Liberty engines, spanned 126 feet. Meanwhile, the Naval Aircraft Factory had built the F5L twin Liberty flying boat with a 102-foot span. After the war Aeromarine civil conversions of this type were carrying 14 passengers and crew. Italy ended the war with a five-engined triplane of 110-foot span which later appeared in a 30-place conversion but found few takers.

Actually, the postwar period in 1919 brought completion and attempted conversion of many late military projects. In Germany Dr. Hugo Junkers began production of a 300-foot flying boat with four 1,000-hp Diesel engines, but the Inter-Allied Commission stifled the project. In England Walter Barling's 131-foot six-engined Tarrant triplane up-ended during her initial taxiing run. Mounting two 500-hp Napier Lion engines on each wing, the Tarrant turned over because the pilot opened the top two on warming up.

In 1920, the 103-foot commercial version of the Zeppelin Staaken emerged. Designed by Dr. Rohrbach, it was the father of modern transport giants. A semicantilever all-metal high-wing monoplane, powered by four 260-hp Maybach engines, it was built for flexible performance and high fuel economy. Boasting such innovations as cabin heat, soundproofing, and reclining seats, the big ship was destroyed as a "violation" of the Versailles treaty. When the Zeppelin Company was put to work building dirigibles for the U. S. and other Allied victors as part of the reparations agreement, Rohrbach left Zeppelin and founded his own company.

The same year brought a rebirth of French engineering in the giant class when Bleriot's *Mammoth* was test flown. Carrying four 300-hp Renault engines, the huge biplane seated 26 passengers and a crew of three, and had six hours' cruising range at 96 mph. Some time later Farman introduced the *Goliath*, a 100-foot design which

(Continued on page 62)



Caproni's Ca 90B was Italy's entry for the world's biggest in 1929. Span 159 feet. It had six 1,000-hp Fiat engines.



Dornier's R-4, built late in World War I, spanned 120 feet. All metal, it was powered by four 270-hp Maybachs.



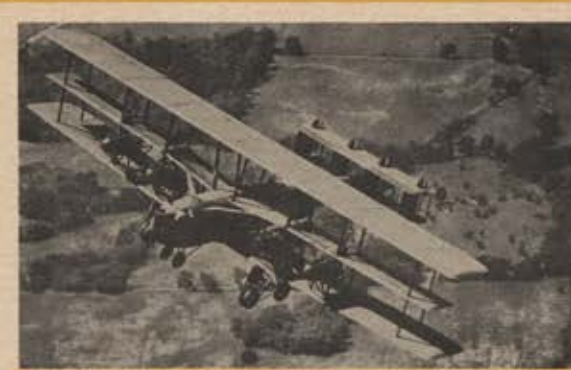
Another "Bomb Berlin" giant, ordered late in World War I, the 106-foot trimotor LWF "Owl," appeared in the U.S. in 1920.



The 102-foot Ilya Mourometz completed in 1914 had 220-hp Renaults. (Below) Germany's 115-foot DFW bomber, completed in 1918. Eight 270-hp engines drove four propellers.



Russia's prewar giant transport, the 260-foot, 69-place L-760. Below, the six-engined Barling bomber, which, like the LWF Owl was ordered late in the war, and flown after Armistice.



White Elephants



Over 10,000 planes are still offered under WAA. Here's how to get the right one

BY FLOYD B. BRINKLEY, *War Assets Administration*

PPRIVATE FLYING IS BOOMING. So is scheduled airline travel. New cargo, charter, and commercial flying operations of all kinds are beginning to crowd each other for room. The flying business was one of the first to recon-vert to full-scale peacetime operations—and it has gone much beyond what it was before the war.

Most of this is due to surplus aircraft—primary, basic, and advanced trainers; light, medium, and heavy transports that were turned into surplus by the Army and Navy with the end of the war and are now being liquidated by the War Assets Administration.

Available to the public even before V-J Day, these planes have been placed on the market since then as fast as possible. Prices have been fixed in accordance with condition, and have been low enough to bring planes within the reach of hundreds who otherwise would not be able to buy their own.

First to be made available were the 5,376 ships which

had been used by the CAA in its pilot training program. These were snapped up as fast as they were offered, and thousands more could have been sold. The shadow of things to come was plainly evident.

As Army and Navy training programs tapered off, primary trainers, basic trainers, light transports, and a scattering of the small "grasshoppers" became available to civil buyers. These types have continued to be the best sellers as they closely resemble civil types and are ready for use after they have passed CAA certification requirements.

Air lines now are operating 687 planes. They had 194 at the end of 1943. The difference consists largely of surplus Douglas C-47s, the military counterpart of the DC-3, and the four-engine C-54, which in civil life is the DC-4. Significantly, the 24,821 surplus planes which have been sold constitute nearly 60 per cent of all civil aircraft flying today. (The 24,821 figure includes 3,375 liaison types, which now are scarce; 8,866 primary trainers; 3,746 basic trainers; 990 advanced trainers; 1,197 light transports; 694 medium transports; and 206 heavy transports.)

The CAA has estimated that more than 4,630 companies are now conducting commercial flying businesses. The majority of these are the little fellows, the boys who operate small nonscheduled passenger, cargo, and charter air services. Many are owned or operated by veterans.

The War Assets Administration still has more than 10,000 salable type planes left in surplus. However, nearly 5,000 of these are basic trainers, and well over 2,000 are twin-engine Cessna light transports. The demand for these now is relatively small, due largely to the fact that a great many have been sold and the market is nearing the saturation point.

The aircraft still remaining in surplus stocks are stored at fields located in the southern and southwestern part of the country. Basic trainers, which are in long supply, can be purchased directly from the fields at fixed prices. The most desirable types, such as liaison planes and transports, formerly sold on a bid basis, and transports in short



Ryan's Dragonfly cost over \$50,000 to build. Cub-class L-planes did the same job cheaper. Such surplus is a bad buy at any price.



B-17s are a poor commercial investment, as proved by the Swedish Airlines who tried to operate conversions of the Fortresses forced down there during the war. Some fighters have been acquired by pilots who hope to compete in air races with them. However, it seems no one wants the old P-40s (right) so they're sold for scrap.

supply were allocated on the basis of urgency of need.

However, with the recent enactment of the Manasco Amendment to the Surplus Property Act, setting up a new system of priorities, the short supply aircraft are now offered in special sales at fixed prices with definite periods set aside for priority holders. Under this system, the first day of the sale is reserved for Federal Government agency purchases for their own use; the next 15 days for veterans of World War II; one day for Reconstruction Finance Corporation purchases for resale to small businesses; and one day for state and local governments. The remaining aircraft then are offered to the general public.

Under this method the veteran gets a real break. Thus far, two sales of this type have been held. In one, veterans bought 80 of the 131 planes offered, while only one plane went to a Federal Government agency. In the second sale, 358 Stinson AT-19s were offered for sale at Norfolk, Va., and all were taken by veterans. Similar sales will be held as planes are available.



White Elephants



The fighters, bombers, observation, reconnaissance, and other planes classed as tactical types—which were built for specialized jobs—are another story.

It was fine to be sentimental about these battle-scarred veterans, but it didn't take much figuring to show that too much sentiment would cost money, and lots of it. To store these planes indefinitely—for no useful purpose—over a period of time would represent the needless expenditure of millions of dollars of taxpayers' money.

Getting down to a little hard realism, it was evident that the only value left in these aircraft was that which could be realized on salvage of metal—industry badly needed aluminum scrap to meet the demands of a commodity-starved public. They were of no further use for military purposes. Fighting ships soon become obsolete and many of these were war-wearies which had seen their best days. They were of no use commercially as they were built for a war job only, and the cost of conversion would be prohibitive. Furthermore, their operating costs are too high for peacetime operation. And to clinch the whole argument—there were more than enough trainers, transports, and other types which could be adapted easily to civil use to take care of all requirements.

In order to get the job done quickly, and with as little further expense to the Government as possible, the War Assets Administration has offered 20,000 of these planes for sale as they are, "on the hoof." Buyers will take over the job of breaking them down and processing the metal.



All combat planes won't go to the scrap pile, however. Early in the disposal program, a plan was inaugurated to make these planes, their engines and parts available to schools and colleges throughout the country for ground instruction. More than 1,500 institutions have received aircraft and parts which had an original value of a little over \$98,000,000. These include 807 planes, 2,037 engines, 24 Link trainers, and large quantities of components and parts of all kinds.

Indicative of the "bargain basement" rates offered to educational institutions, any recognized school can pick up a B-17, B-24, or B-29 for \$350. Medium bombers such as the Marauder and Mitchell carry a price tag of \$200, while Invaders and Havocs can be picked up for \$150. Fighters sell for \$100 to \$150 each, the same price as a Catalina flying boat. Gliders and observation planes are being marked down to \$50 apiece, while trainers sell for between \$50 and \$150. The WAA has imposed a fixed ferrying charge to any point of \$267 for multi-engined and \$117 for single-engined planes. Complete engines go for \$10 and four-blade electric controllable propellers retail for \$15. Aerial cameras cost \$15.

While this program is not expected to dispose of any great quantities of material, it will be of permanent value to schools and colleges over the nation in training young men and women for aviation careers. Many schools have started full-fledged ground courses with the aid of this equipment, and 35 have gone so far in their programs that they have won approval by the CAA as certificated mechanic's schools.

The sentimental value of bombers and fighters like "Wichita Witch," "Memphis Belle," "Frisco Trudy," and many others closely bound up in the lives of home-town boys plays a part in the WAA disposal program.

These planes can be obtained by cities and towns as war memorials, and the WAA has made a special effort to search out and make available those planes which have special memorial value. Thus far, some 200 planes have been delivered to cities for this purpose.

The millions of aircraft parts and components and engines which have become surplus present one of the biggest problems in the aircraft disposal program. Over 90 per cent of this material has value only as scrap, as it was made for combat aircraft and has no further use. The remainder consists of material which was manufactured for the trainers, transports, and other types of planes which are being sold for civil use.

In order to channel these items to the consumer as effectively as possible, War Assets has appointed original manufacturers, distributors, and others who have the "know how" and facilities to act as its sales agents. Many veterans have been appointed as agents.

Even though the War Assets Administration has had to pay the costs of storing and handling many thousands of combat planes and parts, it has returned to the Treasury a net of more than \$64,000,000 above expenses. Operating expenses are being reduced as rapidly as possible, and many sales centers have been closed in order to effect savings. Costs will be further reduced with the sale of the 20,000 combat aircraft.

Such planes as the Wichita Witch, may be acquired by the community and used as war memorials. The Memphis Belle and others will be spared from oblivion by this sort of appeal to local pride.

The New York Times.

NEW YORK, WEDNESDAY, JULY 24, 1946.

DOOLITTLE URGES UNIFIED AIR FORCE

"Would Welcome Annapolis Graduates," General Says—Ground Role Held Minor

Lieut. Gen. James H. Doolittle discussed yesterday the Navy and air unity.

"In the unified air force of the future," he said as president of the Air Force Association in an interview at the Hotel Sherry-Netherland, "we would welcome a few Annapolis graduates."

He was emphatic as to the part that the ground army would play in the next war, if any.

"It will be an army of occupation, that's all," he said, "just as we now have two armies of occupation in Germany and Japan, both of which enemies were essentially beaten by the Army Air Forces."

In a formal statement General Doolittle charged that "carefully planned Navy propaganda" had confused the issue of organization and employment of the armed forces. Later he said he was glad that the unification program had been delayed by President Truman's removal of the project from his "must" list for this session of Congress.

"We had better approach it next year," the General observed, "with a



Lt. Gen. James H. Doolittle.

clear idea of what the problem is. I do not wish to impugn the Navy's motives. It is not whether the Navy and Army advocates are sincere in their expressed beliefs. It is that they are wrong.

MOTIVES OF NAVY

"The primary purpose of our military establishment is to keep us out of war. Can this be best accomplished by obsolete battleships, by obsolescent air-

craft carriers, or by long-range land-based aircraft?"

He then charged that Navy men realized that the future security of the nation and the world lay in land-based aircraft, as proved by their demand for control of a strategic air force of their own.

The speaker was mildly critical of "some injudicious persons" in the Navy on the results of the Bikini bombing.

"The Navy as a whole was honest and fair about it," he said. "But there was something fishy about those first reports that no damage had been done to the target fleet."

He deplored the missing of the target by the man who dropped the atomic bomb at Bikini and added:

"We shouldn't make the mistake of underestimating the effect of bombing, atomic or otherwise, on battleships. A bomb designed to sink a battleship—and there are plenty of them—could have done more at less cost than the atom bomb did at Bikini."

General Doolittle declared that more than half of the antisubmarine operations in the Atlantic when the submarine menace was most critical had been carried out by land-based Army planes. In this connection he outlined his views of future military education.

"There should be," he said, "a single military institution for general military education, after passage through which the graduates should specialize in air, sea or ground fighting." The association head made a vehement plea for continuance of air research under a single head.

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the
AFA
Today



MEMBERSHIP APPLICATION

AF2

Date _____

I hereby apply for membership in the AIR FORCE ASSOCIATION and represent that I am now on active duty with or have been honorably separated from the U. S. Army Air Forces.

Name _____ (PLEASE PRINT) Rank _____

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Annual dues of \$3.00 enclosed.

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Grass-Roots AIRLINER



Speed and economy of Lockheed Saturn promise air mail and air service for thousands of cities now by-passed by larger airliners which demand big revenue and big fields

IF YOUR TOWN has a 3,000-foot airport, a limited passenger potential, or small air cargo possibilities, you can bet that super-airliners of tomorrow will pass it by. It will, however, obtain a modicum of air service and accelerated air mail if American manufacturers can build planes to carry capillary traffic to and from the airports of Main Street, U. S. A. On the surface, the Lockheed Saturn appears to be that kind of airplane.

With the needs of farmers, merchants, housewives, and bankers in grass-roots communities slide-ruled against the best operational, structural, and aerodynamic information developed during the war, Lockheed has engineered a plane which can land frequently, carry fractional payloads, and show an operating profit in any section of the world where air traffic is needed.

The Saturn is a twin-engine, single-tail, high-wing monoplane with wing span of 74 feet, over-all length of 51 feet 6 inches, a fuselage which rests only 34 inches above the runway. Powered by either 800-hp 7-cylinder Wright Cyclone or 600-hp 9-cylinder Continental engines, it cruises at 200 mph with 60 per cent power, tops 250 mph, and operates most efficiently over 300-mile routes, although a maximum range of 1,500 miles is operationally practical with the new plane.

Inside the Saturn

After extensive study of passenger potentials, the Saturn has been designed to carry 14 passengers and crew, 3,000 pounds of cargo, or any combination of people and property within the weight limit. Unlike any previous air-

liner in transport history, this combination business can be accommodated in the Saturn without a full-dress consultation with the engineering department. The bulkhead separating passenger and cargo sections can, if necessary, be moved at each station as the proportion of passengers to cargo varies with the trip. Seats can be removed with hand tools, without sacrifice in structural efficiency. Each set is placed near a large window for open passenger vision and, unlike the low-wing designs, there are no seats where the main surface obstructs the passenger's view. Moreover, the low-slung fuselage eliminates the need for passenger ramps, and trucks can back directly to the cargo hatch at "tail-gate" levels.

In creating the Saturn, Lockheed engineers have given particular attention to ease of maintenance, an important factor on short-haul airlines where profit is synonymous with intensive operation. For instance, the entire nose section is hinged to open like a door. A mechanic, standing on the ground, can service all controls and instruments, and perform normal inspections without removing any of the trim. Items like landing gear legs and doors, engine cowlings, elevators, tabs, and flaps are identical and can be used on either left or right side of the airplane. This simplifies spare parts stock control.

The Saturn is probably the first commercial airliner to use a laminar flow wing and lightweight aluminum in its structure. Weighing 16,000 pounds fully loaded, it can take off in 1,500 feet and climb 1,325 feet per minute. On one engine, fully loaded, it can climb to 15,000 feet. More important, the Saturn can take off on one engine, clear a 50-foot obstacle, land and come to a full stop in well under 3,500 feet for the CAA "crack" test. Thus, any airport meeting Class III standards can welcome Saturn passenger and cargo service.

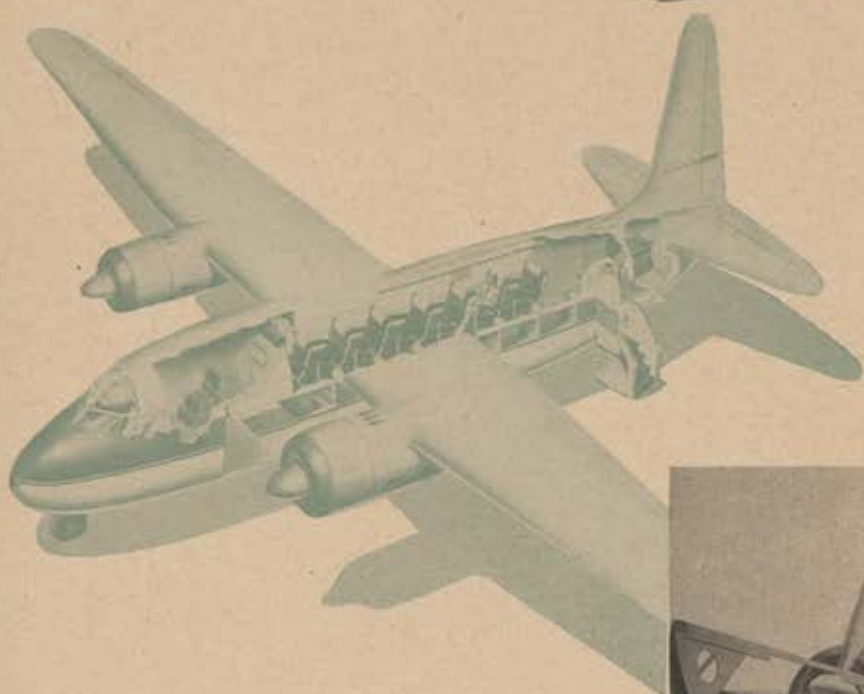
The Saturn is not the Lockheed company's first attempt at a grass-roots airliner. In 1934, they produced the Lockheed Electra, a twin-tailed, twin-engined, low-wing monoplane which became a successful feeder airplane and one of the most popular executive transports of all time. Since then, an entirely new concept of capillary-route operation has dictated a new airplane. Operable from wheels, floats, or skis, the new Saturn should be welcomed by short-haul trunk-line operators in all parts of the world—despite a price of \$130,000. In this, hundreds of cities which now depend upon buses and trains should have their entry to the air world when Saturn deliveries begin modestly early next spring.

Dorsal fin aids directional stability, high wing improves pilot and passenger visibility in the compact, economical new Saturn (above). Twin-tailed Electra, first Lockheed attempt at development of short haul airliner, found enthusiastic markets in all parts of the world.

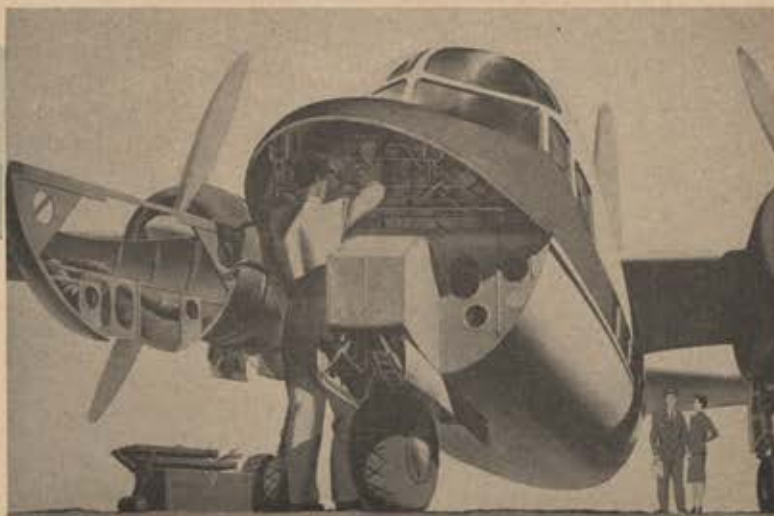




Wide windows and seats in Saturn assure comfort for 14 passengers while movable bulkhead and removable seats allow quick conversion to all cargo or passenger-cargo accommodation to meet traffic demands. Cabin floor is 34 inches above ground.



Air cruising speed of 200 mph and more is matched by on-the-ground speed of chest-level servicing. Open nose permits repair of instruments, controls.



Junkheaps and motor boneyards provide materiel for former AAF "Hotrocks", who satisfy yen for speed racing souped-up stock cars on Southern California's searing salt flats

HOT RODS and HOP UPS

BY BURGESS H. SCOTT, *Ford-Times*

Los Angeles—Nobody seems to know just why Southern California should have given birth to the hot rod craze. Maybe it's the year-round good weather, or the six-lane superhighways you have at every turning out here, or, perhaps, a stock of old automobiles that is abundant in comparison with other sections of the country.

At any rate, the countryside is saddled with the problem, and thousands of timid motorists, policemen, parents of hot rod addicts, and the National Safety Council are wondering what to do about a speed craze that seems ready to sweep the nation.

Hot rod, by the way, is the name applied to any car, not too new, which has been worked on to make it faster than other cars. They're usually owned and driven by extremely mechanical minded youngsters in their late teens or early twenties.

As a rule the hot rods run between the models of 1928 and 1938, roadsters whenever that model is available, or hand-worked into an approximation of one. In fact, so many of these cars are of the one-seat, open type that the word "roadster" has come to be a synonym for hot rod.

One newspaper here has estimated that there are more than 1,000 of these roadsters gunning the Southern California highways and byways these days. They range from hopeless bailing-wire wrecks not capable of more than 65 mph to \$5,000 precision jobs that turn up near 130 mph.

One of the first alarming highway sights for a motorist newly arrived in Southern California is the spectacle of

a couple of roadster drivers—they nearly always drive in pairs, nose to tail—zigzagging down the multiple lanes nearly twice as fast as the rest of the traffic is moving.

However, traffic accidents like a recent one in which a young driver and several others were killed have brought the hop-up to the attention of the police with the result that many boys are being hauled in, reckless or not, simply because they're piloting something suggesting a hot rod. The biggest roundup of the speed kids occurred recently in the "Piccadilly Circus Case."

Piccadilly Circus is the name of a standard, California-type drive-in restaurant on Washington Place in Culver City. The location is in a sparsely settled neighborhood crisscrossed with appealing four-lane concrete streets. The hop-up kids chose Piccadilly Circus as a place to gather to talk about their rigs, drink sodas, and swap speed equipment. Almost every weekend the session would develop into a heated bench race—their term for an argument between owners as to whose car is the fastest.

It didn't take them long to spot Culver Boulevard, a long straightaway near Sepulveda Boulevard, as an ideal place to back up their arguments with action. Culver was several good-sized blocks long and had no important cross streets. The boys took over the boulevard and soon were drawing hundreds of spectators for their informal weekend speed trials and races. Before long the neighborhood protested and the Piccadilly Circus incident followed. Police, sheriff's deputies, and highway patrolmen closed in on both ends of Culver Boulevard and bottled up about 200 speed addicts who were booked on charges varying from operation of a car without a horn to violation of the city's child curfew.

Such roundups haven't stopped the racing. The gang just moves on to other isolated sections. There are some who complain that if the kids are deprived of commandeered race courses, they'll take their speed back to the heavily traveled highways.

Nobody seems able to put a finger on the actual start of this hot rod movement. Some think it's a carry-over from the old tin lizzie days when Youth suddenly became automotive and took to battered old Model T's in droves. Back then, however, the kids weren't concerned so much with the mechanical perfection of their old crates as with the snappiness of the wisecracks painted on the sides.

Possibly the speed germ came with the late World War II and its accent on the engine. America spending billions on the world's most gigantic hop-up job could

(Continued on page 52)



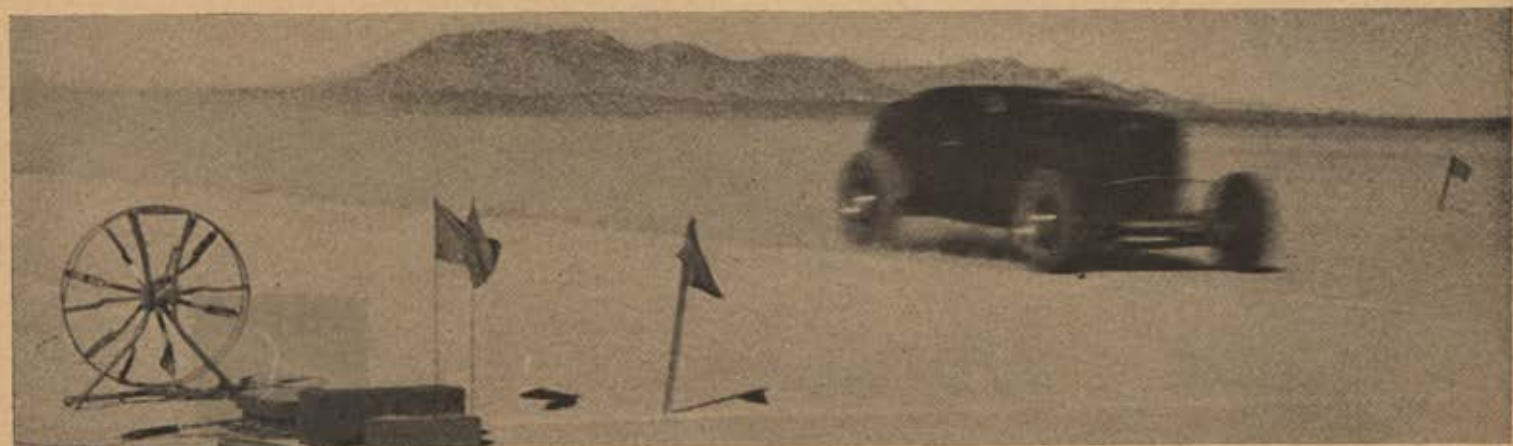
Hot-rock engineering. Don Blair of Southern Pasadena adjusts the interlocking-vane type supercharger, which added sufficient compression to jump his Ford V-8 powered racer to a speed of 134 mph.



This fine specimen, owned by former Merchant Mariner H. L. Markham, is a 1928 model chassis housing a 1933 Ford block.



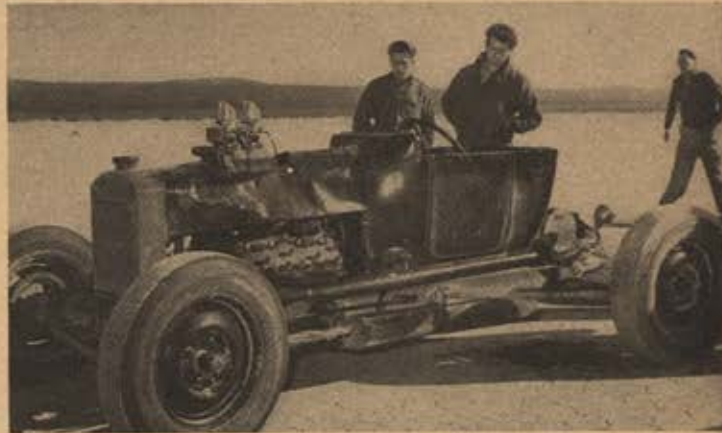
This "reconditioned" 1934 V-8 Ford will be raced by AAF mechanic Conrad Curtiss of Los Angeles, under SCTA supervision.



"Laying down a strip." Captain Ted Lawson, famed B-25 pilot who participated in the original Doolittle Raid on Tokyo, is a graduate of the hot-rod speed school. More than half the current crop of drivers are AAF veterans, satisfying their yen for speed and motors.



Veteran Jack Rutledge races his composite Ford 60, with a 1937 block. Note the old-vintage Austin parts, used in rear of body.



Full view of Don Blair's 134-mph supercharged hop-up. Some of these designs use as many as three carburetors to gain extra power.



The "grand old man" of the hop-up kids is 52-year-old Eddie Meyer, who began making a business of his hobby in 1939 by manufacturing hop-up equipment. Meyer uses automotive power for speedboats as well as cars, twice winner of the Hearst regatta.

STRICTLY *Personal*

IN RIO THEY'LL CALL IT *bonanca* and fly it across the Andes at 18,000 feet. In Rome they'll call it *bonaccia* and fly it to Genoa in ninety minutes. In Paris they'll call it *bonace* and fly it to Algiers on a single tankful of fuel. And English-speaking pilots everywhere will call it *bonanza*, if only for the reason that it is a veritable gold mine of flying qualities. But, whatever the language, everyone will soon be talking about the Beechcraft Bonanza, a newcomer to the personal plane field that stands out in the skies like a mustache at West Point.

From the very beginning, the little Bonanza has been a mystery ship. For two years hangar flight rumor and grease-pit gossip have hinted at a new Beechcraft that would send prewar concepts of private flying into a flat spin. Expecting so much, the several hundred flyers who placed cash deposits with Beech when the plane was still in the design stage might have been disappointed. But they won't be, because apparently the long-heralded Bonanza has just about everything. Created for a market which couldn't be served by the low-power ships and wouldn't be served by the \$15,000 "executive types" of prewar design, the Bonanza should generate tremendous new personal plane interest. Because of its price, it won't be the personal plane that the masses have dreamed about, but for plane-owners and plane-users who have waited too long for a low-powered plane with high capacity, high performance and peak safety, it may well be the answer.

Obviously, Beechcraft engineers have placed utility and safety above price considerations in the newest product of Wichita industry. A low-wing, all-metal monoplane with tricycle landing gear, it emphasizes current trends toward high performance with low power and a



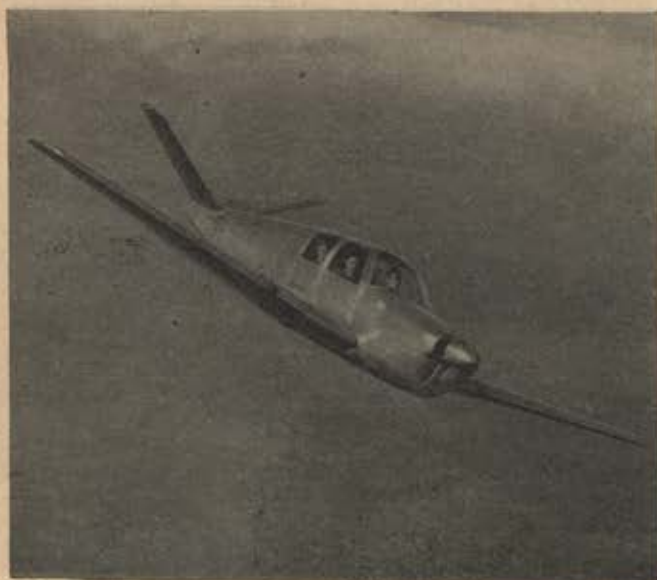
INTRODUCING THE NEW BEECHCRAFT BONANZA

score of interesting variations on this well-established theme. For instance, the Bonanza mounts a 165-hp Continental under its popeyed cowling where prewar executive-type planes with comparable performance used 350-hp or larger power plants. Hence the Bonanza's encouraging economy, making penny-a-mile direct operational cost a reality for companies and charter services which log several hours on an average day.

Amidships, the new Beechcraft has taken the structural ruggedness of wartime primary trainers, the proportions of a motor car, and the visibility of a bubble-canopied fighter to make a cabin that pilots dream about. An honest family plane with side-by-side seating both fore and aft, the Bonanza will accommodate four 6-foot adults or two adults and three fledglings without crowding. Moreover, all instruments and equipment for day-and-night cross country are part of the "empty weight" of the Bonanza, a feature which should appeal to prewar owners of four-seat planes with room for no more than two passengers after necessary long-distance accessories were added.

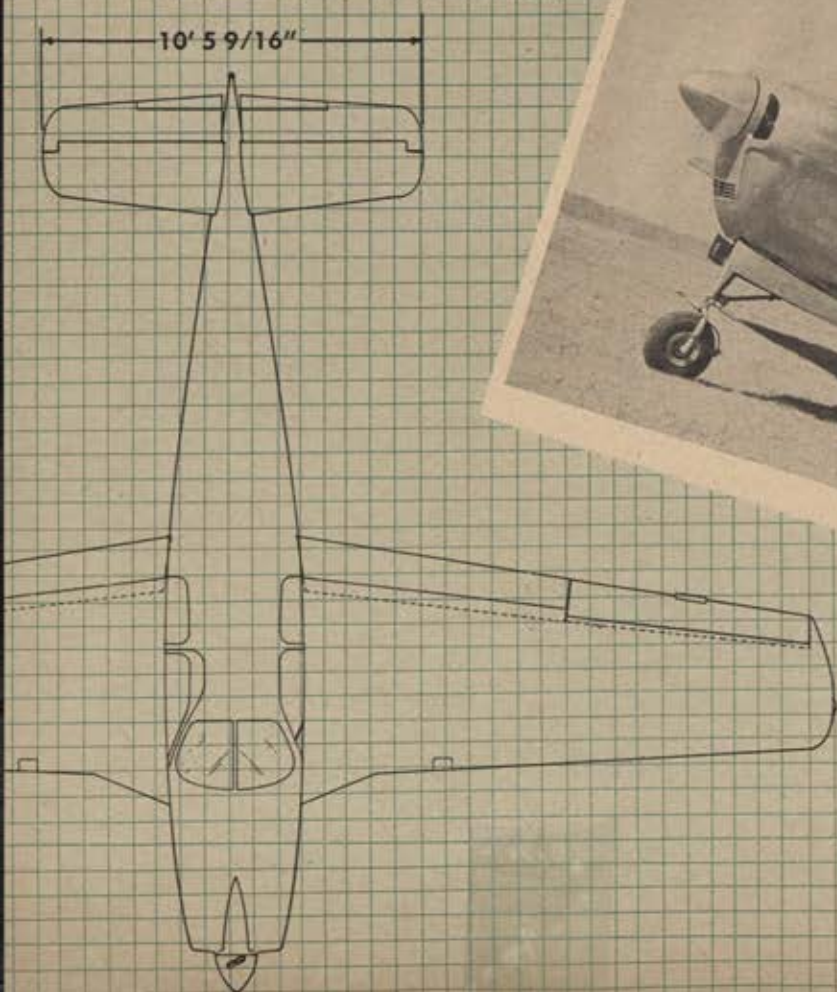
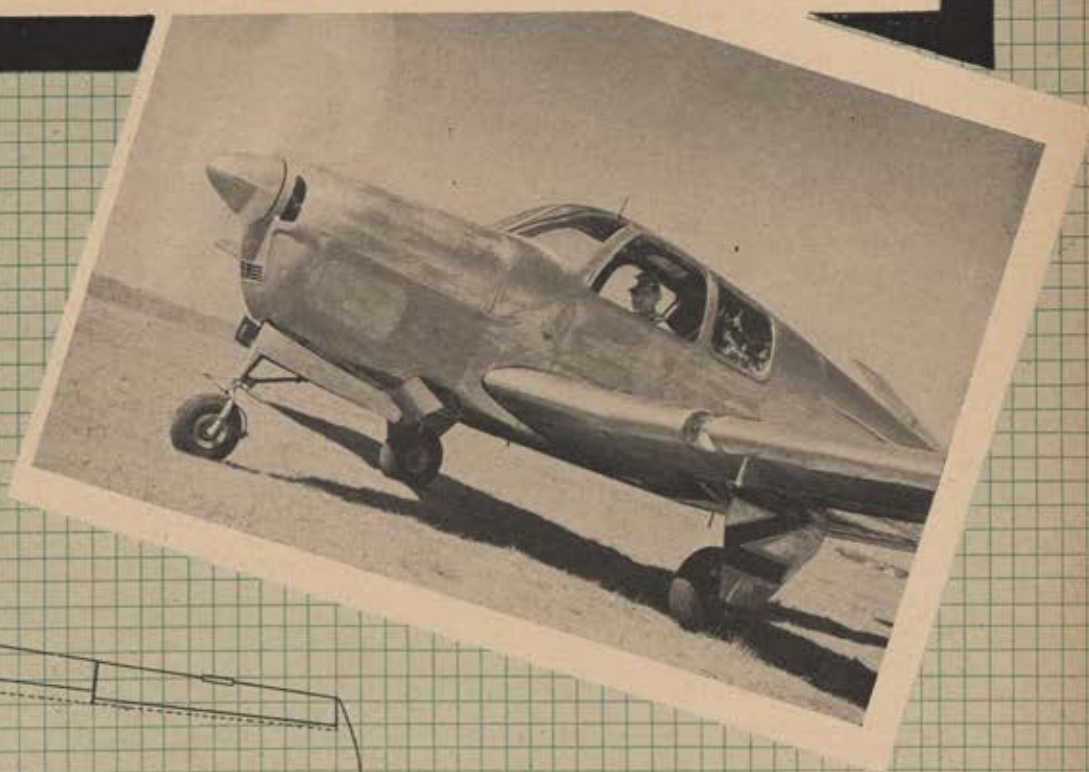
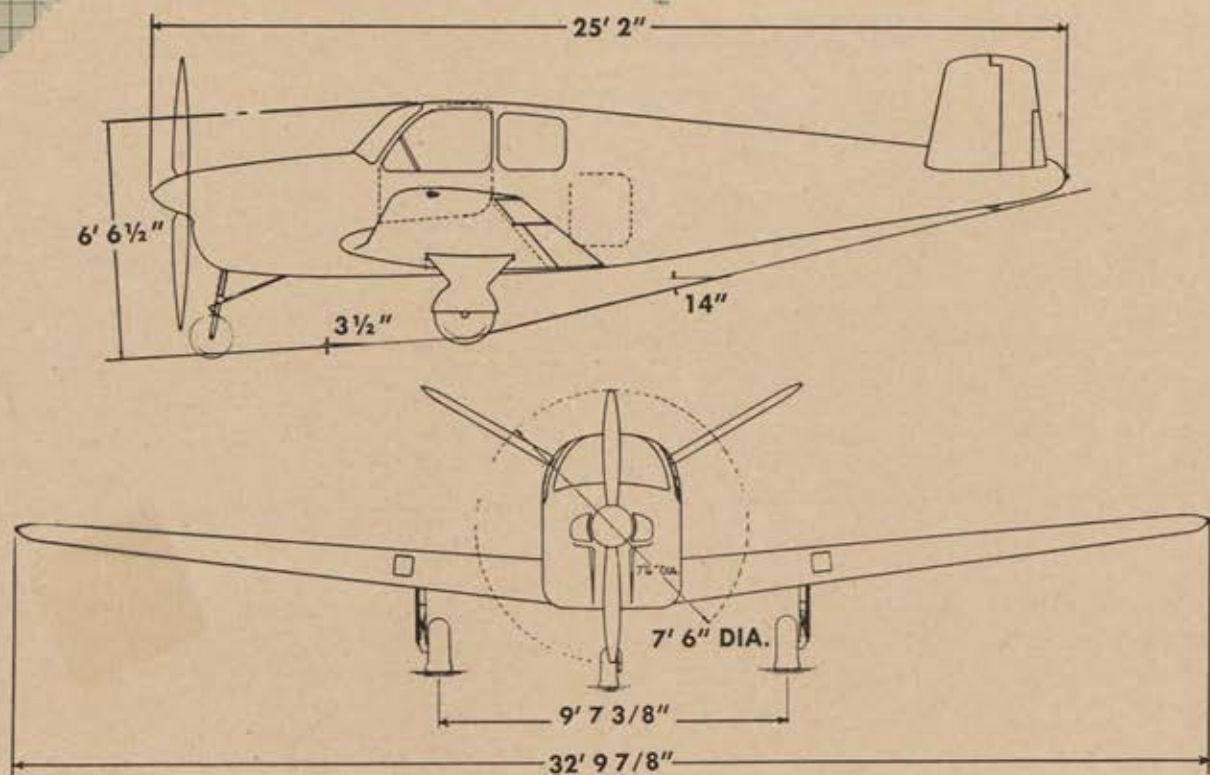
But the case for the Bonanza does not end with economy and utility. By using the distinctive butterfly tail which first appeared on an experimental Beechcraft AT-10 two years ago, Beech engineers have endowed the Bonanza with excellent flyability and performance. With standard rudder and elevator controls demanded by hundreds of pilots, the Bonanza actually demands rudder action only during cross-wind landings or take-off. At all other times, turns and standard maneuvers are accomplished without use of the rudder pedals. The net result is a plane that will cruise 750 miles in "hands-off" operation, carrying 780 pounds of payload, at a true cruising speed of 175 mph. Offering so much in economy, utility, and flyability, the Bonanza would be a lot of airplane at \$15,000. At \$7,345 it can hardly miss being a standout success.

Structurally, the Bonanza offers pilots and passengers a number of so-called minor features which add up to a great deal of airplane. Standard accessories include complete instrumentation; two-way radio with homing loop, automatic antenna reel, and marker beacon receiver; five-duct heating and ventilating system with windshield de-icers; continuously variable controllable pitch Beech propeller; navigation, cabin, instrument, and landing lights; a variety of gadgets including four adjustable sunshades, four individual ash trays, glove compartment, map compartment, and cigarette lighter; a shelf behind the rear seat which will hold chart case, briefcase, or hatbox. And the large starboard door with disappearing steps relegates slacks to the limbo of motorist's goggles for even the most



Cruising at 175 mph, Beechcraft Bonanza has range of 750 miles carrying pilot and three passengers. When used 100 hours monthly, operating costs are under 1½¢ per passenger mile. (Left) Veetail uses conventional controls but makes rudder action necessary only during cross-wind landing or take-off. Tail was tested on AT-10.

Range, speed, unique control system combine with economy
in Beechcraft's all-metal bid for executive plane markets



modest of sky girls. The new Beechcraft incorporates a central shaft wheel with a single control which can be adjusted to two positions in both starboard and port operation. This feature, permitting pilots to change hand positions, combines with the ultraviolet cabin dome light in eliminating most of the fatigue factors of long cross-country cruising at night.

In checking out on the Bonanza, most pilots we know are enthusiastic about the newcomer to the personal plane field. Starting is a simple procedure of inserting the ignition lock key and pushing an automobile-type starter button on the dash panel. In running up the engine, noise and vibration are minimized by the stainless-steel mufflers, exhaust stacks, and excellent insulation of the all-metal cabin roof. The Bonanza engine, rated at 165-hp at 2,050 rpm, is responsive and smooth—although some pilots find the low noise level disconcerting at first.

At the end of the runway, a 90° turn gives full visibility throughout the operation arc, with the specially treated Lumarith windshield giving ultraviolet protection. Moving into a 10 mph wind, the Bonanza is off the ground in less than 400 feet with full 780-pound payload. Wheel retraction, into wells which are covered automatically on the ground, is accomplished by turning a single switch, and the little ship climbs well at the rated 950 fpm. Trimmed into cruising attitude with the elevator tab control, and with throttle and prop speed cut to 115-hp adjustment, it maintains true airspeed of 175 mph with little difficulty. The loudspeaker mounted in the cabin roof permits easy check on position by the simple expedient of pushing a button marked with preselected call letters. On long trips the loudspeaker serves up dance music and newscast reception and provides superb homing service with the aural null, thanks to the low noise level in the Bonanza cabin. Cruising at 10,000 feet on a 320-mile hop, cruising descent is usually started about 60 miles from destination, with power cut to 50 per cent to maintain 500 fpm descent at 200 mph. With 30° flaps the ship lands at 45 mph in 300 feet—excellent performance when one considers that burn-off in 320 miles is only 20 gallons or 120 pounds of loading. Most important of all, the Bonanza pilot can pocket change from a \$5 bill after

moving four 170-pound adults and 100 pounds of baggage more than 300 miles.

During recent years some large corporations have purchased company planes for transport of key personnel. But this market has barely been scratched because only top executives could justify the high cost of private planes. It is here that the Bonanza can become a pacemaker. Considering time as a negotiable item, any executive earning more than \$96 weekly can save his company money by traveling alone in the Bonanza with a paid pilot. When three employees travel together, the Bonanza is more economical than rail coach tickets regardless of the time-saved-personnel factor.

With tax economy and labor resources dictating decentralization of plant and office facilities in modern industry, the Bonanza may well become an important long-distance travel medium for thousands of wage earners during the next few years. Meanwhile, the 250,000 commercial travelers in the United States are certain to look with favor upon this newest of cross-country vehicles. On the average, traveling salesmen cover their territories from three to twelve times each year, using trains or private automobiles. With block-to-block speed some five times greater by air, these commercial travelers can cover their sales areas more often and more thoroughly—and hence more profitably—with the new Beechcraft.

Similarly, the new Beechcraft can be the open sesame to new business in the charter field. Weighing only 2,550 pounds, the Bonanza will be small enough to avoid stringent economic regulation by the Civil Aeronautics Board. However, its large passenger capacity offers charter operators a high-density revenue. With high speed, good range, and substantial payload, it can justify charter plane fares of three or four cents per passenger mile, bringing air service to many communities whose small, soft landing fields cannot be served by standard commercial planes.

Still awaiting certification, the prerequisite to mass production, the Beechcraft Bonanza may not appear widely for six months or more. But 20,000 hours of static and flight tests with four full-scale experimental ships have demonstrated the capabilities of Walter Beech's latest candidate for greatness.



With full flaps Beechcraft Bonanza lands in less than 300 feet. Wide tricycle tread, castoring nose wheel aid soft field landings.



ON THE BEAM

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NEWS

Big Day for the Air Force

August 1, Air Force Day, was climaxed by an AFA coast-to-coast broadcast in which Generals Spaatz and Doolittle were heard from Washington; Meryll Frost, AFA Vice President spoke from Boston. In California, Wing Commander Jack Warner brought Jimmy Stewart, Ronald Regan, Janis Page and other Hollywood high lights to the microphone, then to a dinner where Lt. Gen. George E. Stratemeyer, Air Defense Command chief was honor guest.

In Baltimore, Col. Willis S. Fitch, Executive Director, joined John R. Mitchell, Commander, and Marshall Boone, Vice Commander of AFA's first squadron in a broadcast over WBAL.

Five new squadrons in as many states were granted charters on the auspicious occasion and hundreds of individual membership applications were received in time to earn the "Charter Member" appellation. The University of Texas group, with 75 members elected Clarence R. Martin, Commander. At Columbia University in New York, 29 students formed the Lion's first squadron and elected William S. Roach Commander. Out in Idaho, Clarence Fuller was named head of Boise's first squadron and in Waukesha, Wisconsin, home of crystal clear water which is said to account for the prowess of certain Big Ten football teams, 36 veterans got together and named Gordon W. Fisher to head up their fast growing organization. All in all, it was a big day for the Air Force.

Headquarters Report

Charles S. "Casey" Jones, pioneer racing pilot and aviation educational authority, becomes the first commander of the Air Force Association's New York Wing, according to a recent announcement by executive director Col. Willis S. Fitch.

One of the industry's leading figures for nearly three decades, Casey Jones learned to fly at Wright Field in 1917, soon achieved international repute as test pilot for the Curtiss Aeroplane and Motor Co. He was among the first civilian pilots to participate in the air meets of the early twenties, flying his famed clipped-wing Oreole biplane. Later he became president of the Curtiss Flying Service, considered by many the prototype for modern school-charter operations. In the early thirties he established the Casey Jones School of Aeronautics, which begat the now-famous Academy of Aeronautics at LaGuardia Field. Both organizations trained great numbers of technicians for the AAF during the war.

Jones will serve as wing commander on invitation of AFA president Jimmie Doolittle until the wing's first annual convention.

Response to the drive for AFA charter membership averaged 300 daily applications, crowding the August first deadline at National Headquarters. Wing organizers for 32 states have already been appointed to catch up with the spontaneous formation of local groups.

Associate membership applications ar-

rive in batches with every mail. Seventy-one came in under a single cover from the ATC's 1400th Air Base Unit in Paris. Capt. Paul B. McGinnis, adjutant to the AAF Station Headquarters in Horsching, Germany, sent in 131 applications; Lt. Doyle Price forwarded 100 from Schweinfurt, site of historic pulverization operations.

From the other occupation front Lt. Gen. Ennis C. Whitehead, in Japan, sent an urgent repeat order for application blanks, in the AFA's drive to "keep the gang together."

Emporium Grows Wings

Ex-AAF pilot Barry Goldwater, president of Phoenix, Arizona's leading department store, announces the organization of what is believed to be the first department store flying club in the U. S.

Flying time in an Aeronca Champion is made available to employees. The current club is limited to eighteen members, ranging from 19 to 38 years old, with a like number on the waiting list. (Picture, page 36.)

Back to UAC

Col. Ernest W. Dichman, member of the procurement division of ATSC at Wright Field since 1942, has rejoined United Aircraft Corporation. Before accepting his commission, Dichman was sales manager for the Chance Vought Aircraft Division, is currently assigned as Dayton representative for Pratt & Whitney aircraft engines.

Service Athletes

Since war's end experts have been asking coaches whether returned war veterans have maintained their athletic drive and incentive. Some sports writers have propounded the theory that, after the life-and-death games of war, competitive sports might appear dull.

From Ann Arbor's University of Michigan comes a vehement "It isn't so!" As proof, the school exhibits a pair of AAF veterans who turned out for baseball this spring and have been doing all right since. Bob Chappuis of Toledo, Michigan's slugging right fielder, and shortstop "Robby" Robinson both played football in 1942 before entering the service, and Robinson made his letter playing first-squad baseball.

Chappuis' adventures as a radio operator included bailing out of his crippled bomber over the Brenner Pass, hiding for three months in the home of an Italian Partisan, right next to Nazi Headquarters. But no postwar slump is evident. For the first ten games of the season his score was .459. The only



Ex-AAF pilot Barry Goldwater, Phoenix department store president, with members of club to which he presented an Aeronca champion.

trouble Coach Ray Fisher had with his returnees was in getting Robinson to take it easy while his war-injured leg healed.

Veterans in Airlines

Any number of stories concerning the attitude of U.S. airlines toward returning vets have become current, varying from tales of unlimited employment opportunity to a chilly barring of former AAF personnel. In an effort to locate facts on the aviation industry's ability to utilize the skilled manpower released from the AAF, this department is in process of running an industrial survey. While not complete on an industry-wide basis, some of the data so far procured prove worthy of examination.

PCA, for example, has placed over 1,500 veterans of World War II, upward of 1,000 of whom are ex-AAF personnel. Of the airline's 340 pilots, 175 saw wartime service, and a good number of the flight-allied positions, such as operations, are held by veterans. Many of PCA's top executives served in the AAF, including Col. Luke Harris, vice president in charge of maintenance and engineering, who established ATC's famed "fireball route" to India, and Col. James D. Henry, member of General Brereton's staff who returned as assistant to President C. Bedell Monro. Col. H. J. Reid, former deputy chief of the Office of Flying Safety, is PCA's new director of flying operations and Capt. Murl Estes, former military attaché to Bolivia and Chile, is the new system chief pilot.

Braniff Airways reports that more than 1,000 of its total 2,400 employees are veterans, 75 per cent of whom served with the AAF. Seventy-six of the line's 200 pilots are recent acquisitions from the AAF, while executives recruited include: Col. Jess B. Bennett, ASC's Director of Military Training,

who joined Braniff as director of research and planning; Major P. Howard Farley, expert in heavy bombardment training, who took over as superintendent of training; and Capt. Donald H. Snell, former ETO fighter pilot, now traffic representative in the air mail and cargo department.

United Air Lines at this writing employs 2,300 ex-servicemen, the bulk of whom served in the AAF. This figure includes over 100 captains and first officers. Over 150 AAF vets were graduated from United's flight training school in Denver, 300 hold executive positions in the company. Among the latter are Col. Ray Ireland, former head of priorities and traffic for ATC, currently vice president in charge of administration; Major T. Lee, Jr. of AAFTC, superintendent of training; Col. J. R. Cunningham, former AAF liaison officer to the British Air Ministry, now director of communications; Major Richard E. Pfennig, returning to United as regional vice president for eastern operations. Col. Weldon E. "Dusty" Rhoades, who piloted General MacArthur's C-54, leads United's returning pilots.

Continental Air Lines has taken on over 200 veterans in addition to former employees who have returned from service. Of these, 85 per cent are ex-AAF.

Delta Air Lines reports that 1,021 of its total 1,500 male employees are veterans, chiefly AAF. Their number includes 28 captains and 105 co-pilots. In the airline's brass section are Laigh C. Parker, vice president for traffic, a former ATC colonel; Major John L. Schneider, superintendent of stations; Col. T. P. Ball, assistant chief pilot.

Chicago and Southern records show that 746 of 1,939 employees at all levels are vets. Nine captains and 55 first officers are included. Vice president in



PFC C. E. Moore, one of the A-bombing B-29, *Dave's Dream's* crew, holding Kwajie, who accompanied them on Bikini mission.

charge of finance and administration is Col. N. Henry Josephs. Major James F. Griffin, former CO of the 802d AAF Specialized Depot at Camden, N. J., is supervisor of property.

This is but a fractional report on the survey, but it does indicate that the air transport industry is utilizing AAF-trained personnel for the mutual benefit of airlines and veterans.

Stratemeyer asks AFA Support

Lt. General George E. Stratemeyer, chief of the Air Defense Command, in a recent address to members of the Aviation Writers Association asked the press's continued support of air power. In pointing up the appalling condition of what was, a year ago, the greatest air arm on earth, Stratemeyer stated that "the 19,000 first-line aircraft we now possess cannot be adequately manned with the untrained personnel which make up the AAF today. . . . Figuratively speaking, right now, we couldn't punch our way out of a wet paper bag."

The general emphasized the need for public interest in either a unified command with autonomous air power, or a three-arm system—land, sea, and air. He called for support of those organizations which carry the battle for air power, mentioning specifically the Air Power League and AFA. "The Air Force Association, headed by General Doolittle," Stratemeyer said, "is an organization designed to foster national interest in Air Force matters. This is an organization open to any person who has been commissioned, enlisted, assigned or attached to the Army Air Force at any time since the beginning of the aviation section of the Signal Corps. The Air Force Association does not compete with or duplicate the benefits of other veterans' organizations, but simply offers additional advantages to a group which has shared the special experiences of the AAF." (See picture, page 37.)



Lt. Gen. G. E. Stratemeyer and Col. L. R. Parker welcome Wing Comm. A. J. L. Craig, who led the visiting R.A.F. Lancaster Flight.

Heroes of global war, gliders and glider pilots are returning to Elmira in quest of national, international soaring records

SILENT FLIGHT

BY SANFORD A. WOLF

VIEWED FROM THE AIR, Elmira is very much like a dozen other pleasant cities which brighten the scenic valleys and slopes of upper New York State. Encountered at close range, its 50,000 solid and conservative citizens are singularly undistinguished in speech or manner. This is a friendly city where industry is the order of business and night life revolves around the country clubs and modest homes which line the wide, tree-shaded streets. It could be an insignificant dot on the air map of the world. But it isn't, because Elmira is the capital, the focal point, the fathering laboratory for gliding and soaring in America. To disciples of silent flight, Elmira is home—and the sailplanes and gliders have come home from the wars to fly peacefully over Harris Hill in the thirteenth National Soaring Contest during August.

Since 1911, when a group of collegiate enthusiasts gathered with their homemade craft at Squantum, Mass., there has been a handful of wind-blown Americans who insisted that no thrill quite equalled that of silent, unfettered flight in a glider or sailplane. Though their enthusiasm was shared by several hundred thousand Germans, Russians, and Englishmen, the great American public remained wholly apathetic for more than three decades. Despite twelve exciting annual glider meets at Elmira, silent flight was little more than a side show to American aviation's main events when 1941 brought an end to organized competition above and around Harris Hill. Then world catastrophe brought rude awakening. When the Nazis floated down on Crete, gliders leaped into the headlines which were to build in frequency and fervor until American and British troops made their motorless entry into Hitler's back yard. It was here that millions of men and women discovered that there were

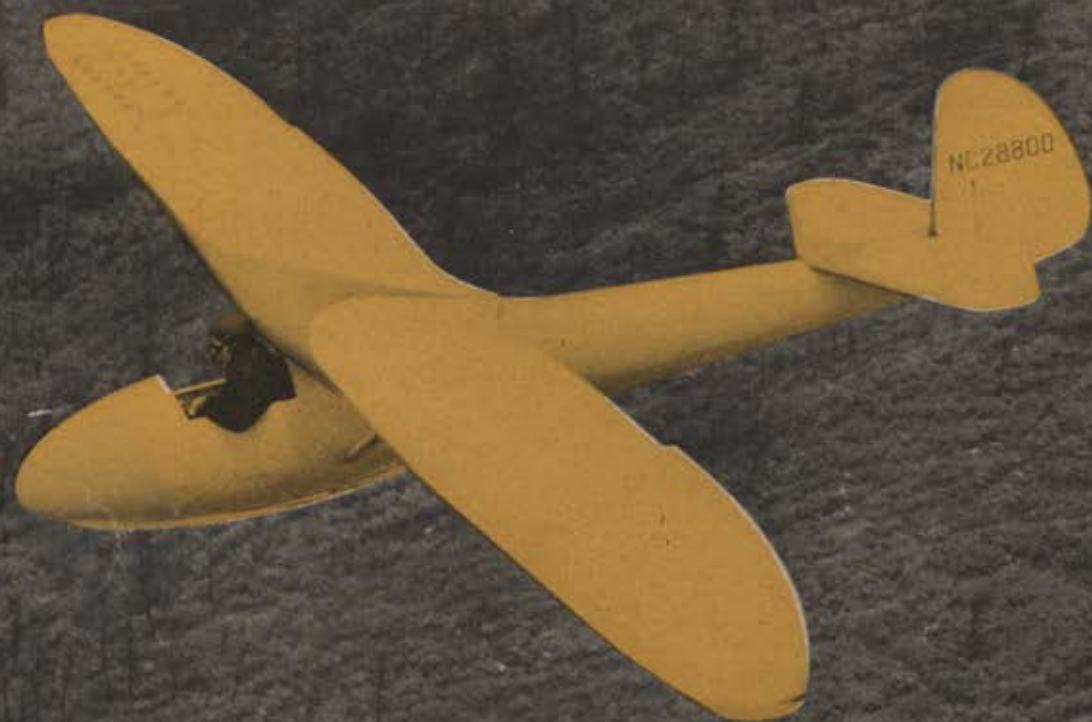
more ways than one of taking to the air. So the August meeting at Elmira will be the dawn of a new era for soaring planes and pilots—an era in which concentration will be upon individual records rather than collective demonstration of a flying technic which few people knew about and fewer cared about prior to the war.

Without considering the glider's military contributions or the practical economics of commercial cargo gliders, the student of aviation can safely admit that the glider approaches the ultimate in air-training vehicles. Gliding is relatively easy. It is a fact that competent students of high-school age frequently master the glider with two hours' instruction. Gliding is relatively safe. Starting on the ground and rising foot by foot as he attains proficiency, the glider student has little chance to make a mistake and little to lose if he does err. Crack-ups, infrequent in motorless aircraft, rarely result in serious injury because the glider landing speed is only twenty-five mph. Gliding is relatively inexpensive. With two utility gliders costing less than one of the smallest airplanes, actual operation as free as the air itself, volunteer tow crews cost considerably less than powered-plane mechanics. Hangar rent, a major expense for every light-plane pilot, is missing entirely from the glider pilot's budget. With wings removed, the glider and its trailer roll easily into any fairly long garage.

Moreover, glider activities can be carried on with safety in every suburb and village, wherever an unobstructed space is available for take-off and landing. Elmira has the nation's best-known glider site at Harris Hill but similar terrain is found in every one of the forty-eight states. Furthermore, the success of glider operations over desert sands at Twentynine Palms, California, in the mountainous pocket of Sun Valley, Idaho, and above the low-rolling river bottoms of Lockport, Illinois indicates that the variety of gliding technics makes the sport adaptable to any American terrain. Conversely, the best of gliding sites all have limitations. For example, the contestants who gather at Elmira during August will have little chance to better the existing distance record for sailplanes because Harris Hill is so close to the Atlantic Ocean that prevailing winds would send a record-setting glider well out to sea. It is contest records, incidentally, which best mirror the progress of glider design and glider technic.

When Orville Wright returned briefly to soaring in 1911, he established an endurance record of 9 minutes, 45 seconds which was to remain on the books for nearly ten years. Then, in 1920, Oscar Ursinus who edited Germany's *Flugsport*, set the stage for the world's first real glider meet. In the first soaring contests at Rhoen, a motley assemblage of schoolboys, scientists, sportsmen, and scar-faced war veterans gathered at Mount Wasserkuppe with everything from Lilienthal and Chanute hang gliders to motorless Fokkers left over from battle. Despite





Prewar favorites like Frankfort sailplane (above), and Kirby Kite (at right) will vie with war-born sailplanes like the Pratt-Read trainers in thirteenth running of national soaring meet at Elmira. Other entries include the well-known Laister-Kauffman LK-10A; Schweizer TG-2, TG-3, SGU-1-19, and SGU-2-22; Ross-Stephens high-wing Zanonia; Bowlus Baby Albatros; and Briegleb BG-7 and BG-8. (Left) The late Eddie Allen in early glider competition.





widespread interest in the meet and large-scale participation, results of the meeting were unimpressive until Wolfgang Klemperer kept his *Schwarzer Teufel* in the air for 2 minutes, 23 seconds.

By 1921, the Germans had so improved their designs that records began to fall within a few days after the opening of the meet. Klemperer stayed aloft in his *Blue Mouse* for 13 minutes, then Arthur Martens sailed for 15 minutes, 30 seconds in his *Vampyr*. When Friederich Hart, a short time later, flew for 21 minutes, 30 seconds, the endurance record had changed hands three times in a period of two weeks. Where the 1920 *Schwarzer Teufel* had provided the pattern other glider designers had long needed, the 1921 *Vampyr* established a delineation between gliders and sailplanes to open a new era in motorless flight. From then on, skilled pilots began to discard the rudimentary downhill gliding, with its inherent limitations, to master the art of soaring.

Thus, no one was surprised to see all previous records quickly outreached during the 1922 meeting on the Wasserkuppe. Martens kept the *Vampyr* aloft for more than an hour on August 10th, only to watch Henzen raise the record to 2 hours a day later. Five days later Martens again took off, to land in 3 hours with new record. The success of this Wasserkuppe meeting stimulated glider activity everywhere in Europe and, by 1923, the French were watching contests at Vauville, the beaches of Crimea had brought soaring to Russia, and a new continent had

come into the glider world when meets were held in North Africa. In the meantime, French pilots had recaptured some of the gliding prominence of Captain Le Bris when Thoret soared for 7 hours in a powered plane with the engine cut out. Barbot later raised this record to 8 hours, 30 minutes, while a third Frenchman, Deschamps, established a world's altitude record by soaring to 1,750 feet at Biskra, Algeria.

During the succeeding three years, permanent buildings and schools were established at the Wasserkuppe, a new German site was opened at Rossitten in Prussia, and gliding records were constantly improved until Ferdinand Schulz flew for 12 hours in 1925—to reach, in the minds of his contemporaries, the soaring millennium. Despite these apparent advances, however, silent flight had made little real progress since the 1921 meeting at Rhoe. Men were still soaring above hillsides, unwittingly limited in their flights by the duration of slope winds. It was the 1926 gathering at Wasserkuppe which revealed the secrets of rear soaring progress to the enthusiasts and rejuvenated interest in the sport.

Shortly after the opening of the meet, Schulz effectively disproved the fallacy that gliding was a fair-weather sport by flying safely in a hail- and rainstorm. Then, when Max Kegel was sucked upward by a thunderhead, a motorless plane doubled the previous distance record while simultaneously climbing to the greatest height ever reached by a glider. A short time later, careful study of



Built by Schweizer in the shadow of historic Harris Hill, mid-wing 2-place fabric-covered sailplane (facing page) will be used by more than a score of eastern contestants at Elmira, while the plywood Bowlus Baby Albatros (left) will be flown by several western enthusiasts. (Below) *Recordbreaker*, appropriately named Schweizer TO-2 which holds pre-war distance and two-place altitude honors.

topographic conditions affecting air currents enabled Johannes Nehring to make a goal flight between Wasserkuppe and Milseburg. Measured in miles alone, Nehring's flight was not outstanding. It did, however, attract the attention of leading scientists and bring research leading to development of the technic which we now describe as storm flying. Cloud soaring took its first real impetus from the 1928 activities of Robert Kronfeld.

Making contact with a cloud over the Wasserkuppe, this intrepid Austrian pilot was pushed upward to 1,400 feet and carried to Himmeldakberg, where he rode slope winds while waiting for other clouds which finally carried him back to his starting place. On October 20, 1929, Kronfeld continued his experiments by setting out deliberately to ride a thunderhead in the manner discovered accidentally by Kegel three years earlier. Soaring from the Wasserkuppe at the peak of a thunderstorm, Kronfeld negotiated a distance of 85 miles and climbed to 7,525 feet to establish two new gliding records. This flight, and other spectacular performances of the late twenties, contributed much to American interest in soaring and, as a logical outgrowth, the competition at Elmira was born.

Where Peter Hesselbach, a German expatriate of Cape Cod, had flown for only 4 hours, 5 minutes, in setting an American endurance record in 1928, Hawley Bowlus quickly advanced the record to 10 hours in two years. Two months later, Jack Barstow, an assistant to Bowlus, claimed the official record with a 15-hour flight, while Wolfgang Klemperer, by this time an engineer at Good-year Zeppelin Corporation, had established a distance record of 15.7 miles—just ten years after his 2-minute record flight. It was the first Elmira meeting which climaxed the rebirth of American motorless flight. Here, on a site discovered by Klemperer and Jack O'Meara, Wolf Hirth made his spectacular flight of 54 miles without the aid of clouds or slope winds. The resulting research into thermal soaring culminated in genuine success just a year later when Hirth, Groenhoff, and Kronfeld all made flights of more than 62 miles. Thermal up-currents rising from large cities meanwhile had been utilized by pilots over Berlin, Munich, and London, while Jack O'Meara had ridden the currents over New York City. It was these thermal flights, combined with new launching methods, which liberated motorless flight from dependence upon slopes or clouds. Gunther Groenhoff and Peter Riedel perfected the airplane tow, American pilots improved the automobile tow, and Kronfeld perfected the winch for high altitude tows. Gliding had finally come of age, with soaring sites and records limited only by the enterprise and endurance of pilots.

To appreciate the importance of launching improvements, we need look backward no more than fifteen years. It was the airplane tow which started Kronfeld's glide from 6,000 feet to carry him across the English Channel in 1931. The same towing method aided Groenhoff's 170-mile storm-front flight from Munich to Kaaden. At Honolulu, Lt. William Cooke soared for almost 22 hours on December 17, 1931, to surpass the 14-hour duration record set in 1928. At first considered unbeatable, Cooke's record fell less than two years later when Kurt Schmidt remained aloft for 36 hours, 35 minutes. In the meantime, Heini Dittmar, engaged in a scientific expedition to Brazil, soared to 14,000 feet over Rio to eclipse the altitude record



which had endured since 1929. On the same expedition, Hanna Reitsch, who already held the woman's duration record of 10 hours, soared to 7,040 feet to set an altitude record for fair pilots, then added the distance record to her laurels with a flight covering nearly 100 miles.

American activity, too, came upon good times in the early thirties. In 1932, Warren Eaton and a group of foresighted habitués of the Elmira soaring site organized the Soaring Society of America. By the end of the Society's first year, Jack O'Meara had established an American distance record of 66 miles, only to see the late Richard du Pont outreach this mark with a 122-mile flight along Virginia's Blue Ridge in 1933 before making a world record flight of 158 miles in 1934. In April, 1935, Lewin Barringer fell three miles short of this du Pont record in flying from Ellenville, New York to Picketown, Pa. The Barringer flight did, however, win recognition as the longest slope wind flight ever made.

Overseas, the Germans continued to lead the record parade when Groenhoff's three-year-old endurance record was bested four times in two days during the 1934 Rhoen meeting climaxed by Heini Dittmar's 234-mile flight without power. A year later, the German government openly supported pilots at Wasserkuppe, and the mass participation brought the first mass record flight when Oeltschner, Heineman, Steinhoff, and Brautigan all covered 313 miles in a thermal-soaring flight to Brno in Czechoslovakia. When Oeltschner crashed to his death while being towed back home by an airplane, the other three pilots requested that their mutual record be listed in Oeltschner's name alone as a tribute to his soaring genius. This 1935 meeting in the Rhoen mountains also brought the first long goal flights, with Peter Riedel traveling 165 miles over a predetermined course from Berlin to Hamburg. Subsequently, the Russians adapted the goal flight idea to large glider trains, Kraft covered the 208 miles between Cologne and Hornberg, and Ludwig Rotter completed a goal flight between Berlin and Kiel.

Thus, the sailplane tour covering a planned course regardless of soaring conditions was a logical development which brought a 432-mile flight by four pilots in 1936. Their flight linked Darmstadt-Wurzberg-Munich-Augsburg-Stuttgart-Mannheim and provided the pattern which

led to completion of a flight between the Rhoen Mountains and Nuremberg by nineteen pilots participating in the 1937 meet. As the result of this flight, the official list of possible sailplane records was augmented in 1938 with addition of "distance with return to starting point." Meanwhile, the Russians were reporting new records in rapid succession. Rastorgoneff covered the 335-mile distance between Moscow and Devitz on May 5, 1937; then followed with a 374-mile flight one week later. Fifteen days later, he climbed skyward again in his GN-7 to soar 405 miles from Moscow to the Volga's Hammer and Sickle Farm, covering the distance in 8 hours, 18 minutes for an average speed of 45 mph. Another Russian pilot carried a passenger 253 miles on the same day to establish another record. The Russian sailplane excitement also brought the best high-altitude performance of 1937 when Fyodoroff, towed to an altitude of 28,050 feet, released his topline to ride upward on alto-cumulus currents to an altitude of 39,946 feet.

With Germany preparing for war and German pilots concentrating on military training, 1938 saw America's emergence as the world center for soaring sport. More than fifty planes with nearly 150 pilots registered at the Elmira meet that year to double the largest previous entry list. Peter Riedel, then attached to the German consulate at Washington, used his *Rhoensperber* in a goal flight to Washington on July 3, covering the distance in slightly less than 8 hours. The following day, Navy Lt. Robert M. Stanley, now with Bell Aircraft, outclassed the famous German pilot by reaching Washington in 7 hours, 30 minutes. Traveling 225 miles, he simultaneously established a new American distance record, eclipsing Lewin Barringer's thermal ride from Wichita Falls, Texas to Tulsa, Okla. Motorless flight in America continued to flourish in 1940 when John Robinson completed a 290-mile goal flight from Elmira to Mineral, Va., on July 3, just a month after Woodridge P. Brown had soared 263 miles from Wichita Falls, Texas to Wichita, Kans. Robert Stanley carried his single-place sailplane to 17,264 feet on July 4, to set a new record in this category, and the late Lewin Barringer raised his own two-place record by soaring to an altitude 14,960 feet above Sun Valley and 21,000 feet above sea level. That was on August 12, 1940 and, with two exceptions, it spelled the end of sport soaring records for the duration. In July, 1943, a German *Minimoa* piloted by Shelley Charles, climbed to an altitude of 19,434 feet over Atlanta to set a new record in this category. In March, 1946, Frank Hurtt and Richard Powell kept an all-metal *Schweizer 222* in the air over Elmira for 10 hours, 9 minutes to establish a new two-place American endurance record.

When the 1941 meet opened at Elmira, most of the familiar faces were gone, and glider manufacturers were already converted for military production. Everyone knew then that silent flight—at least the friendly variety—would have to wait for victory. So the National Soaring Contest at Elmira in August is a milestone of dual significance. It marks the resumption of sport soaring in America. More important, it marks the emergence of American sailplane enthusiasts as the world's leaders of motorless flight—whether or not they hold all of the records. And Elmira, the city of silent flight, deserves most of the credit for keeping the sport alive during fifteen long years when none but the Germans cared about the quiet record ships.



E. W. Geller, 16, and H. H. Brown, 73, are glider students at Elmira.



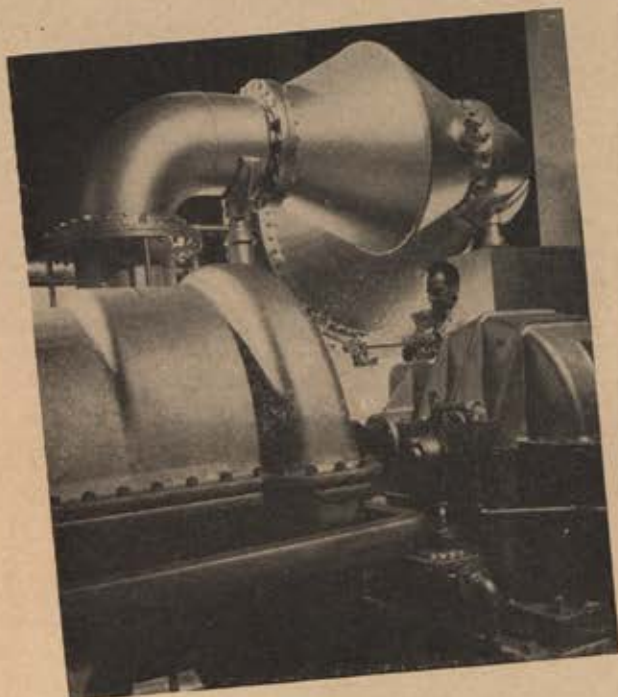
Air Tech

SEPTEMBER, 1946

43

Transsonic tunnel in California gives U. S. aircraft designers a large-model research facility which simulates speed of sound in the low-turbulence manner of actual flight

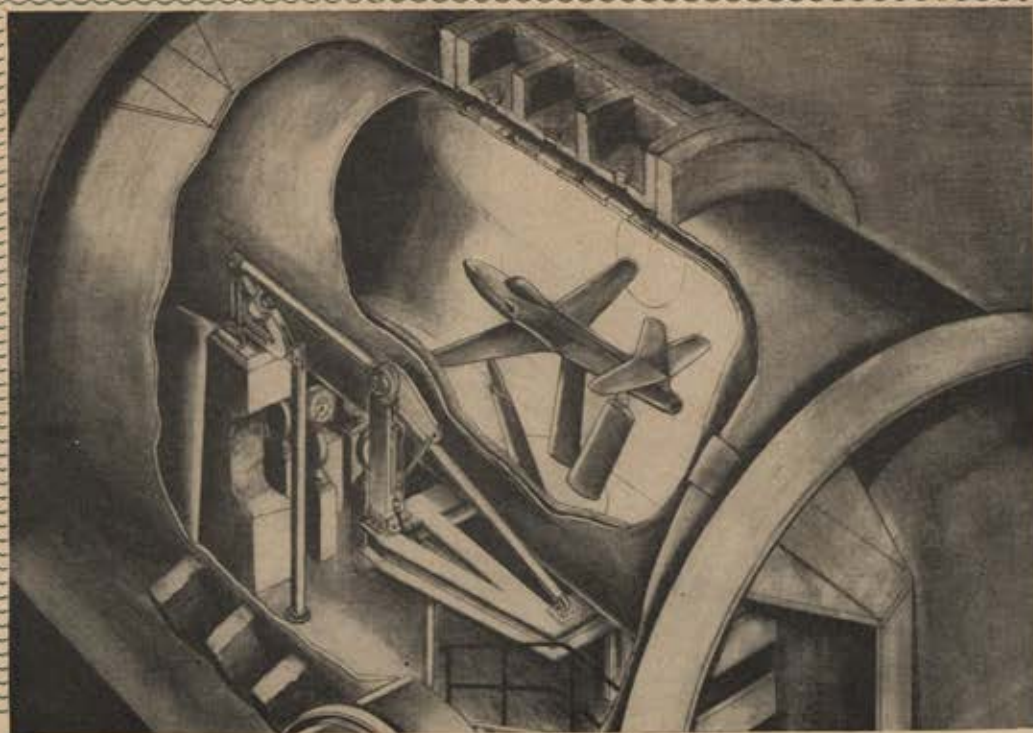
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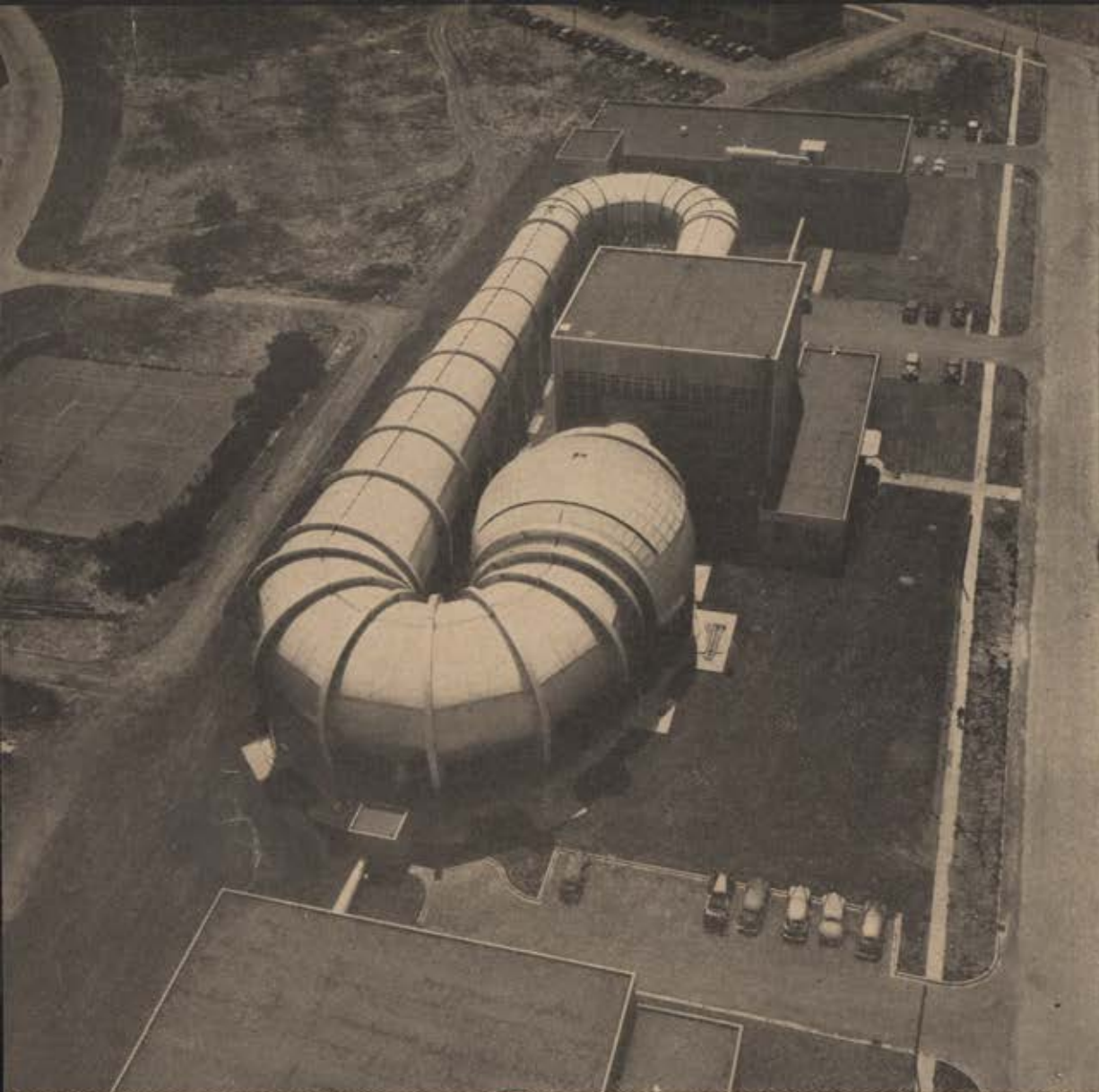


FOR A LONG TIME, the world's engineers have been talking about transsonic research but few nations have been able to do much about the subject. But the key to long-promised sonic air speeds may be contained in the new National Advisory Committee for Aeronautics wind tunnel at Moffett Field, California. Rated as the most versatile aeronautical research facility in the world, the unique new structure simulates speeds up to 720 mph and permits scientists to obtain design information applicable to full-size, high-speed aircraft.

Officially designated as the Twelve-Foot Low Turbulence Pressure Wind Tunnel, the new chamber incorporates large screens in the sphere just ahead of the test section for reduction of airstream turbulence. In the past, only small tunnels could duplicate the free-air smoothness of actual flight. Although the new test section will barely accommodate 10-foot span plane models, air pressure in the tunnel may be increased by six times to give them all the characteristics of a 60-foot span fighter.

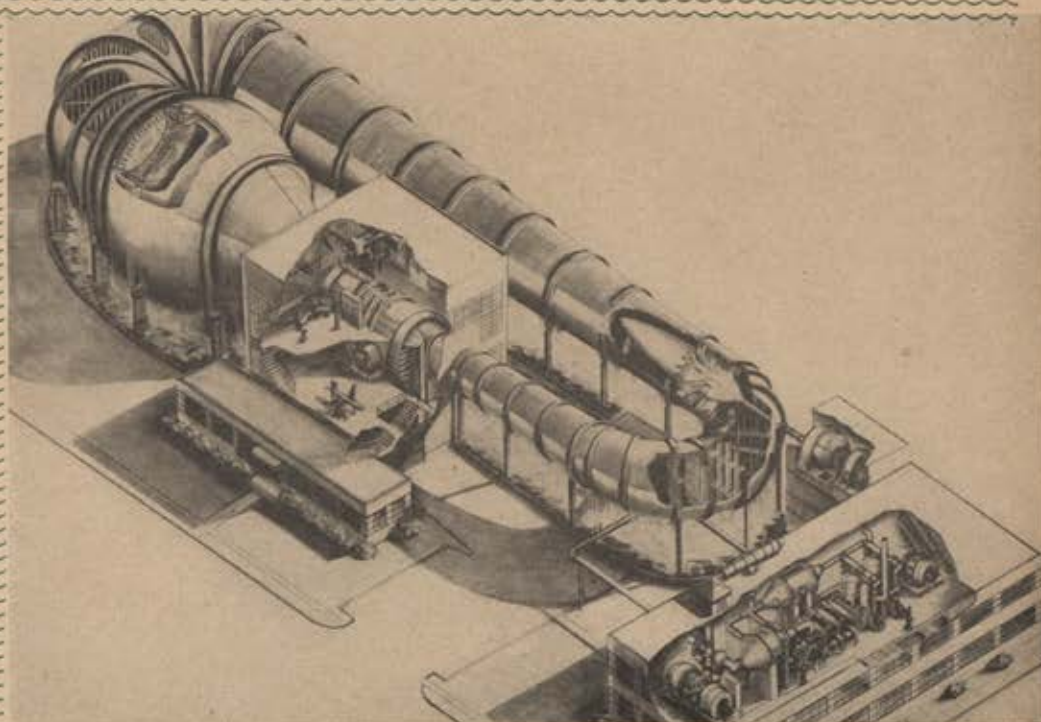
In tunnel operation air is circulated by a pair of 18-ton variable-pitch fans powered by electric motors developing 11,000 hp. For simulation of transsonic speeds, pressure may be reduced to 1/6 normal atmospheric pressures. Conversely, tunnel pressures may be boosted to 88 pounds per square inch to duplicate large plane characteristics.





n.a.c.a.

Housed in service building, compressors (top, left) vary pressures in NACA low-turbulence tunnel (top, right). In photo (at left) 10-foot model is supported in pressurized test section. Distinctive sphere (at right) contains low-turbulence equipment.



AIR POWER BY THE POUND

BY JOHN PAUL ANDREWS

DURING THE DRAMATIC SUMMER of 1939 in the comparative oblivion of Arroyo Seco near Pasadena, five men under the obscure aegis of ACJPRP-GALCIT and the learned leadership of Dr. Theodore von Karman worked at wrapping up airpower in a small, neat package.

Officially, the alphabetical garble which designated von Karman's project identified the *Air Corps Jet Propulsion Research Program, Guggenheim Aeronautical Laboratory, California Institute of Technology*. The object was to find an answer to General H. H. Arnold's request for a supplementary power source which would put bombers and fighters into the air from small airports in Europe. That the resulting JATO units played little part in the European conquest was only because installation of the units on all combat planes would have taken longer than the laying of portable flight strips. So the Navy took over where the Army left off, finding in JATO the missing operational link between out-size dive-bombers and pint-size carriers. It was here that Aerojet, now a division of General Tire & Rubber Company, was born as the child of necessity.

Under terms of the Guggenheim endowments, Dr. von

Karman's engineers were permitted to engage in research but could not sell the products of such research for profit. When the Navy ordered sixty liquid propellant JATO units, the five engineers simply organized their own corporation and set up shop in the rear of an East Pasadena store. That was in January, 1942. Although a promised Army order for \$200,000 failed to materialize when AAF needs for JATO passed, the new company mushroomed on the strength of Navy orders until the five original engineers were joined by 1,600 additional scientists while the original shop—The Gulch—gave way to a plant layout of eighty buildings spread over seventy California acres. All this, and sea rescue, too, came directly from an idea more than two hundred years old.

In its broadest sense, jet propulsion refers to methods for propelling a body by the reaction or thrust developed by a fluid jet. When Sir Isaac Newton propounded his Third Law of Motion, declaring that every action must be accompanied by an equal and opposite reaction, he provided the axiom on which jet propulsion is predicated.

Ercoupe with JATO beats unassisted Porterfield in take-off challenge.



With Army JATO, Douglas C-47 clears 50-foot obstacle at Ontario, Cal., in test clocked by camera. Jet assist for civil aircraft raises payload, reduces airport runway requirements, provides safety factor.

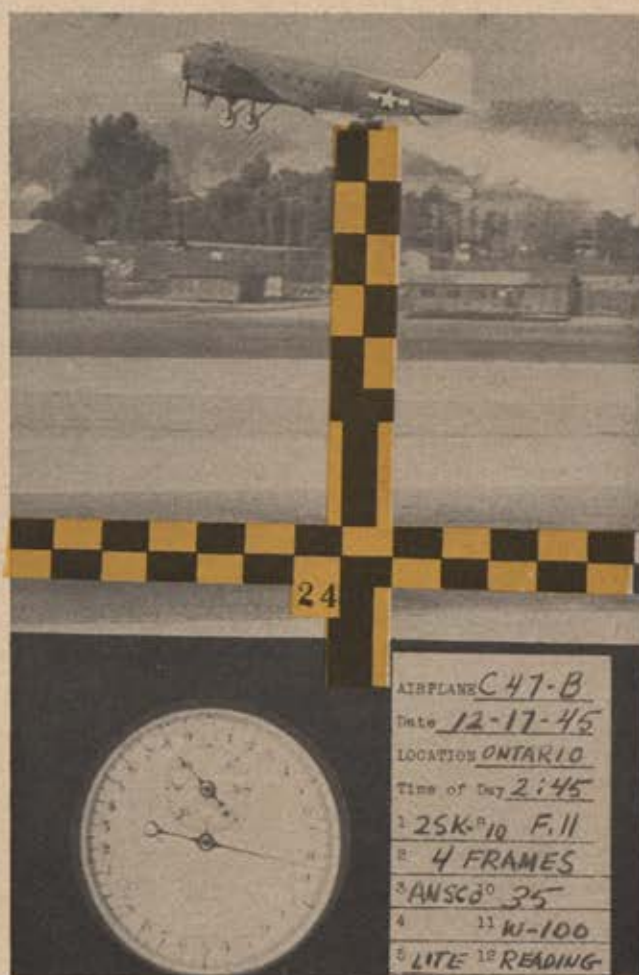
Contrary to popular belief, the driving force of a jet-propelled motive system is not the result of a push developed when the escaping fluid stream strikes the surrounding medium, but is due instead to the force originating from reaction generated by the rapid exit of a fluid stream through a jet nozzle or orifice. This push is developed regardless of the type or density of the surrounding medium. In practice, rocket reaction is usually produced by discharging large quantities of gases to form a fluid jet, with self-contained fuel and chemical oxidizer providing the components of reaction. For convenience, the container in which the propellants are stored can be designated as a rocket motor.

Fashioned in the style and manner of a large steel bottle, it is the rocket motor which re-creates the legendary genie who, released from his bottle prison, grew into a towering slave giant with limitless powers of magic. Spun from a segment of a seamless steel cylinder measuring 10 inches in diameter and 3 feet in length, the rocket motor is closed on the forward end and fitted on the after end with a nozzle, igniting mechanism, and safety blow-out device. Three mounting lugs welded to the shell permit attachment to any airplane. With a thrust roughly equal to 330 hp when used on planes travelling at 90 mph, the 115-pound Aerojet motor ranks with the most efficient motive units known to man. Cast in the form of a cartridge, the 90 pounds of propellant ignites at 725° Fahrenheit and emits a non-corrosive, non-toxic exhaust of somewhat smoky opacity. To prevent erosion at high temperatures, the Aerojet nozzle throat is protected by a carbon insert while a protective cap fitted over the nozzle keeps the motor dry and free from foreign matter during shipment. In operation, the pilot activates the igniter by closing the ignition circuit to set off a "flash cap" which in turn fires the main charge igniting the propellant—with approximately 2/10 of a second sufficing for the entire train of actions. Demanding all of the care accorded any ordnance matériel, the Aerojet unit is stored vertically, nozzle-end upward and sans igniter, at temperatures of about 60°. When handled in this manner, storage life of propellants is up to one year and motors may be fired repeatedly after proper servicing and reloading.

Rockets for Peace

Born of wartime necessity, Aerojet answers the peacetime demand for a small, lightweight, portable power unit boasting great thrust for a short period of time. For example, the Civil Aeronautics Administration currently authorizes operation of the Douglas DC-3, S1C3G at a gross weight of 25,200 pounds from sea level runways measuring 4,000 feet or more in length. Where shorter runways are used, a payload reduction of 500 pounds is mandatory. With air service expanding to include hundreds of smaller communities in the United States while scores of DC-3s operate from short South American airports 13,000 feet above sea level, collective revenue loss occasioned by load limitations is considerable. Actual tests demonstrate notable economic advantages in the Aerojet and similar rocket motors.

When Aerojet power is turned on after 920 feet of

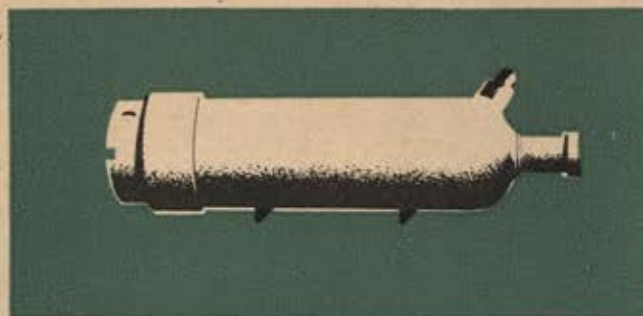


DC-3 sea level runway travel, the ship becomes airborne in 1,660 feet and clears a 50-foot obstacle on one engine in 2,587 feet. Without take-off assistance, the DC-3 requires 4,000 feet to meet the CAA take-off requirements. Similarly, in operations at 4,800 feet above sea level, Aerojet power after 1,115 feet of runway travel gets the DC-3 into the air after 2,193 feet and enables it to clear a 50-foot obstacle at 3,261 feet. In sharp contrast, single-engine take-off without JATO requires 5,500 feet at the same moderately high airport altitude.

Because runway lengths, by themselves, mean nothing to the average air traveler, the inherent advantages of Aerojet motors are perhaps best interpreted in the light of passenger demands. Geography, and American travel habits, have made commercial flights of 300 to 500 miles the keynote of civil aviation. And the twin-engine airplane of relatively high wing- and power loading is supreme in this range bracket. However, such planes characteristically demand flying speeds 40 to 50 mph higher than take-off speed. If an engine fails during the critical period between take-off speed and minimum safe single-engine flying speed, a crash can be expected. With auxiliary power the same plane could continue to accelerate to safe flying speed even with the loss of one engine. In four-engine aircraft, landings and take-off normally require the same runway distance. However, a plane which takes off with 90,000-pound gross loading on a 1,500-mile flight will burn off 14,400 pounds of fuel en route and land with a gross loading of 75,600 pounds. Hence, required landing distance is reduced without change in aircraft



Versatile JATO units serve equally well on small private planes, giant flying boats like Martin above. Tested on a Mars, JATO cut take-off requirement by 60 per cent. (Below) Reversible props, flaps, low drag airfoil sections offer three alternates in reducing landing distances but JATO is only current means to big plane take-off from short runways. (Top, right) Rocket plane, mother ship of tomorrow.



structures. When landing run is further shortened by the use of reversible-pitch propellers, which save 25 per cent in runway length, and by the use of slotted flaps, which reduce landing distance by another 5 per cent, 300 mph cruising speeds coupled with 40 mph landing speeds become practical. However, required take-off distance will continue to increase unless airliners are equipped with auxiliary power sources. Moreover, the coming of "all-weather" airline operations will also call for a 50 per cent increase in runway lengths to compensate for instrument lag, pilot corrections, and other factors inherent in instrument take-off. Unfortunately, the world has few runways 7,000 to 9,000 feet in length.

Local Services

Expansion of commercial aviation along other lines will also emphasize the advantages of supplementary take-off power. In an effort to give air service to thousands of U. S. communities not now served by the scheduled airlines, industry leaders have suggested two possible operational innovations. The misnamed "feeder" services would provide purely local service between smaller communities. For example, present airline service between Los Angeles and San Francisco would be augmented with flights into Bakersfield, Tulare, Hanford, Visalia, Fresno, Merced, Modesto, and Oakland. The alternative proposal, designated as "skip-stop" service, would find regular Los Angeles-San Francisco airliners stopping at Bakersfield on the first flight each day, at Tulare on the second through flight, at Hanford on the third trip, and so on to give each smaller city daily flights to both Los Angeles and San Francisco. Either type of local service would call for runways measuring at least 4,000 feet. Here again, the airline operator must predicate his "through loads" upon the runway length at the smallest airport en route—or look to auxiliary power like JATO as the alternative.

Light plane owners, too, can widen the utility of their small ships through the use of supplementary power, albeit for different reasons. As take-off assistance, JATO enables small planes to take off from any field or lake adequate to a landing. Hundreds of trainers annually



land without mishap in small fields but must be dismantled and hauled out because of take-off requirements. Furthermore, the same auxiliary power can offset the hazards which result when small planes lose their lone engine. When this happens shortly after take-off, JATO power of 25-second duration will permit the pilot to return to his airport of origin. When mishaps occur at cruising altitudes, the small rocket motor will usually stretch the glide sufficiently to permit location of a safe landing area. That JATO units adequate to the needs of private pilots detract little from normal plane performance is apparent in the fact that similar rocket motors can be used on high-performance sailplanes. In this case, JATO is more than a safety device. Where glider enthusiasts now spend long hours in dismantling, trucking, re-assembly, and waiting for the winch before they can grab a few precious hours in the fugitive thermals, JATO whisks them to soaring altitudes at the rate of 3,000 feet per minute—from any airport.

From this necessarily limited discussion, it should be obvious that rocket power for aviation has vast utility right now. The future is even brighter. By 1955, 20,000-pound rocket ships should be carrying passengers from Los Angeles to San Francisco in 10 minutes or less. With 14,000 pounds of fuel, such rocket ships will carry four passengers and a pilot at speeds exceeding 2,000 mph during take-off climb, at 4,000 mph during cruise trajectory, and at 5,000 mph and more during descent. Economical range will be limited to 400 miles with a single ship but "multi-step" operations with another ship and progressively smaller auxiliary ships will make 20-minute transcontinental schedules practicable. Meanwhile, ramjets using rockets for take-off assistance and cruising at 1,500 mph will be offering low fares on 2-hour cross-country services. So the shape of things to come will all be fashioned to a pattern born without fanfare in 1939.

REDUCED TAKE-OFF DISTANCE



REDUCED LANDING DISTANCE

Doodles for DESTRUCTION

BY ERIC FRIEDHEIM

THERE ARE A NUMBER of pre-embryo stages through which any airplane design must pass before it emerges as the faintest shadow of reality. In the AAF, this "glint in the designer's eye" takes form in imaginative models called *design studies*. In a sense, they are three-dimensional images of the airplane creator's scratch-pad "doodles." They precede the wind tunnel model by a complete generation of thought.

A new batch of design studies has been evolved by the Aircraft Design Branch of the AAF's Air Matériel Command at Wright Field. They represent the most advanced thinking on the subject of future aircraft, with calculations based on power plants and wing data no less fanciful than the design studies themselves. Some of these ideas may wind up in the Command's copious File-and-Forget section, but all of them will have some impact on future designs just as all World War II aircraft were well past the design study stage when the first bomb whistled down on Honolulu. For that reason, design studies now in the works represent our sole hope for safety in case of atomic war.

The new design studies fall generally into three classifications. One category includes perimeter defense types, or interceptors. The second category embraces outer zone aircraft of the long-range attack-fighter variety which defends the middle zone. Long-range bombers constitute the third design study class.

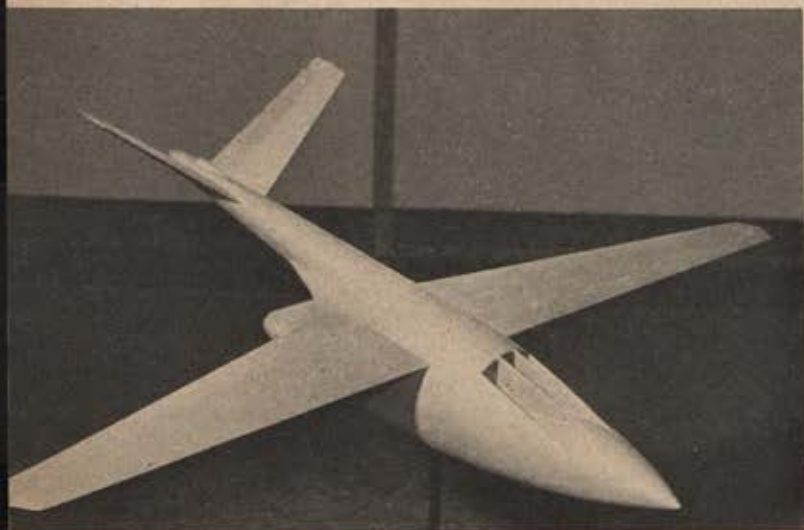
For the defense of the immediate center of the target, an interceptor has been designed which serves as the war-head on a V-2 rocket. The interceptor consists of a short,

stubby fuselage with needle-point supersonic nose, swept-forward wings, and the newly developed butterfly tail which characterizes many of the new designs. This interceptor is mounted on the front end of a 90°-finned rocket. Launched vertically to interceptor levels, it is released from the carrying rocket to proceed under its own power.

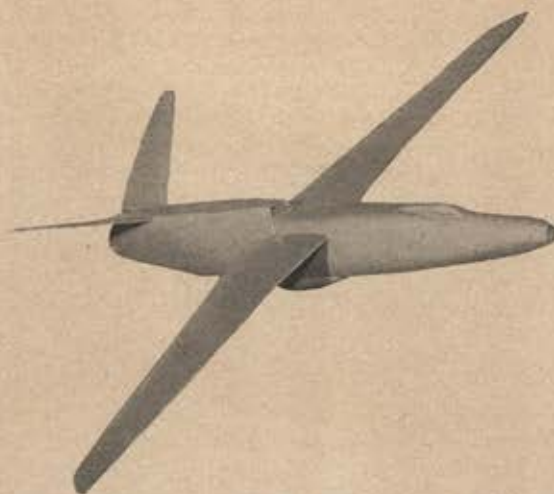
Other fighter proposals include an outer-perimeter design somewhat resembling the German jet fighters. This type carries four jet engines in two nacelles slung under the wing and mounts special radar directed fire-control equipment. Another proposed fighter has butterfly tail, an extremely thin wing, and embraces 10,000 pounds of fuel in its 15,000-pound take-off weight. A third fighter proposal calls for a very slim fuselage, high tail, and large jet engines placed at the wing tips. The lifting surface has a very low aspect ratio, permitting great structural strength with low weight. The double-tracking effect of the two widely spaced power plants presumably offers sufficient directional stability. The last of the fighter proposals places two engines inside the fuselage, in the manner of the recently announced Douglas XB-43. This permits a clean fuselage and a wing free from breaks.

In one proposed attack plane, a butterfly tail and high wing are combined with the diamond-sectioned supersonic wing. Powered by two gas turbines utilizing a conventional propeller in front and jet exhaust behind, this plane derives extra power from a pure jet tail engine.

The jet bombers indicate high design originality. In both of the announced proposals, great effort has been expended in keeping the wing free from ducts, air scoops,



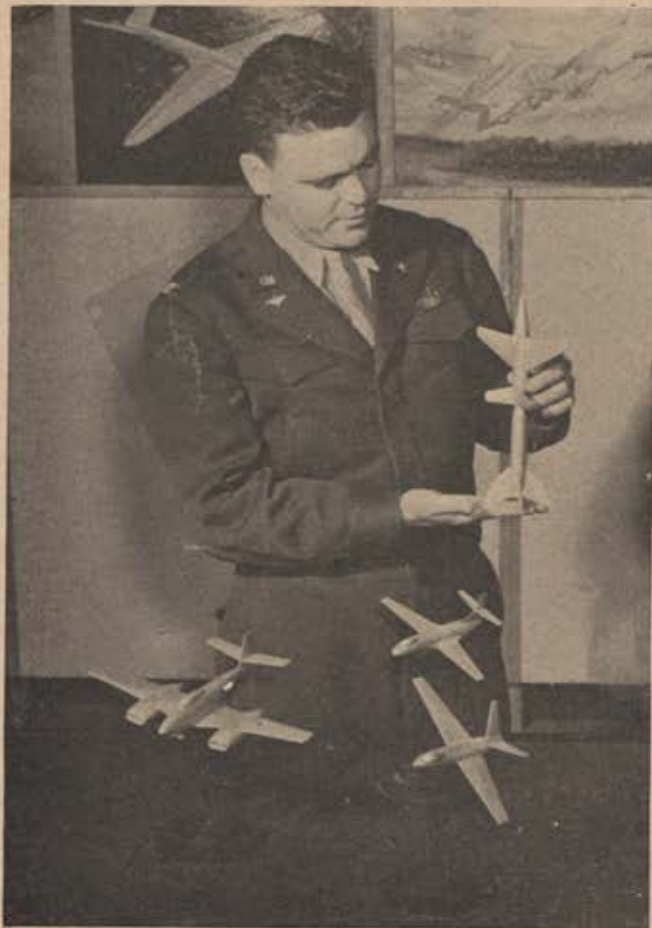
Designed studies frequently highlight blueprint bugs that would not show up in two-dimensional presentations. This is study of a



six-engined 100,000-lb. jet bomber. Above, 90,000-lb. four-engined type with small frontal area, exhausts amidship and in tail unit.



This proposed attack-type carries two prop-jet engines under the wing, and a turbo-jet in the tail for combat-emergency power. Right,



Col. P. H. Dane, examines a vertical-ascent interceptor, a jet design which is carried to operational level by a V-2 rocket. On the table are other jet proposals, including a four-engined radar night fighter.



This 200,000-lb. bomber proposal will be prop-jet powered. Right, the rear view of the 100,000-lb. six-jet bomber. Tailwise bomb bay

SEPTEMBER, 1946



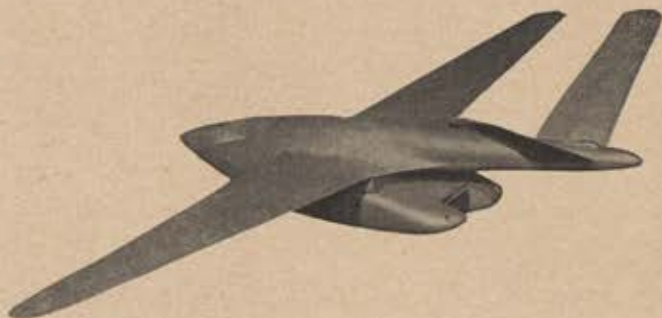
Col. Paul H. Dane of Aircraft Laboratory at Wright Field and Maj. Joseph Wadsworth study 90,000-lb. butterfly-tail jet bomber.

or other breaks in the main surface. There is a four-engined 90,000-pound proposal, which would carry a thin, high aspect-ratio wing amidship. A single air-intake in the nose provides air for two jet engines located forward of the bomb bay, with jet exhausts extending from the under surface of the fuselage aft of the wing's trailing edge. A supplementary airscoop on top of the fuselage, just behind the wing, supplies air for two engines behind the bomb bay which exhaust through the tail. The cockpit is forward of the front engines.

The 100,000-pound jet project is a high mid-wing design with a main nacelle resembling a needle-nosed tank and a butterfly tail supported on a tailboom. Air for the six fuselage-installed jet engines is taken in through a set of scoops in the front end of the main nacelle. Rear bomb bay doors improve high-speed accuracy.

Larger designs appear more conservative. One 200,000-pound proposal uses supersonic fuselage, butterfly tail, and ultra-sophisticated wing form in combination with a prop-jet in four underslung nacelles of conventional form.

Several things are apparent in these projections. First, that no future planning is being done on the basis of reciprocating engines and few on the assumption of propellers. However, it should be remembered that even under wartime stimulus there is a three- to five-year gap between design study and prototype, and almost as great a distance between first flights and widespread application. For that reason, there is still plenty of life remaining in the piston-propeller design which has endured in military aviation for more than thirty years.



allows improved bombing accuracy at high speeds. This jet bomber could be used for cargo. Note tail-turret accommodations in boom.

HOT RODS and HOP UPS

(Continued from page 30)

easily infect an impressionable younger generation.

At any rate, the youths who went into their late teens during those four years are the core of the present craze. They are competent driver-mechanics with an automotive knowledge vast in comparison with the average kid of 15 or 20 years ago. They know exactly what it takes to get the maximum speed out of any stock car chassis.

The average hop-up strips it, tightens it, strengthens it, and replaces worn-out members. Then, as pocket money permits, he does some or all of the following:

He buys high compression cylinder heads which provide a sharper explosion, and hence more power and speed every time a piston is thrust downward.

A further step concerns the camshaft, the gadget which operates the valves, allowing the explosive gasoline mixture to enter the cylinders. They regrind the camshaft so that each valve is opened longer, causing a greater amount of gas to enter.

He may move nearer the ultimate by adding either a dual or triple manifold, providing two or three carburetors instead of the conventional one. This means that two or three times the volume of gas is available to the engine.

He may go even further by installing a special lightweight aluminum flywheel and adding high-speed gears.

All of this has resulted in a new industry that's growing by leaps and bounds out here—the manufacture and sale of speed equipment. The manufacturing end has run into big business for several hot rod authorities.

The manufacturers' wares find their way to the teen-aged adherents via the speed shop, the retail manifestation of the new industry. The speed shop automatically becomes the gathering place for every hop-up in the community and the resting place for their pocket allowances.

The saner element of the hop-up kids is known as the Southern California Timing Association, a registered organization dedicated to scientific exploration of the realm of second-hand speed. SCTA's regulations emphasize safety, and it is strict in its enforcement of them. The cars of its members must be sound as a dollar or they're not allowed to participate in the all-important speed events. Driving habits of the members are also considered.

The association is made up of representatives of 28 speed clubs who meet once a month to plan meets and keep regulations up to date. It furnishes a few trophies for winners, and occasionally an interested firm will throw in a free grinding job or a set of coveralls as prizes, but mainly all the work is done purely for love of speed.

The war interfered with the SCTA's activities for the past four or five years. The lakes were taken over as Army or Navy installations, and its members were sure and early meat for the draft boards. Its boys were exceptional pilots on all fronts. Capt. Ted Lawson of "Thirty Seconds Over Tokyo" fame is one of them. Before he went into the air force he was an enthusiastic hop-up kid; now that he's back he's spending spare time on another roadster.

SCTA's speed rules are simple, the principal one being that the contestant must use an American-made production engine. Otherwise the sky's the limit on souping up.

The next official SCTA trials, scheduled for late spring,

will shoot at marks set in 1942, the year of the last trial before war interfered. Those records are examples of the amazing speed these youngsters are coaxing out of cars and engines up to 15 years old. Bob Bebek took the roadster class in his Ford V-8 with an average speed of 123.71 mph. (Speeds quoted are the average of two runs over the course.) Karl Orr, proprietor of a thriving speed shop in Culver City, won the modified class in his Ford V-8 at 133.30 mph. A streamliner driven by Bob Rufi at 140 mph was winner in that class. Donald Blair won the unlimited division at 130.27 mph, proving that the bigger engines aren't always the fastest.

This year the boys will probably better last year's top. Some returnees from air forces jobs may have new speed wrinkles that will run the high score up to 150 mph.

The SCTA at present seems to be the only redeeming feature of a craze that has the youngsters enthralled, the oldsters fearful, the police puzzled, and all of Southern California talking. Some good thinking has been recruited for the problem of what to do about the hop-ups, and the solution seems to lie along the line now being fostered by the SCTA: provide places for the boys to race and you'll clear most of them off the highways.

Even now there's a move to provide a four-mile-long paved four-lane strip across some unused suburban section for the exclusive use of the hop-ups. Although such a project is costly, there's proof that a portion of the money can be raised through donations.

Those in favor of the speedway point out that the kids have benefited the country's war and peace efforts during recent years. More than half of the SCTA's membership went into the service to become outstanding pilots or mechanics. And more than one home workshop engineering improvement made by the hop-ups—high compression and improved valve action among them—preceded the automotive industry's adoption of them. Because of that, they feel that a good turn for the speed kids would be a good investment as well as a safety measure.

Hot Rod Lingo

Hot rod, rig, outfit, hot iron—Fast roadster or other stock model automobile worked on by a hop-up.

Hop-up—Person (usually a young fellow) who tinkers with a car to increase its speed.

Gook wagon—Fancy, chromed, noisy, stock car with no speed refinements.

Squirrel—High school-age owner of a sad imitation of genuine hot rod.

Stacks—Exhaust pipes.

Pots, jugs—Carburetors.

Skins, boots—Tires.

Slugs—Pistons.

Drag, peel off, lay a strip—To accelerate rapidly.

Binders—Brakes.

Goat, dog, crutch, crock—(Never a jalopy. This is as unpardonable as referring to a slick chick as a flapper.) Ancient car with no mechanical refinements.

Mill—engine.

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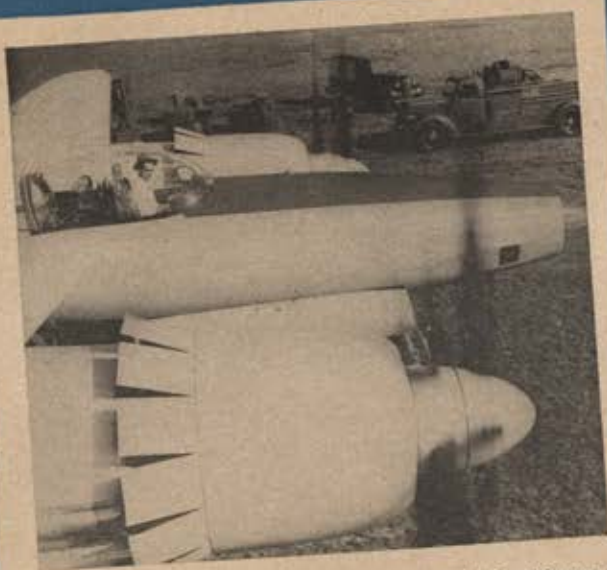


CLEVELAND PNEUMATIC

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Newest application of the twin-fuselaged P-82, the Twin-Mustang night fighter. Note the radar installation in the special nacelle under the center-section. With its 2,500-mile range at 475 mph, P-82 can patrol between West Coast and Pearl Harbor.



Close-up of Howard Hughes in the XF-11, just before his near-fatal take-off. Nearer prop suddenly reversed in the air.



Latest in helicopters, the French SE-700. Note retractable nose gear, fins housing rear main wheels.



Newest version of the Luscombe Silvaire has metal-covered wings, making this U.S. light plane pioneer "all metal but the tires." Note molded one-piece windshield.



AAF ribbon parachute, designed at Wright Field for high speed.



Britain's first tailless jet, the deHavilland DH 108. Designed as a supersonic testing type, it uses the swept-back high-Mach wing, is powered by a Goblin jet. Like Northrop's XB-35, the 108 incorporates the "elevon" combination elevator and aileron.

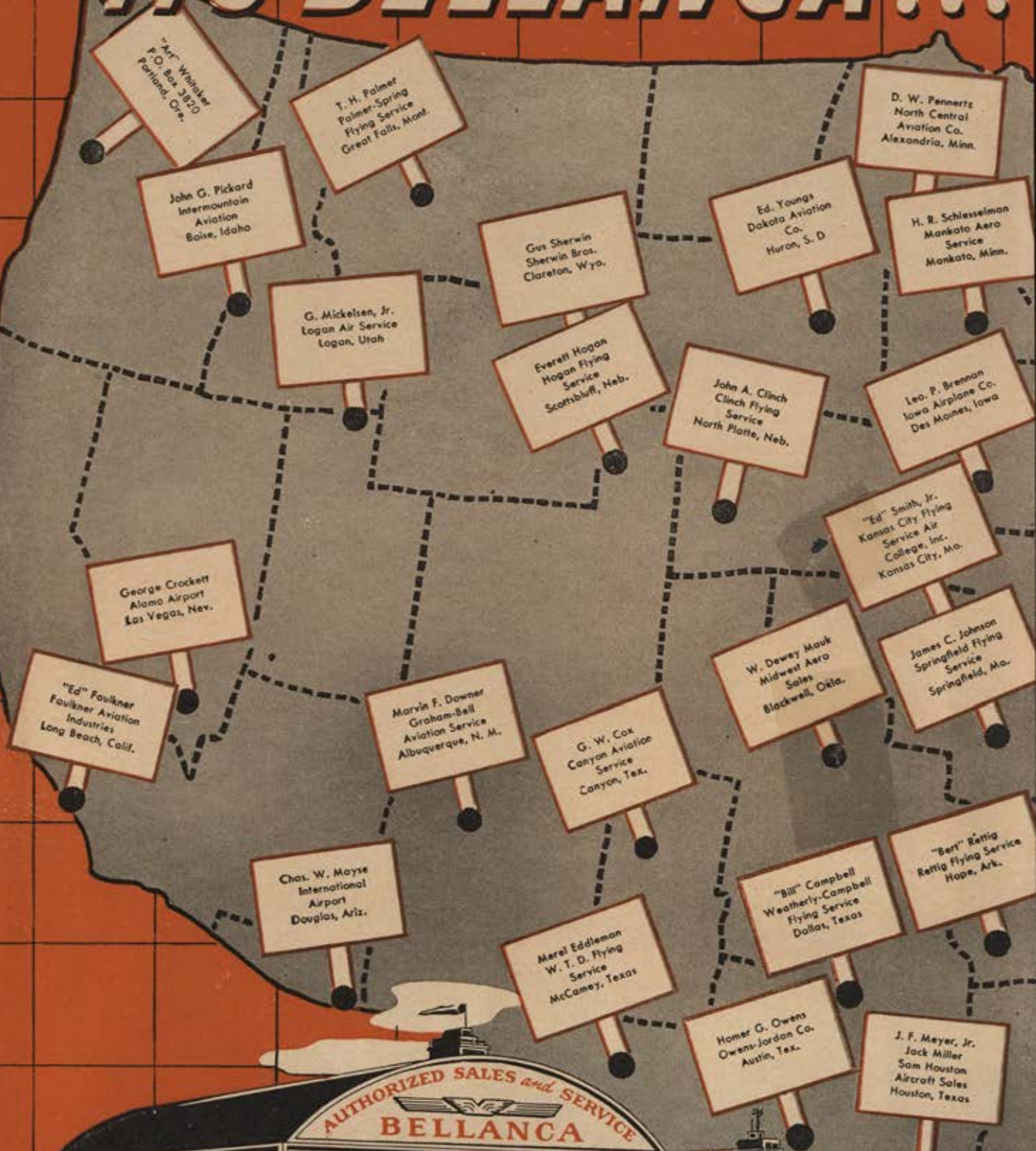


Have you seen this? XP-47H, a production Thunderbolt used as a test bed for an experimental Chrysler engine.

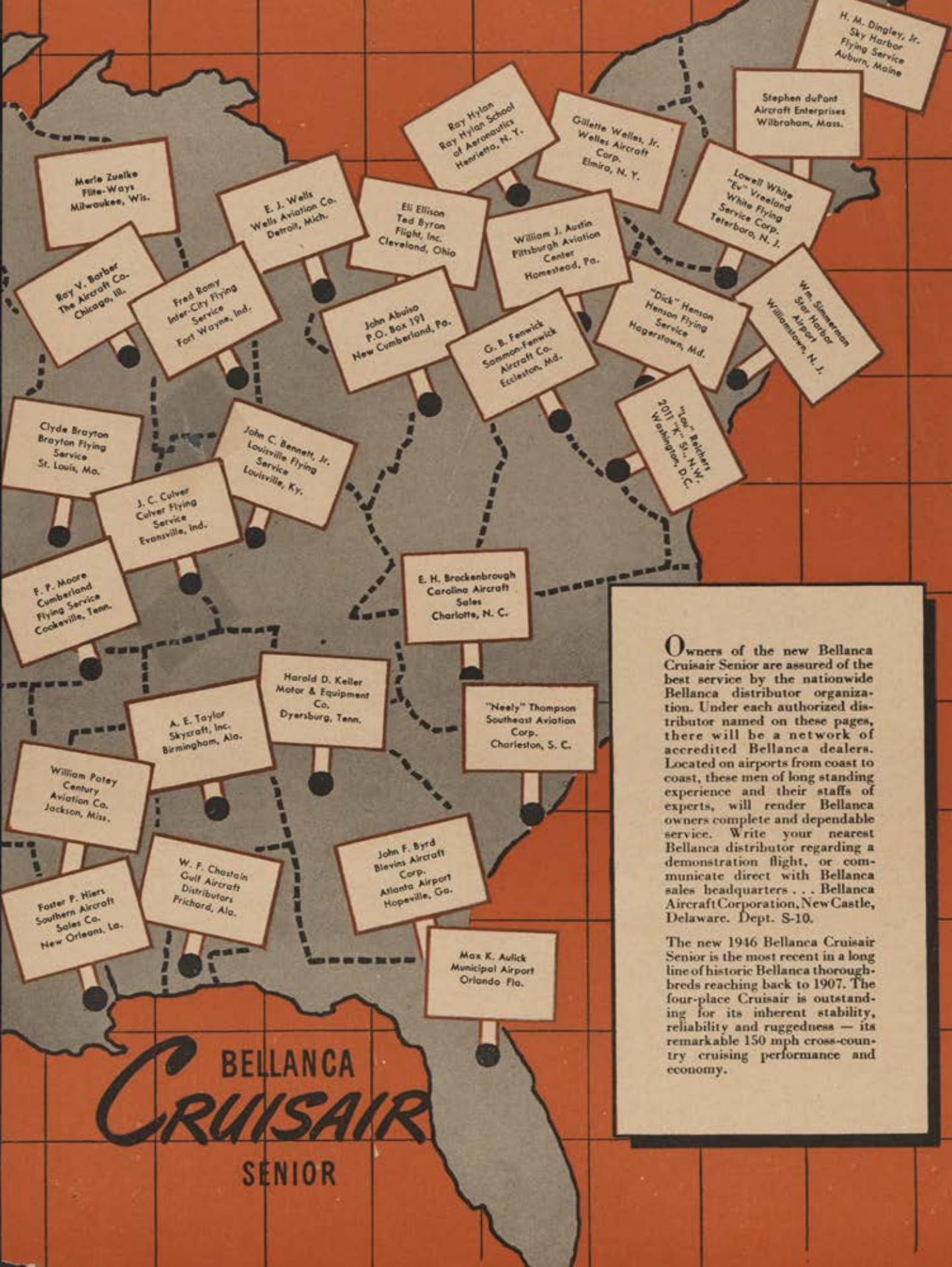


Landing a CAA experimental Fairchild PT-19 with castoring wheels, to minimize hazards of cross-wind landing.

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BOOKS

WE DROPPED THE A-BOMB. By Merle
Miller and Abe Spitzer. 152 pp.
Thomas Y. Crowell, N. Y. \$2.

As the mushroom-shaped cloud drifts away from Bikini lagoon, a man who was part of the first dropping of an atomic missile tells the story of what happened on a certain week in August of last year. That day may go down in history along with the moment when Prometheus brought down fire. There are those who have wondered what the mythical fire-bringer felt like when he delivered his luminous burden. Those same people may ask how the crews of those historic B-29s reacted when they dropped their "gimmick." For them, Abe Spitzer, radio operator on the Superfort *The Great Artiste*, sums it up in the simple, honest phraseology of the AAF—"It was hell, absolute hell!"

From the human point of view, the account of the second bombing was more interesting. Now the crew knew what the impact of their burden was. So did the enemy. When the first atomic bomb fell, the Japanese must have taken the little formation of two planes for a photo-recon mission. Not a single flak-burst hindered their way.

On the second A-bomb mission, only a normal amount of rather discouraged flak and fighter interception was encountered. Aboard the plane the decisions that had to be made were, in a sense, world-shaking. Kokura, the designated target, was obscured by cloud cover. Orders forbade a radar drop. Gas was running low and, if the Superforts proceeded to Nagasaki, they would not have had the fuel to get back to their bases. There were visions of the "hottest crew in the AAF" having to ditch in the Pacific, to be picked up by the elaborately-planned Dumbo net—maybe. Nevertheless, they bombed Nagasaki, then made a nerve-racking run to Okinawa by slideruling the navigational skill of Captain Jimmie Van Pelt against Master Sergeant "Nails" Kuharek's ability to keep the power plants going on a starvation diet.

Their welcome at Okinawa was historic. They made the landing on a too-short strip by slapping the props into reverse. The hungry crew, who had spared the world at least six months of war, tried to get an old-army mess sergeant to feed them.

"Why the hell you combat guys can't ever get to chow on time I'll never know!" he spluttered.

Ray Gallagher, assistant flight engineer, answered, "We were busy, just a little busy. Nothing much, just a little bit occupied."

The sergeant, who had dirty yellowish-white hair, lost his temper. "Busy," he said, "busy. I'm busy eighteen to twenty hours a day. Been busy for

PILOTS, INSTRUCTORS, MECHANICS. New editions of the famous Zweng Aeronautical "Quiz System" textbooks have just come off the press. These include: Private Pilot Examinations (Multiple Choice) \$1.00; Flight Instructor (examinations included) \$3.00; Instrument Flying (Weems & Zweng) \$4.00 including latest examinations. Aircraft & Engine Mechanic Manual (with new multiple choice examinations) \$3.00; Radio & Instrument Flying \$4.00; Airline Pilot Log Book \$2.00; Air Navigation Log \$2.00; Private Pilot Log \$1.00; Mark VII Dalton Navigation Computer with instructions \$5.00; (New) Type A-2 Dead Reckoning Navigation Computer with instructions \$2.00; Military Pilots Exams. \$1.00. New "First Edition Books by Zweng" are Aeronautical Navigation \$3.00; Meteorology for Airmen \$3.00. (Free catalog) Pan-American Navigation Service, Dept. AF, 12021 Ventura Blvd., N. Hollywood, Cal.

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twenty-five years, and I always get to my meals on time."

"Ever on a mission, Sarge?" S/Sgt. Ed Buckley, the radar operator, asked.

"Never," the sergeant replied. "Absolutely not. I'm an infantryman myself, don't believe in the goddamned Air Corps. I was in France in the last war and we knew how to fight a war then."

"I see," said Ray, "and we don't."

"Bunch of drafted jerks, that's what the Army is right now. The Regular Army'd be better off without them."

"I'm willing to let the Regular Army do it," said Ray. "Come on, boys let's get the hell home. Let's let the Regular Army finish the war. All by itself. Okay?"

The sergeant finally produced a bologna sandwich for each, a thick piece of cold, greasy meat on a thicker piece of at least day-old bread and half-warm coffee. That had been the crew's first meal since the midnight before.

Former *Yank* editor Merle Miller's fine GI hand is visible in the new book only in retrospect. There is no place where the reader feels the editorial blue pencil on sulphurous AAF nomenclature toned down to relatively mild goddamns. None of the personal ache, the worry, or even the gripe seems to have been filtered out in the process. It appears to be a worth-while combination of an airman's experience plus a first-rate editor's logical and dramatic presentation.

THE AIRCRAFT YEARBOOK FOR 1946.
Edited by Howard Mingos. 702 pp.
Lanciar Publishers, Inc., N. Y. \$6.

Marking the 28th consecutive appearance of the authoritative publication, this year's edition of *The Aircraft Yearbook* has a tougher-than-usual job to perform. While it adequately covers what happened in aviation during the final year of war, it has been called upon to catch up with a great many civil and military developments which were closely guarded secrets a year ago.

Naturally, over half of the book is devoted to military aviation, to a study of air power's place in achieving the victory and in keeping it intact. This study is divided into sections on events and military philosophy, to technical and political progress, to naval aviation, and to the progress made in air transport technics under the pressure of war.

On the civil side, the business of private and transport flying and of training is carefully considered. Current and future airport facilities are scrutinized with the budding airpark system getting particular attention. In the chapter devoted to Federal agencies touching aviation, a general "catching up" on what has happened in the last era is included with the specific 1945 review. The sections covering airframes, power plants, and accessories are the *Yearbook's* usual standard.

The tabular section, long a standard reference source, contains a breakdown on military statistics along with the usual industrial figures.

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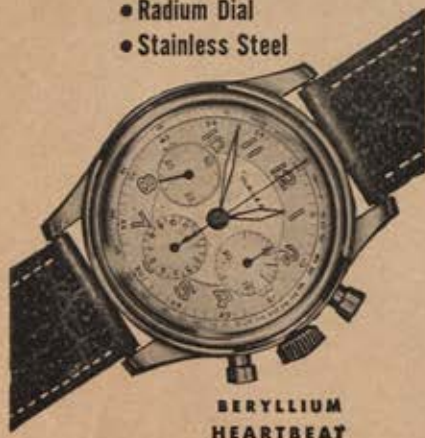
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Rendezvous

(Continued from page 6)

Too Many Misses

Gentlemen:

One factor which prompted my joining the Air Force Association was that a subscription to *Air Force* was thrown in. It was my desire to keep in touch with all phases of military aviation and the development of new equipment. I found the July issue sorely lacking. I believe the organization of *Air Force* material in the past was much better and should be reinstated as soon as possible, at least to include the following features:

"Rendezvous," or a letters to the editors department, to allow small contributions from interested members.

"How Sharp Are You," with military and/or civilian planes, interesting and beneficial toward safety goals.

"Cross Country," news and views around the globe of AAF bases and interesting items.

"Questions on Re-enlisting and its Benefits" may be a popular, if small, column.

"New Aeronautical Books," a monthly list.

"Plane Boners." This column on civilian and military accidents has an important safety value.

"Technique" to cover the development of new experimental aircraft, with pictures of the latest AAF and Navy ships and proposed designs, covering also maintenance and supply of aircraft and equipment, new AAF techniques.

"Tech Topics" and "On the Line" were popular features with mechs around the world.

"Veterans' Notes" would be interesting as a source of information about old buddies, what they're doing and where, and news or opportunities affecting them.

"The Album" should be continued.

"Jet and Rocket Development" should be added monthly to give news on the latest developments in these very important fields.

"Guided Missiles," a monthly report, for instance, on progress with the White Sands project.

"AFA News," national and local.

"Personal Planes and Equipment," interesting to everyone interested in aviation. News of commercial aviation should also be covered.

I hope this criticism is taken in a strictly constructive sense. I have always enjoyed *Air Force* and hope that it will ever continue as an interesting and up-to-date journal on military and naval aviation.

I should be greatly honored if I may contribute at some time to our magazine.

R. W. THABIT,
Brooklyn, N. Y.

A magazine, like a man, requires a few weeks' time in converting from

military to civilian status. So our first white-collar issue was hardly perfect. As more local AFA units are chartered and as more members pass along their comments on the changing aviation scene, we'll have more and more of the features suggested by Mr. Thabit.

On Nazi Wings

Gentlemen:

While the Army Air Forces has progressed favorably with flying wing designs for military employment, nothing or little has been released of German progress in this field beyond the Messerschmitt Me 163B Komet and Junkers Ju-248 part-wing rocket fighters. I recall that mention has been made in AAF releases of a Horten attempt at a flying wing fighter. Just how far did the Germans advance with the complete airfoil aircraft?

Frank Symons
Brooklyn, New York

Germany's advances in this field were notable, especially with the Horten 229 twin-jet all-wing fighter aircraft. This machine reputedly flew at a maximum test speed of 720 mph at critical altitude, was to have attained over 700 with full military equipment. The American counterpart of this project, Northrop's XP-79 twin jet all wing fighter, crashed in September, 1945 killing its test pilot, Harry Crosby. No other information regarding continuation of the XP-79 project has been released. However, Northrop's N-1M and N-9M series flying wings have made thousands of successful flights since 1940, and recently successful flight tests of the 104½-ton gross weight Northrop XB-35 four-engine pusher all-wing bomber indicate that America is far ahead of every other nation. The 172-foot span XB-35 will be superseded by the titanic Northrop XB-49, reportedly powered by eight 10,000 pounds thrust jet engines. What the performance is, we can only guess.

Seagoing Mustangs

Gentlemen:

Throughout various publications there has been vague mentioning of several North American Mustang fighter aircraft temporarily acquired by the U. S. Naval Air Arm from Army channels. Use of the aircraft has not been listed, although it must have been for special purposes. Does *Air Force* have the information on this subject?

William Phayre
Bronx, New York

A small group of late model Mustangs were modified by the Navy for special high speed photographic reconnaissance duties somewhere in the Pacific area. The exact location and photographic nature of the missions has not been released.

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GIANTS

(Continued from page 22)

survived seven different power modifications, including a four-engined edition. One of the first major transports, it set the stage for the supermonsters of 1921.

A standout among the freaks was Caproni's triple triplane, a tailless boat measuring over 70 feet in length and mounting triplanes at either end and in the middle. Power was provided by eight 420-hp Liberty engines. Built to carry 100 passengers and a five-man crew, it rose from Lake Maggiore in Italy after a mile run, ascended to 200 feet, then crashed on its first landing. Although attempts were made to rebuild it, progress passed it by.

In the U. S., the superplane fared little better in the years after World War I. The LWF Owl, built on a contract let during the "Bomb Berlin" fever of 1918, emerged after the Armistice. Twin-fuselaged, with a center crew nacelle, it differed from many of the larger types in the use of full wood monocoque structures. It had a 106-foot span, was powered by three Liberty engines. The Army accepted the prototype as a night bomber.

Another example of the "Bomb Berlin" airplanes was the Barling NBL-1, built by the Wittenman-Lewis plant in Teterboro, New Jersey. A 120-foot triplane, it was powered by six Liberty engines and followed the general philosophy of the British Tarrant. Weighing 40,000 pounds fully loaded, it could actually lift 10,000 pounds of bombs, but its range for that weight was only two hours.

In the U. S. the Lawson Airliner, a sturdy biplane powered by two Liberty engines, had flown as early as 1919. Singularly successful, this craft barnstormed the country after the war, stirring up interest in air transportation. The Lawson was designed by Vincent Burnelli, who later created the revolutionary all-wing design. After Burnelli left the company, a 111-foot trimotor was built for overnight service from New York to Chicago, but the project engineer insisted that the loading was too high for the available landing field. The accuracy of his judgment seemed verified when the craft cracked up on take-off during test. That crash marked the beginning of a three-year lull in big-plane activity. Then, in 1924, Armstrong Whitworth emerged with a 106-foot twin-engined troop transport called the *Aviana*. Powered by two Napier Lion engines and capable of hauling 25 fully armed troops, this giant plane was a practical answer to sporadic troubles in far-off parts of the empire. Born of the same military necessity, the Fairey Titania also appeared at this time. A 136-foot flying boat powered by four 660-hp Rolls-Royce Condor engines, this deep-sea patrol craft weighed 31,600 pounds.

In 1926, the Penhoet flying boat was launched in France, one of the first real postwar all-metal attempts made. It spanned 131 feet, was powered by five engines, and had a top speed in excess of 100 mph. While the Penhoet boat cracked during test, the accident stemmed from lack of pilot familiarity with large seaplanes rather than from any structural or design failure.

Rohrbach's *Romar*, which was flown in Germany the same year, marked the advent of big flying boats as practical commercial vehicles. The *Romar* spanned 136 feet, carried three 600-hp BMW engines, had operational speed of 136 mph, and had sufficient pay load to make

it a feasible air carrier. Deutsche Lufthansa was spreading lines over water, and the big boat was necessary. That same year a giant Rohrbach design, buried for several years by the Versailles treaty, was built in England. Designated as the Beardmore *Inflexible*, this 150-foot trimotor was powered by 700-hp Rolls-Royce Condor engines and incorporated flat-skinned all-metal structure with floating wing-tip ailerons.

For several years after the Beardmore no giants were built because the budding air transport business saw little use for large planes. However, Claudius Dornier, who had been conservative about the size of his flying boats, which were built on both the German and Swiss sides of Lake Constance, built a four-engined *Super-Wal*, which topped the 100-foot mark. Moreover, the big Dornier got into the export market and became the first giant to see service under a half-dozen flags. Dornier's only serious competitor was Consolidated Aircraft of Buffalo, which was offering the *Commodore*, a commercial version of the twin-engined 118-foot *Admiral* patrol bomber. The *Commodore* boats pioneered the famed New York-Rio-Buenos Aires route, which was later consolidated into Pan-American Airways. At this point Dornier countered with the immortal Do-X, the 12-engined flying boat which took off with 169 passengers in 1929. Handley-Page built their '42 series, a 135-foot four-engined landplane, familiarly known as the Imperial Airways Hercules class. Standards on Europe's airways for almost a decade, these giants had enough room for good steward service and a bar, and introduced the travel luxuries which are now considered the right of the air traveler. In the same international boat class, Short Brothers built a four-engined 113-foot job with 550-hp Bristol Jupiter engines and a stainless steel bottom. More practical was the high-winged Short *Valetta*, a 107-foot trimotor which could carry 21 passengers and crew. Cruising at 138 mph, this plane lost very little performance on twin floats.

A few months later, France hiked the size with the *Bordelaise*, a twin-fuselage craft built under license from Burnelli and using his lifting fuselage principle. It carried 28 passengers and was powered by three 700-hp Lorraine engines. This craft's most important contribution was a 136-mph cruising speed and a practical operational range. Unfortunately, the *Bordelaise* faced a depression era, where her size and efficiency could not be used to advantage. In similar manner the Fokker F-32, measuring 99 feet in span and powered by four 525-hp P & W Hornet engines, was doomed to failure.

Another child of financial disaster was the Dornier Do-X, the 157-foot twelve-engined flying boat. The craft weighed 49,000 pounds, 24,280 of which was pay load. The giant was simply ahead of its time. No one in Europe could use it and it did not boast the cruising speed for successful transoceanic operation. In order to improve performance, the 720-hp Curtiss Conqueror engines were substituted for the original 560 air-cooled Siemens-Halske engines, producing top speed of 150 mph, but boosting fuel consumption to an uneconomical point. Italy purchased one of the giants, in order to add to the show of air power with which Mussolini bolstered fascist morale.

Flown across the South Atlantic and thence to the U. S., it was offered for sale but attracted no buyers. After overhaul at the old North Beach airport, the ship was flown back to Germany to end her days in the Deutsches Museum at Munich. The major Do-X contribution to design was negative: the fact that a low-aspect-ratio wing is not efficient for long-range aircraft, and that the engine-over-wing arrangement does not make for airfoil efficiency.

Two landplane giants of that era demonstrated the sharp trend toward cleaner lines for big ships. In Italy, Caproni built the Ca-90B. Powered by 1,000-hp Isottas, the plane had a 159-foot lower wing and a 114-foot upper span. Bestrudded and box tailed, it weighed 66,000 pounds and scarcely topped 127 mph. It was the kind of airplane that would be produced from an arbitrary order from a dictator, "Build the biggest bomber in the world!"

In striking contrast, Germany's Junkers G-38 was built for Lufthansa on airline order, the first air goliath designed strictly on the order of an airline. Erhardt Milch of Lufthansa created a set of performance specifications, and the big Junkers made money from the outset. With most of the craft's volume in its thick 145-foot wing, large mail and cargo loads were carried efficiently on power provided by four 800-hp Diesel engines, largely because the 59,300-pound behemoth cruised at better than 125 mph. The last of the 38s, carrying somewhat more power than the prototype, was burned on the ground attempting to evacuate troops trapped on Cape Bon in North Africa. The giants of 1929 proved conclusively that big planes, designed to a market, could make money.

On this assumption, the giant assumed commercial status in the early thirties. Latécoère built a 103-foot fast mail seaplane for transoceanic service to South America. Powered by only two 650-hp Hispanos, the 10,600-pound boat was an efficient mail carrier and a prototype for larger craft to be built later by the same concern. Cruising at close to 150 mph, this design set the pattern for the 30-1, a four-engined passenger seaplane with similar power plants. Spanning 144 feet, it failed to match the prototype's performance but it did measure up to the flying boat's transoceanic possibilities.

It was this encouragement which brought Pan-American Airways' order for the 114-foot Sikorsky S-40. Powered by four Pratt & Whitney Hornet engines, this custom built amphibian carried 38 passengers on Caribbean routes and proved that it was cheaper to build adequate boat facilities than to carry amphibious gear.

When Ford withdrew from the transport field in 1930, his all-metal trimotor was the standard for landplane transports. Guided by William Stout, the motor company built the unorthodox wing curves and flaps, formerly used only in pursuit aircraft, which brought peak air speeds and low ground speeds to the giant plane class.

In Russia, population shifts toward Siberia encouraged the production of large transports built for load and range rather than for speed. Tupolev's ANT 14 was the first Soviet design to crack the giant class. It was a five-engined corrugated all-metal high-wing monoplane powered by geared-down 480-hp Jupiter engines. It hauled 36 passengers, a crew of five, and a large amount of cargo. Spanning 132 feet and grossing 17,330 pounds, it cruised comfortably at 130 mph. It was this design which brought supergiants to the world airspace.

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American Airways had ordered the S-42, spanning only 114 feet and carrying 32 to 40 passengers. But the S-42 was too small for practical passenger service across the Pacific, so Pan-American ordered the larger Martin 130 Clipper. Nominally a 50-place boat, this 130-foot transport with twin P & W Wasps was the first airplane to challenge the well established luxury ocean liners.

First flown in Russia during 1932, the *Maxim Gorky* was originally designed for six 1,000-hp units, but engine production failed to materialize. As a result, 850-hp liquid-cooled units were installed, with six in the leading edge and two in tandem in a nacelle over the center section. The big ark spanned 210 feet. Used as a propaganda craft, the 210-foot gargantua was equipped with printing presses, movie theaters, etc., and barnstormed outlying parts of the Soviet Union in behalf of adult education. During one of these trips the craft was rammed by a single-seater and destroyed. Succeeded by a six-engined design, when 1,000-hp engines became available, the design was Russia's standard as a long-range transport, with some versions still in operation.

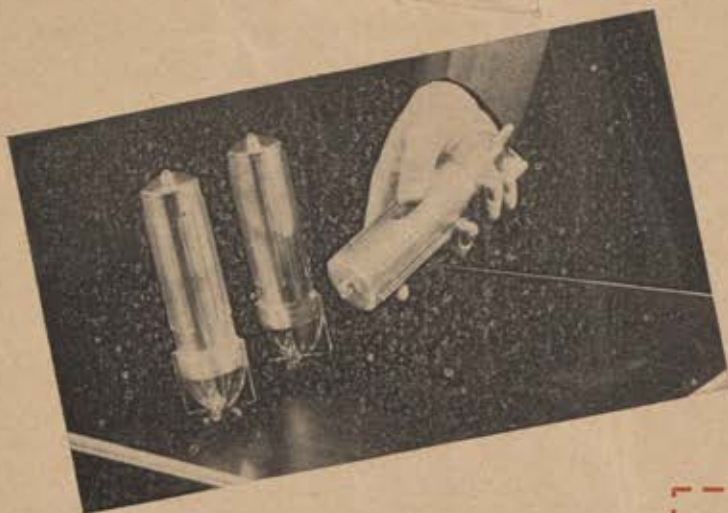
The last of the important biplanes came along during the Gorky period. Mounting identical wing and power assemblies on a boat hull and a landplane fuselage, Short Brothers of England came up with the *Scipio* boat and the *Scylla* landplane. Powered by four 660-hp Bristol engines, they were supposed to end the landplane vs. seaplane efficiency arguments, but failed through their own weaknesses. Spanning 113 feet, the seaplane carried 15 passengers and a 4-man crew on long-range water operation, while the landplane accommodated 39 continental routes. The common use of many parts offered standardized maintenance, but the design proved too slow.

In 1935, England entered the *Short Empire* in competition with U. S.-built equipment. A clean, high-winged boat powered by four Bristol sleeve-valve engines, its 114-foot wing displayed remarkable efficiency. That same year the era of peaceful giants came to a close when the Boeing B-15 was flown in the U. S. Four 1,150-hp Cyclone engines proved inadequate for the 150-foot giant, but B-15 failings were eliminated to give us the first B-17s in 1936.

Other latecomers among peaceful giants were Armstrong Whitworth's *Ensign* and the Latécoère 521. The *Ensign* was a 40-place high-wing landplane powered by four 880-hp Armstrong Siddeley Tiger engines. Weighing over 46,500 pounds, it cruised near 200 mph, and was the last important landplane built solely for airline use by the British. The last of France's completely commercial giants was the 521. Only the prototype, the *Lt. Vasseur de Paris*, ever flew. A transoceanic design, spanning 161 feet and powered by six 890-hp Hispano engines, this giant cruised 155 mph. After crossing the Atlantic, it was destroyed at anchor in Miami by hurricane.

There were many giants in the years between 1936 and 1946 and their names are already legend. There was the prototype DC-4 which was flown in 1937, also the B-19. But 1936 is a good year to end any history of outsize flying machines. Virtually every ship spanning over 100 feet that flew successfully after that date begat offspring that made history in the great war.

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