K

FLYING ACES

FACT MODEL BUILDING FICTION

15¢

JULY

WILL HITLER LAUNCH A GAS BLITZ?

by LUCIEN ZACHAROFF

NEW WARPLANES CLASH ON WESTERN FRONT!
(Westland Whirlwind vs. Focke-Wulf Fw. 198)

SCHOMBURG

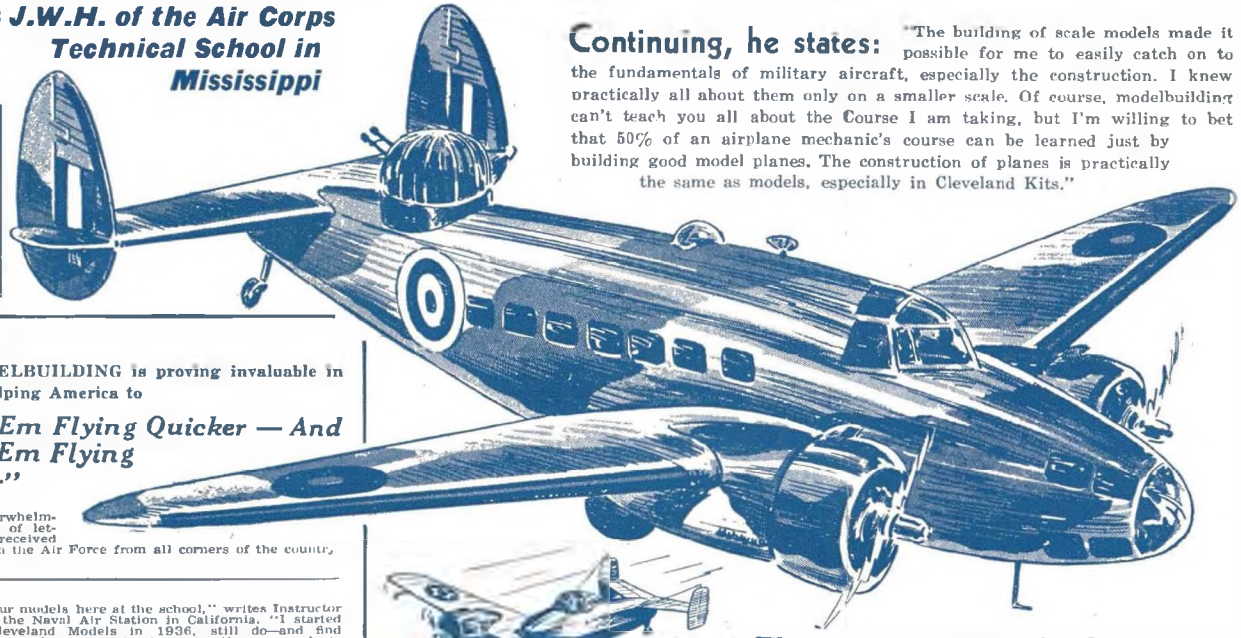
"SO YOU WANT TO BE A CATAPULT PILOT!" by WILLIAM HERBERT RANDALL
ERIC TRENT AND MORT CRABB • PHINEAS IN "MALTESE DOUBLE-CROSS"
MODEL SECTION: "FROM R.O.G. TO AT-6!" • BELL AIRACOBRA SOLID SCALE

"I enlisted in the Army Air Corps immediately after the yellow belly attack on Pearl Harbor... *and the aid my model building experience has given me knows no bounds"*

—writes J.W.H. of the Air Corps Technical School in Mississippi

ORDER THESE KITS NOW—DON'T BE SORRY LATER

Continuing, he states: "The building of scale models made it possible for me to easily catch on to the fundamentals of military aircraft, especially the construction. I knew practically all about them only on a smaller scale. Of course, modelbuilding can't teach you all about the Course I am taking, but I'm willing to bet that 50% of an airplane mechanic's course can be learned just by building good model planes. The construction of planes is practically the same as models, especially in Cleveland Kits."



"MODELBUILDING is proving invaluable in helping America to

"Get 'Em Flying Quicker — And Keep 'Em Flying Longer"

is the overwhelming opinion of letters we've received from men in the Air Force from all corners of the country.

"We use your models here at the school," writes Instructor J. L. P. at the Naval Air Station in California. "I started building Cleveland Models in 1936, still do—and find this experience of great service in instructing my students in the theory of flight, and the forces which sustain or hinder the action of the plane in the air."

"I recently passed the Aviation Cadet examination with a high score," writes F. J. T. from "somewhere" in Louisiana, "and I credit 20 points of that to my knowledge gleaned from modelbuilding."

"I am an American in the Royal Canadian Air Force," writes W. H. from "somewhere" in Canada, "and like with many of the fellows here, modelbuilding was my hobby as a civilian. The knowledge gained in my years of modeling has helped me immensely in such classes as aerodynamics, aero engines, airmanship, aircraft recognition and almost every course we are required to study."

"I have been building model airplanes since 1927," writes R. A. L. of the U. S. Army Air Corps in Massachusetts, "and have every Cleveland Kit made except four. I was drafted a year ago this month and was an Airplane Mechanic in Colorado all last summer at the Air Corps base there. Last fall I was an Inspector on the Final Assembly line of bombers at one of our largest aircraft manufacturers until I was recalled this winter and sent here. I feel that Cleveland Kits have helped me considerably in teaching me various types of construction used extensively in full size planes. Every American boy should build Cleveland-Designed Kits, each one is indeed an Aviation Milestone. May you continue to lead Young America and bring joy to all modelbuilders, young and old."

Even key men in the war planning program state that America's excellent air consciousness is due to young America's many years of building models. To GET 'EM FLYING QUICKER—TO KEEP 'EM FLYING LONGER—model building must continue. But unless the model industry gets a top priority, the manufacturing of Kits will stop soon. We hope Washington approves the priority.

Grumman Skyrocket. 31½". Master Kit SF-75. **$3.50**

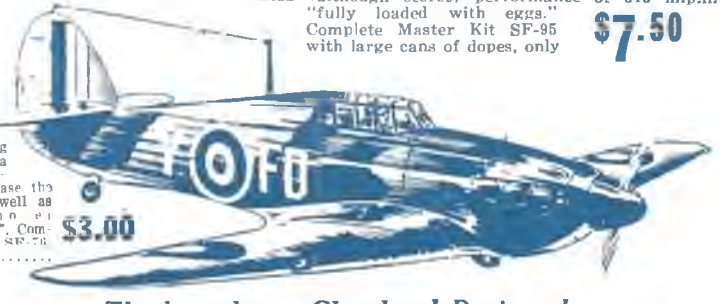
The brand new Cleveland-Designed

LOCKHEED HUDSON BOMBER

This now famous Lockheed Hudson bomber so extensively used by the R.A.F. and now for our own use over the Pacific, needs no introduction. It has wide acceptance by the British Coastal Command operation over the North Sea and Channel areas, and its sturdiness and endurance have gained for it a high reputation with the British crews. Hudsons are now patroling Australia constantly. (As we go to press, our government still has made no admission regarding the first historic Tokyo bombings, but Hudsons were believed to be among the ships in action.) It is a beautiful model correct in outward appearances to minute detailing, retractable landing gear, and with its "full dress" of camouflage coloring. The model, with a span of 48¾", flies fast and furiously as does the prototype, which has an estimated (although secret) performance of 315 m.p.h. "fully loaded with eggs." Complete Master Kit SF-95 with large cans of dopes, only **$7.50**

The Deadly AIRACOBRA

Thousands of these are now in action for the United Nations against the enemy—and giving a most amazing account of themselves. Deadly as the cobra, when they sting, they kill. It is a beautiful model, and due to its long, projecting nose makes "perfect" flying scale model with a high speed performance that will please the most serious, as well as the beginning model builder. Span 25½". Complete Master Kit SF-76 only **$3.00**



Messerschmitt MF-109, 24½". Master Kit SF-75. **$3.00**

Curtiss P-40 "Tomahawk." 34½". **$3.00** Master Kit SF-77.

The brand new Cleveland-Designed

HAWKER "HURRICANE"

This design was selected duplicating the "Mark III," which now comprise the famous Hurricane night fighter squadrons of fighters protecting English coastal towns and other large areas, protecting English aircraft in the historic battle for supremacy in the air for the protection of freedom throughout the world. The model, with a span of 30", has been repeatedly requested by model builders everywhere. It is camouflaged and very colorfully decorated with the proper insignia on both the fin and fuselage sides and also on the top and bottom of the wing in the most modern up-to-the-minute authentic colorings of RED, WHITE, BLUE and YELLOW. It is otherwise as authentic as possible to be made, including retractable landing gear. Order this Master Kit SF-78 today, complete with camouflage coloring, only **$3.00**

British Spitfire. 27⅝". Master Kit SF-73. **$3.00**

Lockheed P-38 "Lightning." 38¾". Master Kit SF-85. **$4.00**

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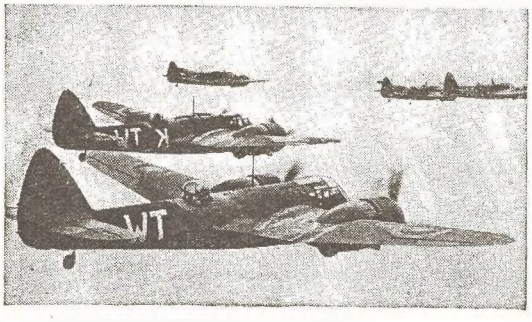
CLEVELAND MODELS

"THE MODELS THE MEN IN THE AIR FORCES BUILD"

"Somewhere over England," these British Bristol Blenheims wing toward Germany with a load of bombs.



Do You Know Why

catapult pilots are drawn from the best stock in the Navy, and why they are usually Annapolis graduates? Bill Randall tells about these men in "So You Want to Be a Catapult Pilot!"

FLYING ACES

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• MODEL BUILDING

• DEPARTMENTS AND FEATURES

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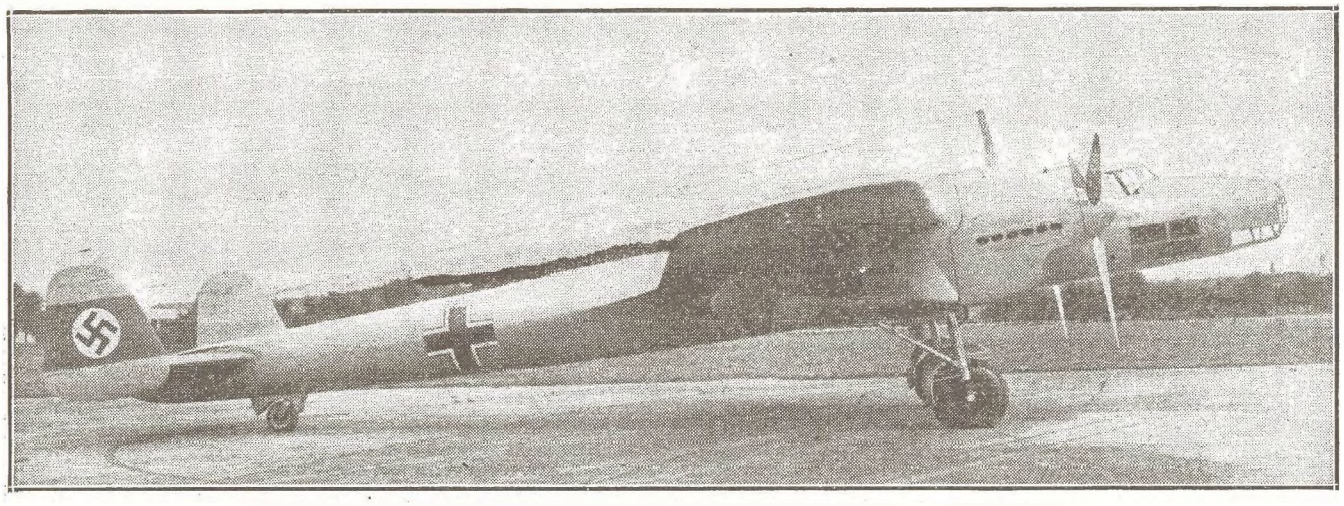
Lucien Zacharoff

Will Hitler

If—and when—the Germans actually get their backs to the wall, will they again resort to gas warfare? This eminent analyst is positive that they will!

by Lucien Zacharoff

Mr. Zacharoff, author of "This Is War!", "'We Made a Mistake'—Hitler", the "Voice of Fighting Russia", and other books, is an internationally known commentator on aviation developments for leading American and British newspapers, magazines, and syndicates. He recently returned to New York after an extended aviation lecture tour.



Before an actual gas attack, enemy forces or cities would undoubtedly be subjected to bombing on a very large scale. This Dornier Do. 17P carries a disposable load of 3,510 pounds.

IN HIS HOUR of frenzied desperation toward the close of the first World War, the Kaiser ordered his Supreme Command to resort to horrible chemical warfare. Now the world is wondering if Hitler will repeat that frightfulness, with the added advantage which his chemistry has in combination with the powerful Luftwaffe.

As the final traces of lightning war vanish on the Eastern Front and the going gets rougher and tougher for the Nazis faced with the mighty military-economic coalition of the Soviet Union, Great Britain, and the United States, it is a certainty that chemical weapons will be brought into play by the Axis.

What of the prospects in the Far East? When the Allied Nations swing into their victorious counter-offensive, will the double-crossing *samurai*, who started the war with a stab in our backs at Pearl Harbor, try to end it with poison gases for our troops and hundreds of millions of civilians in the teeming countries of the Pacific? Again, the answer is: They will, without doubt!

I am not guessing or speculating about this. I am telling you. My files are bulging with unimpeachable evidence to support this outlook. Just take a look at some of my data:

When the Japanese generals became frantic after the disastrous defeats delivered to them by the united Chinese armies in the heavy fighting around Southern Shantung more than four years ago, they had hurled into action poison gases and dum-dum bullets, although both had been outlawed by humanitarian international covenants. This information was cabled from Shanghai in April, 1938.

Again, when floods, mosquitoes, and cholera aided the courageous Chinese defenders during the offensive up the Yangtse River toward Hankow, the Tokyo militarists had applied poison gas. An official communique from Hankow, made known by the United Press on August 20, 1938, declared that a counter-attack by the Chinese in the Kiukiang sector failed *only* when gas was used.

There is very recent proof of similar measures by the Japanese invader in China. I don't think it is necessary to take up space with that, as two cases are sufficient; I cited the foregoing merely to show that the Nipponese are well versed in chemical warfare and prepared for its use.

As for Germany, its blitz smash into Russia was not a month old when in the bitter fighting west of Sitnia, east of Pskov, the Soviet troops captured documents and equipment of the Nazi 152nd Chemical Regiment. On one of the seized envelopes was this inscription:

MOBILIZATION FILE

Under No Circumstances to Fall Into Enemy Hands

OPEN ONLY UPON ORDER

STAFF OF THE SUPREME COMMAND

The text of the secret document is in my possession. It is quite long and consists of detailed instructions on the tactics of chemical combat, de-

Launch a Gas Blitz?

scribes the various types of chemical bombs which were being dispatched to the front, advises use of toxic substances on a large scale and in surprise raids. These papers, which were not intended for our reading until the Hitlerites had pulled off their charming surprise, once more confirm that it was not for nought that Germany had long been a world leader in the chemical industry.

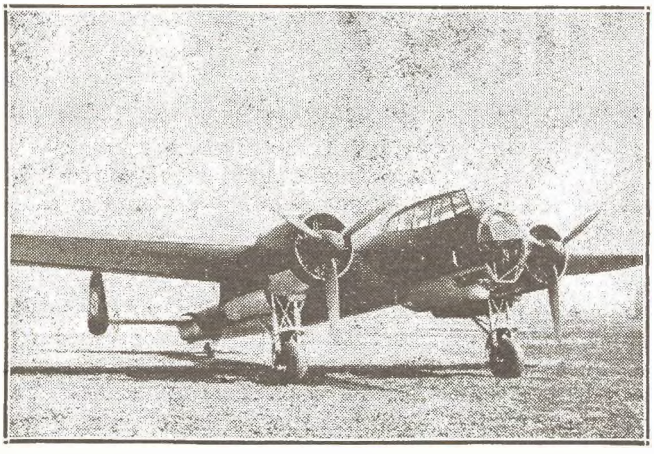
Bearing out my contention that a gas blitz will be launched, our War Department, which is not given to extravagant or sensational pronouncements, recently stated: "It is known definitely that considerable quantities of poison gases have been prepared by the warring European nations, and it must be realized that extensive use of poison gas might yet occur." Coming from that conservative and authoritative source, these words carry more significance than meets the eye.

NEW, TERRIBLE potency is given to chemical warfare by its coordination with aerial operations. In the first World War aircraft were mainly used for reconnaissance; air bombardment at the front, and particularly far behind the lines, was a mere sideline. But even before the second World War burst upon mankind, the German-Italian interventionists in Spain and the Japanese despoilers of China had established the fact that modern warfare made for mass extermination of innocent non-combatants in the rear. Needless to add, the new bomber aircraft are equally intended for the annihilation of troops on the march, to prevent their concentration or to wipe out the meeting spots.

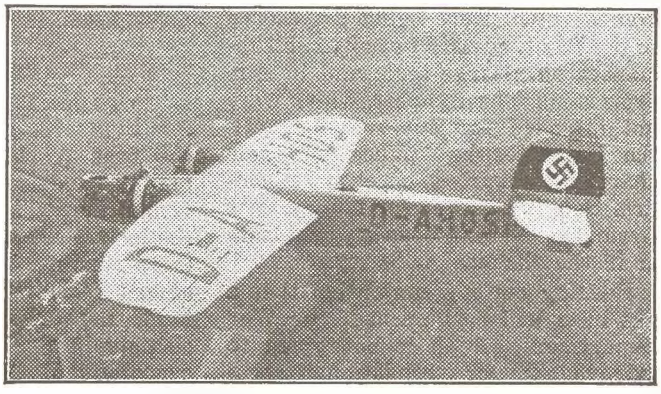
From the standpoint of an artillery specialist, the airplane represents a long-range cannon which delivers its firing power over a distance of hundreds and even thousands of miles. The "shells" of this cannon are bombs of various calibers—incendiary, explosive, fragmentation, screen-smoke, illumination—all with chemical action, many specifically assigned as the weapons of chemical warfare service.

As for the poison chemicals designed to strike at hostile manpower, these need not necessarily come in aviation bombs, for the planes mount spraying devices. When the Axis chemists are sent into action, they will choose an Allied troop concentration at bivouac, or in thick marching columns, perhaps at the approaches to the battle grounds or at a river crossing. Their low-flying machines will suddenly emerge from behind

After the initial "softening" attack, low-flying craft would spray their lethal load of poison gases. By using airplanes, the surprise element would give offensive advantage.



Left: If the Germans do launch a gas attack by aircraft, the Dornier Do. 17Z2 will probably be used in large numbers. With its two fixed forward guns, the machine could strafe while discharging gas. Below: Though quite old, the Dornier Do. 23 would also undoubtedly be used. Luftwaffe pilots often use this craft for dusting crops.



some forest or hill to shower the enemy from such installations. The entire procedure will be a matter of seconds, because of the speed of the aircraft. Undoubtedly it will be painstakingly rehearsed, and it may be a part of wisdom for our side to perfect the spotting and observation of such raiders and the instantaneous measures of anti-chemical defense.

Summing up the uses of chemical agents which the aircraft will dispense, we may say that they will be the following: (a) inflicting casualties; (b) denying certain areas to the enemy; (c) destroying or contaminating materiel and supplies; (d) harassing opposing troops and forcing them to wear gas masks, thus reducing their freedom of movement and interfering with their eating and sleeping; (e) obscuring observation with screening smokes.

I want to remind the readers that while for the purposes of this publication I am discussing chemical warfare in relation to aviation, there are other methods for spreading among opposing forces tear gases, screening smokes, irritant smokes, lung irritants, and vesicants or agents that form blisters on the body.

Aviation bombs and spraying apparatus will be particularly concerned with incendiarism, poisoning, and smoke-screening, while those and many other chemical functions will also be undertaken by the ground troops.

On the basis of the ascertained accomplishments of military chemists and of well-founded suspicions of some of their secret weapons, it is possible to visualize the nature of the impending chemical air raid.

LET US SUPPOSE that the enemy decides to stage a series of raids. Earlier I made the assumption that the enemy's resort to chemical combat will be the result of our growing strength. Hence, our then powerful air force may be expected to strike a daring, well-planned, sudden blow at the hostile air bases and fields, wrecking hostile aircraft on the ground and in the air, thus nullifying their potency.

Attaining mastery in the air over the terrain adjoining our frontier, we would compel the enemy to transfer his air bases into his own interior, greatly complicating his subsequent offensive operations.

However, we must never underestimate his potentialities. So, let us suppose that the Axis still succeeds in reconcentrating some of its squadrons. These swarms of aircraft, loaded with incendiary, explosive, and poison substances, are en route to some important Allied center. Their mission is to wreak havoc that cannot be readily rectified.

Our vigilant observation posts, equipped with sound locators and other facilities, suitably spaced throughout the zones of approach to our important center, detect the winged foe. In a short space of time, our spotters transmit—by telephone, telegraph, radio, or visual signal—the information.

As the whereabouts, numbers, itinerary, and other pertinent data are transmitted, our mighty A-A batteries open up with their hurricane fire. Shells of various calibers sweep the sky for the highest-flying invaders. Those that descend to low altitudes are showered with armor-piercing and incendiary bullets from anti-aircraft machine guns.

During a night raid, groups of powerful searchlights assist the defense. They discover the enemy and blind him with their crossing beams of million-candlepower light. Then daring interceptors lunge forth to meet the bombers laden with chemical missiles. They subject the enemy to their fire at close quarters and destroy him.

If any bombers manage to break through, they are apt to strike our balloon network and perish. Those that stay high enough to escape this and other hazards may release chemicals from tanks slung under their wings or in the fuselage bottoms.

Their chance of success is negligible, for our population, forewarned, has extinguished lights in good time, also putting into operation all the anti-fire precautions which never fail to be effective if properly employed. During the raids on Moscow last Summer, more than 200 small incendiaries fell on a single neighborhood one night. However, so well prepared were the fire brigades and volunteer squads of civilians that *every* bomb was promptly extinguished.

It is not easy but quite possible to organize a splendidly functioning defense against chemical raids, reducing damage to an insignificant factor. Just as chemical weapons are most effective in conjunction with airpower, so the defense against them is best in coordination with hard-hitting interceptor aviation.

BECAUSE of the great menace which chemical agents pose over our heads, defense measures as elaborate as the better-known air-raid precautions have been worked out. So far as our armed forces are concerned, the Chemical Warfare Service of the U.S. Army, for example, is a great, efficient organization which concerns itself with the following problems: (1) research in and development of chemical warfare; (2) procurement and supply of chemical materials to the Army; (3) training in offensive and defensive procedure; (4) setting up and operating special gas troops.

In fulfilling these responsibilities, the Service sees to the development and production of gas masks and gas-proof garments which give protection against all known war gases. It evolves and develops chemical warfare agents and instructs personnel in protective measures through courses conducted at the Chemical Warfare School. Extensive experiments have been conducted by our Chemical Department with smokes, gases, and incendiaries to determine

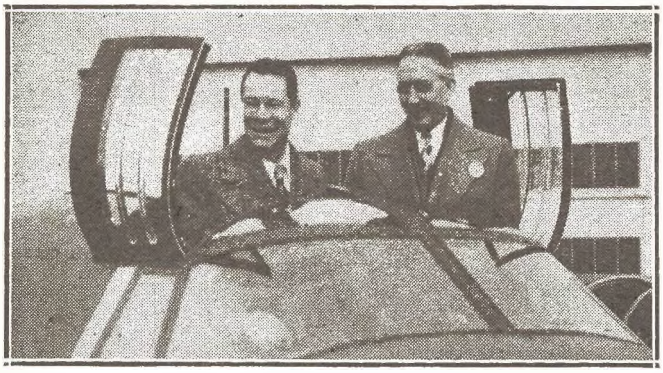
(Continued on page 70)

RAF WESTLAND WHIRLWIND

BRITISH CIRCLES — especially aviation periodicals—have been prone to deride the Lockheed P-38 fighter on many occasions. They seemed to believe that twin-engine fighters were something to be avoided, that they would much rather risk their luck with a single-engine job. And after digesting reports of this sort for so many months, news now comes out that they have a twin-engine fighter of their own—the Westland Whirlwind—which seems like a strange paradox.

To begin, we must admit that the Whirlwind is undoubtedly an excellent machine, but—to do a little criticizing ourselves—it seems entirely too small for a twin-engine job. The span of this ship is only 45 feet, which is only 5 feet greater than that of the Hawker Hurricane; the length is 32 feet 3 inches, against the 31 feet 5 inches of the "Hurry-Box"; and the height is 10 feet 5 inches, whereas the Hawker job stands 13 feet 3 inches. From this it seems that the purpose of the plane has been defeated, for it is logical that two engines instead of one were mounted to step-up the cruising range for bomber-escort purposes. Too, the wing loading must be tremendously high, because of the extra engine and additional fuel which must be carried, thus increasing the landing speed far up the arc.

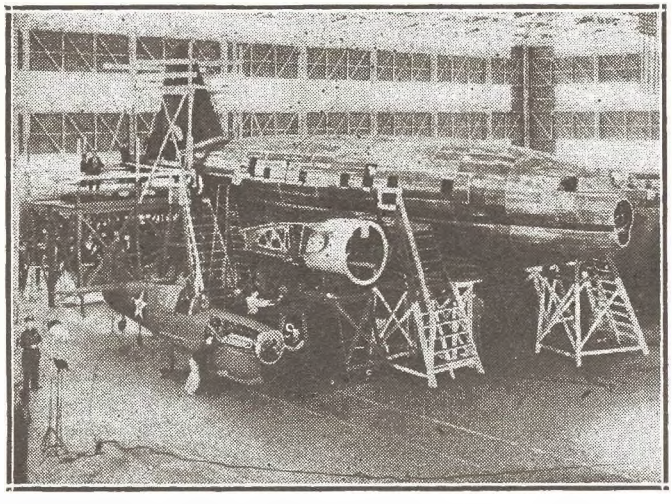
The Whirlwind is of all-metal construction, and is built-up on the usual transverse frames and longitudinal stringers; covering is smooth metal sheet. Armament consists of four 20mm. cannon mounted in the nose. The wing is attached in the low position and is fully cantilever. Structure probably consists of two spars and main and auxiliary ribs; covering is smooth metal sheet. Both ailerons and flaps are on the trailing edge. An interesting feature is the tail unit, the horizontal surfaces of which are placed high above the fuselage. It is said that the prototype was tested with the stabilizers and elevators in the orthodox position, but that they were blanked out at times by the wing and thus could not be employed effectively. The surfaces were then raised to counteract this difficulty. THE END



Glenn L. Martin gave Comedian Joe E. Brown his first airplane ride way back in 1911, and the two have since been fast friends. Here, Martin shows Brown the B-26 bomber.

Flying Into Focus

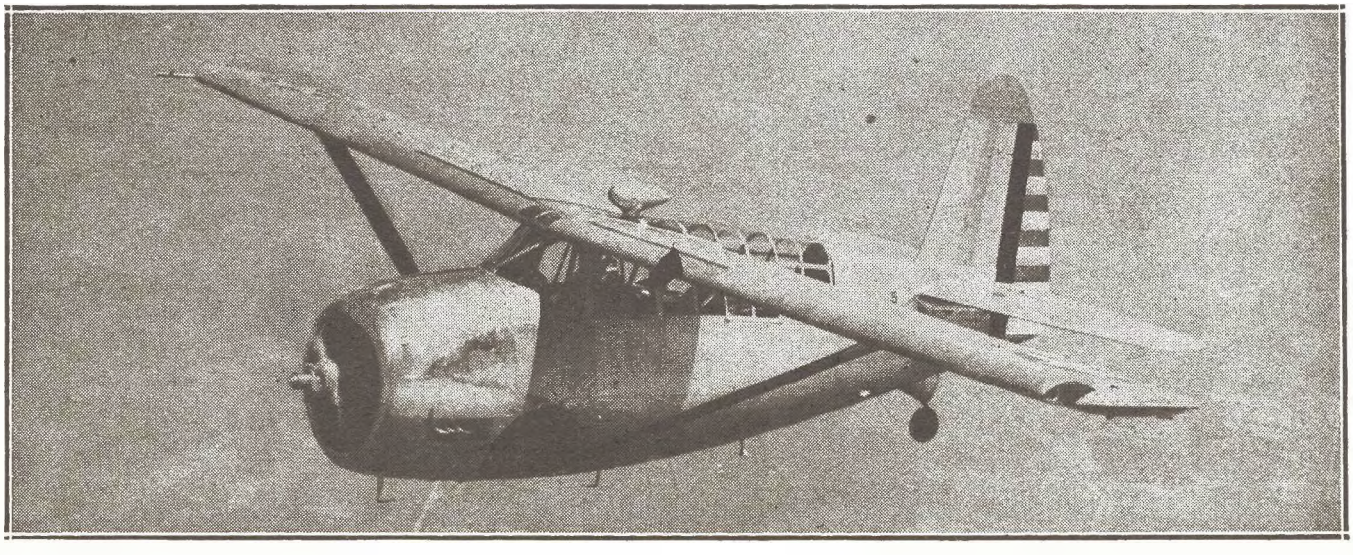
Five Stearman trainers for five services. From top to bottom, they are for U. S. Air Corps, U. S. Navy, China, England, Peru.

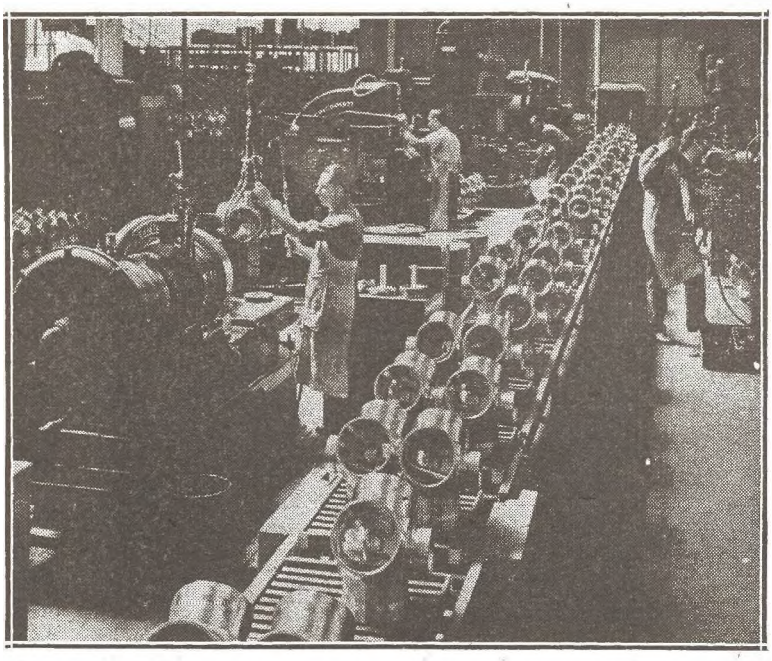


The world's largest twin-engine transport, the Curtiss C-46, dwarfs the bullet-like P-40's being built on adjacent lines.

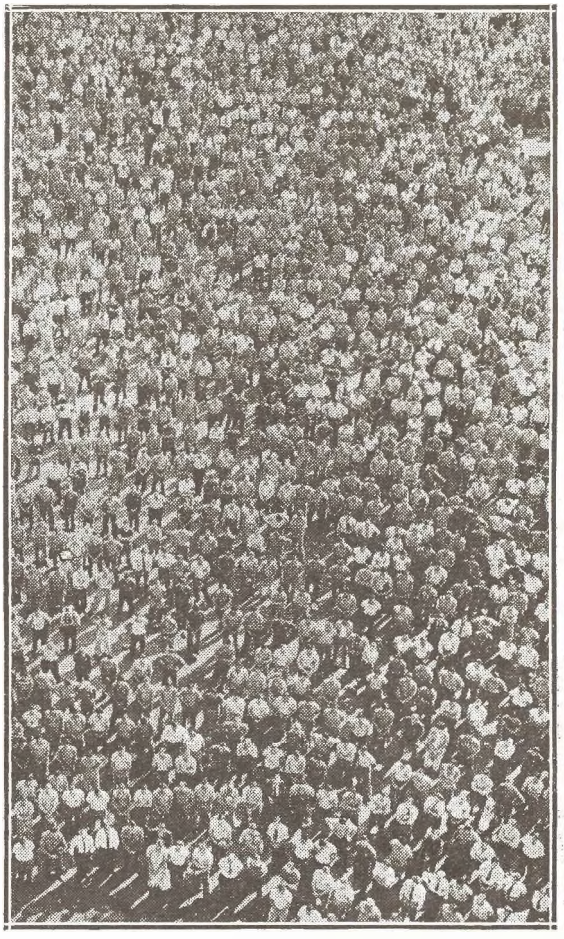
Off to the wars. Familiar scene at the Martin plant these days is arrival of ferry pilots to fly away B-26 bombers.

Shown in flight is a Curtiss O-52 two seat monoplane used for photographic and liaison missions. Equipped with slots and flaps, the ship can operate from unusually small areas.



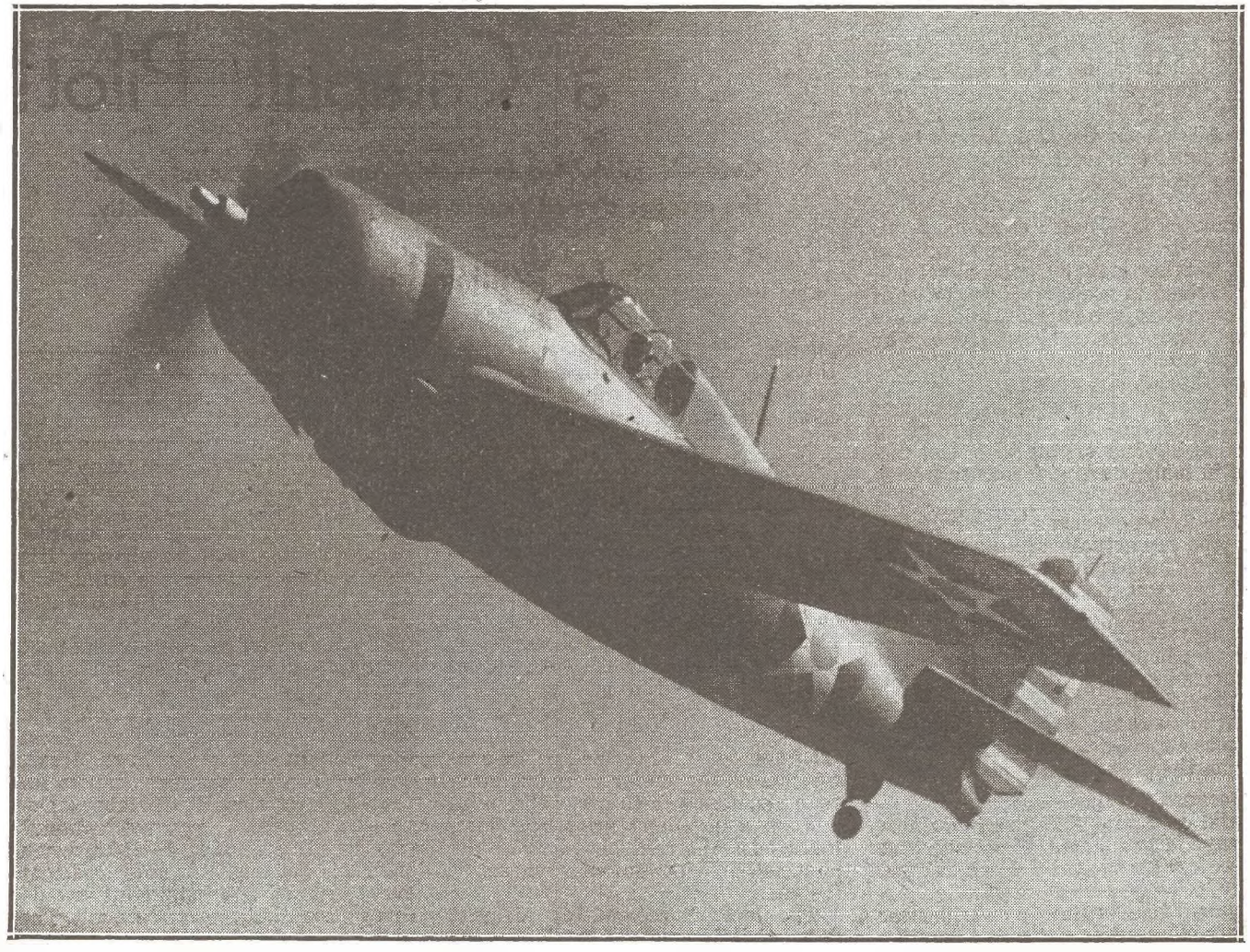


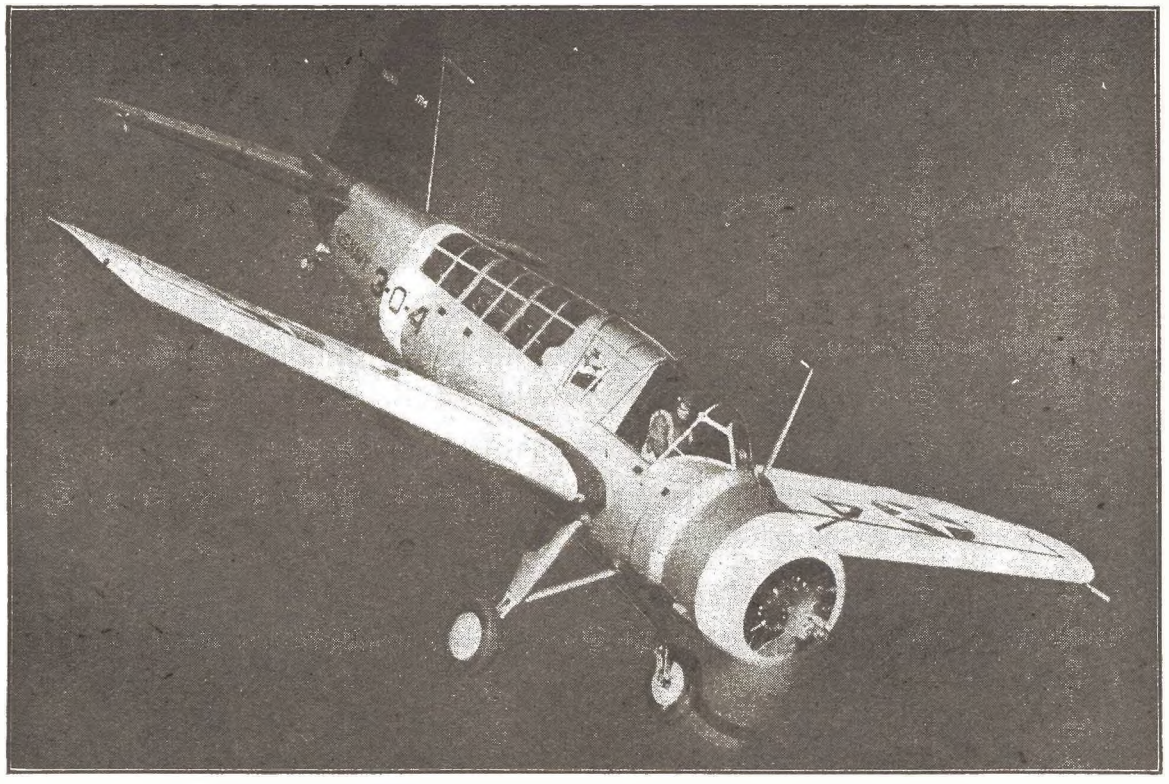
A production line of semi-finished steel propeller hubs at Curtiss-Wright. By such mass methods, U. S. industry has smashed the bottle-neck of props for our aerial army.



Right: Every eight hours a fresh crew takes over the humming assembly lines at Douglas. This shows only a portion of the thousands of men waiting for whistle to blow.

Below: Grumman's F4F-4 Wildcat fighter holds the individual combat record as the most effective combat type. Flying a similar ship, Lieut. Edward O'Hare shot down five Jap planes early in February. Powered with an air-cooled radial Pratt & Whitney engine of 900 h.p. at 12,000 feet, the top speed is rated at 320 m.p.h.





Delivered to the Navy in 1940, the Vought-Sikorsky OS2U-1 was the first low-wing monoplane catapult job. The wheels may be replaced by a single float for shipboard duties.

So You Want to Be a Catapult Pilot!

Catapult pilots are invariably Annapolis graduates, for the average airman cannot perform the work successfully.

by William H. Randall

THE flying of an observation or scout plane may seem an unimportant and comparatively simple field of aviation, but if that plane is one of the U.S. Navy's catapult jobs, it is certainly far from a tame and unadventurous occupation.

High school and civilian-college graduates may make excellent fighter, dive-bomber, or interceptor pilots, but it takes a really good naval officer, versed in naval warfare, to be of much use in the catapult planes. He must know enemy ship silhouettes by heart, must understand naval gunnery thoroughly, and must be a competent radio operator—both code and radiotelephone—as well as being thoroughly conversant with fleet tactics in maneuvering for contact with an enemy fleet.

The flying observer is the only officer who can actually see the enemy in modern long-range naval warfare, and he must necessarily be able to relay his observations in a thoroughly understandable and reliable manner to officers on surface vessels. It becomes his duty to get the big guns on their target, and, once the engagement has started, to keep them there, despite zigzagging and course-changing on the part of that enemy target.

Because of these special requirements, catapult pilots are invariably Annapolis graduates, experienced at sea before being sent to Pensacola for their pilot and radio training. Assignment to a battleship or cruiser as an air officer does not mean that the pilot is ready to take over his duties. He is first assigned to the rear cockpit of the plane as co-pilot and gunner to an experienced catapult officer. He will not be ranked as a qualified catapult pilot until this senior officer places the stamp of approval on his abilities. The senior air officer of such an air group is seldom lower in rank than a senior lieutenant, equivalent to captain in Army ranking.

The junior officer rides in the rear cockpit during his probationary period, making his own observations and comparing them with those transmitted by the senior pilot. In this manner he receives his training in the best possible way—through trial and error. If threatened by enemy planes, the junior pilot mans the rear machine gun to cover the pilot, and when no planes are threatening takes over the controls to allow the pilot full freedom for observation of the enemy fleet.

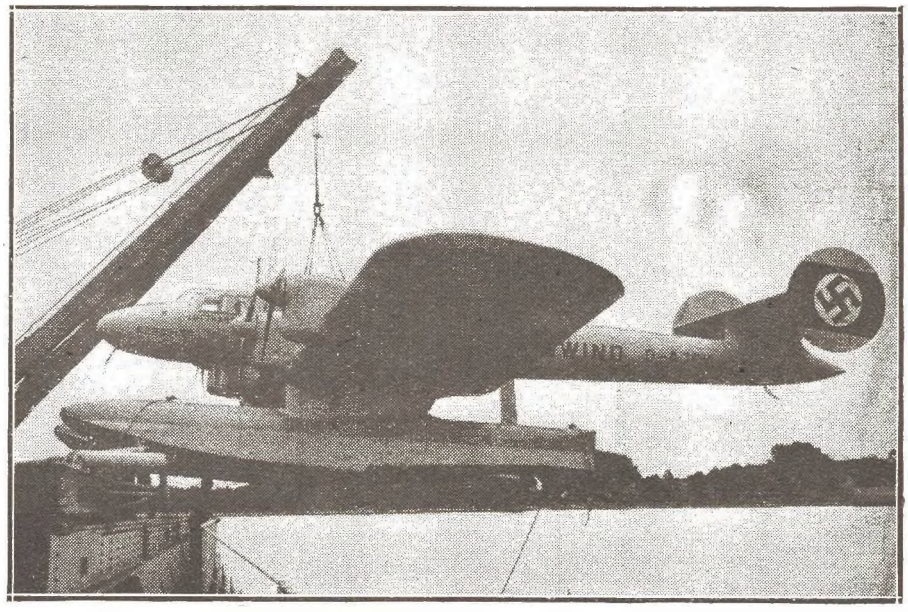
The idea of catapulting aircraft from capital vessels of the Navy was born early in the history of American naval aviation. Lieut. T. G. Ellyson, the pioneer of catapult flying, is credited with making the first catapult flight after two previous failures. Early in 1912, Lieutenant Ellyson made his first attempt by the use of a tight rope. Although successful on land, this method proved impracticable for shipboard installation. His second attempt, from the Annapolis docks, resulted in dismal failure and crack-up.

Lieutenant Ellyson escaped unhurt from this crash, which was fortunate for the Navy because on November 12th of that same year he made the first successful catapult flight from the Washington Navy Yard docks, employing a practicable catapult invented by Captain W. Chambers. Development of the powered catapult was rapid from 1912 to 1919, when the Navy department announced that every American battleship would carry a turntable power-catapult. The plane used in the initial shipboard

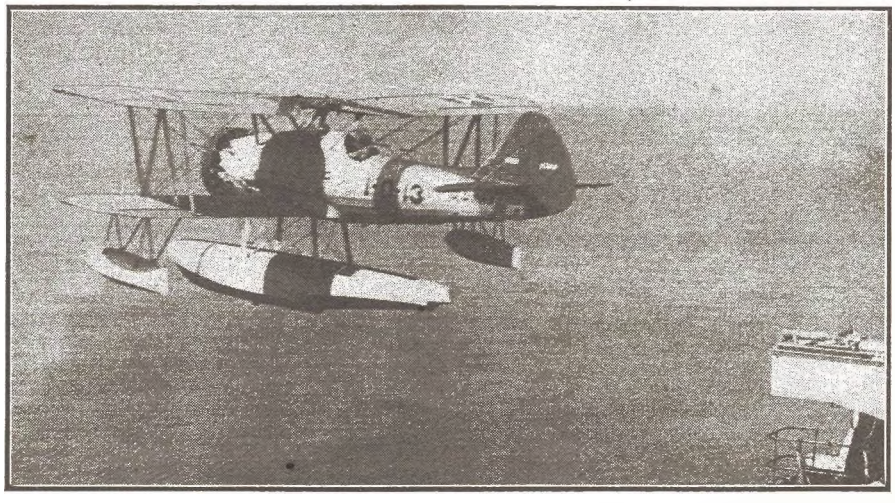
service installations was a Navy version of the Army Air Corps Vought VE-7. The machine was a two-seat double-bay biplane powered with a Hispano-Suiza in-line engine of 200 h.p. As in the usual Navy fashion, only one main float was mounted.

MANY aircraft manufacturers have furnished the Navy with experimental catapult airplanes, but only two of the builders—Vought and Curtiss—have consistently been able to meet the rigid specifications set forth as essential to withstanding the severe strain of repeated catapulting. Since that early day, these two companies have consistently developed fine catapult aircraft for the Navy.

The VE-7 was joined in 1923 by the Curtiss SC. In 1928 Vought delivered the OU-1 and the improved O2U-1, to be followed in 1929 and 1930 by the improved versions, O2U-2



One of the largest catapult ships in the world, loaded weight of the Blohm & Voss Ha. 139 is 38,610 pounds. Speed, 202 m.p.h.



Left: From a dead stop, a plane picks up speed to more than 60 knots in less than 60 feet! This machine is a Vought O3U-3.

and O2U-3. In 1930 and 1931 Curtiss likewise delivered improvements on their original, designated O2C-1 and O3C-1. From 1931 to 1933 the Vought O3U-1, O3U-2, and O3U-3 were accepted by the Navy, to be followed in 1934 by the O4U-1. Curtiss seemed to take over the field for a few years with the SOC series that is still in service; the SOC-1 in 1935, the SOC-2 in 1936, and the SOC-3 in 1937. The SOC-4 was accepted late in 1938, when the Naval Aircraft Factory took over the design and turned out similar models under the SON designation. Thus ended the Navy's series of biplane catapult scout-observers.

Vought merged with Sikorsky in 1939 and designed the Navy's first low-wing monoplane catapult plane. In 1940, the OS2U-1 was accepted, to be followed in 1941 by the improved OS2U-2 and OS2U-3. A similar plane, powered by an air-cooled V-12 Ranger engine and designated the SO2U-1, was also delivered for the cruiser catapults. The OS2U series was also taken over by the Naval Aircraft Factory and similar planes built under the OS2N-1 designation. In 1941, Curtiss also produced a low wing catapult monoplane after one failure on this type. It is authoritatively reported that this SO3C-1 is the fastest catapult plane in the world. It is a mid-wing monoplane with extremely modernistic lines. Cockpit accommodations are for a crew of two under a long sliding canopy. The fuselage is long and slim and has little or no waste space. The rear cockpit is far aft and is just a few inches from the vertical fin. Power is supplied by an inverted Ranger engine of 520 h.p.

In 22 years of service-practice development, the catapulting of aircraft from naval vessels has become a technique individual in aviation, with the American Navy tops in performance and equipment. Compressed air catapults, located on the extreme aft end of the quarterdeck, have given way to gunpowder catapults mounted atop the big-gun turrets. On these catapults, a plane picks up speed from a dead stop to more than 60 knots in less than 60 feet.

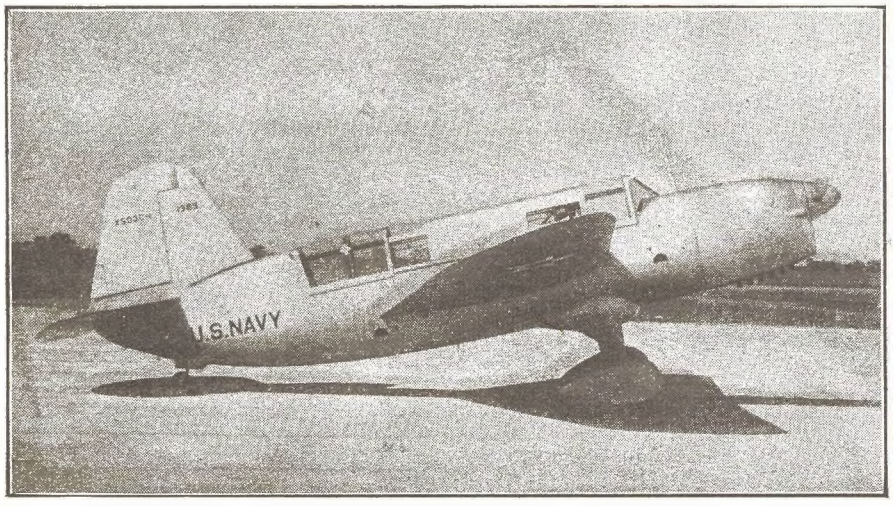
The pontoon step of the plane fits snugly into a padded saddle that is shaped in the exact opposite contour of the pontoon step, thus assuring perfect fit. The saddle is a part of the pontoon car that is whipped along the 60-foot steel track during catapulting. Bumpers on the forward end of the track serve to arrest the car's forward motion, allowing the plane to fly clear and into the air. The principle of catapulting thus becomes similar to that of the sling shot. Forward motion of the car holds the pontoon snugly in the saddle until the bumper is reached; and when the car stops the plane is literally slung into the air. Light safety catches serve to hold the pontoon in the saddle while the ship's motor turns up preparatory to catapulting.

The effect of the terrific rate of acceleration on the human body presented many problems that have been overcome through a definite ritual that must be rigidly followed by the pilot and the deck catapult officer, who directs the launching.

BEFORE ENTERING a machine to be catapulted, the pilot makes a complete inspection of the catapult car and his plane. Satisfied with his inspection, he climbs into the ship and dons his radio earphones, leaving the greenhouse cover open in case he has to get out quickly in the event of accident.

While the big-gun turrets swing to the ship's beam, so that the plane may be catapulted well clear of the warship, the pilot warms up his motor. Satisfied that the plane is ready, he fastens his safety belt and claps his hands over his head as a signal to the catapult officer. Then deck men hose the deck with salt water in case of fire.

The "go-ahead" signal comes from the bridge of the warship. The catapult officer starts his stopwatch and holds up five fingers for the pilot to watch. In just five minutes the charge of powder that starts the plane on its terrific rush into the air will be set off. The pilot opens his throttle halfway, and the observer in the rear pit



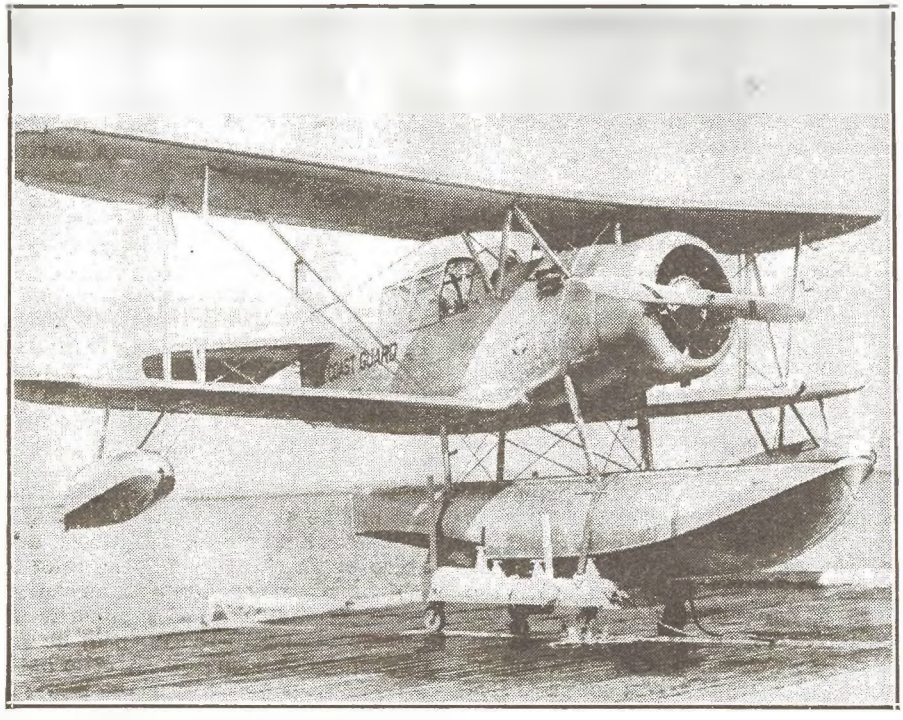
Curtiss' SO3C-1 scout-observation may be fitted as a landplane as well as a seaplane. It is reported that this is the fastest catapult craft in the world.

—having no present duties to perform—puts his head down between his knees and hooks his arms under his thighs. This is the best protection against a snapped neck during acceleration.

But the pilot's eyes never leave the upraised hand of the deck officer—the catapulting must not catch him unprepared. Four fingers: four minutes to go; three fingers: three minutes; and so on, until the deck officer crosses his index fingers. This is the action signal, indicating that in just thirty seconds the charge of powder will be detonated in the driving cylinder. The catapult officer rotates his right arm and the pilot obeys the order to rev up his motor. He braces his elbow on his knee, pushes the throttle wide, then wraps his whole hand around the throttle quadrant to keep it from snapping closed when the plane is catapulted. The pilot shoves out his other arm in a clenched fist signal to indicate that his motor is full out. Then he gets the arm in quick to grasp the stick tightly, bracing the back of his head against the crash pad to tense his neck muscles.

The shock of the explosion is almost paralyzing as it comes on the uproll of the warship. Everything to either side of the suddenly rushing plane has become a blurred panorama. The pilot feels that his stomach has been left behind, that his skull is crushing against the now-flattened head rest. The saddle-car hits the bumper with a terrific thud and the plane is free in the air, the motor pulling hard to gain a safe margin of flying speed. The body pressure lessens as it begins to equalize with the plane's speed, and the pilot starts climbing for altitude necessary to execute his mission successfully.

Delivered late in 1938, the Curtiss SOC-4 was the last biplane accepted by the Navy for catapult duties. Top speed, 165 m.p.h. with a 500-h.p. Wasp engine.



LET'S ASSUME that a scouting plane on a routine flight returned to the mothership with information that an enemy battleship—presumably a commerce raider—has been sighted. Confident that the enemy had not detected his plane's presence in the sun, the pilot had avoided breaking radio silence and returned to deliver his information verbally. For the past three hours the warship had been stalking the enemy, according to the scout pilot's report of estimated position, course, and speed. Unless the enemy changed course, the first warning it will have of hostile presence will be a salvo of 16-inch naval shells.

The pilot glances back at his mothership and smiles with satisfaction. Three more planes are coming up to cover the observer, or to take over the observation if his plane is shot down.

At 4,500 feet, the enemy ship becomes visible, but the surprise element is obviously lost—the plane has been sighted. The enemy is also sending up planes. Quickly estimating the range, the pilot radios, "Range, 20,000 yards . . . Range, 20,000." There is no answer—he expects none. Neither does he look back at the mothership to see the big guns go off. He keeps his eyes glued to the enemy. The 12 splashes, 500 yards beyond the enemy warship and 400 yards to the right, were what he had been waiting to see.

"Down five . . . Down five. Left four . . . Left four," he radios the correction, trying not to think of the enemy planes boring up to him. Then come 12 more splashes, just short of the enemy. Only luck would have provided a hit in the first two salvos—but they could give him a straddle, and that was exactly what had been attained from his directions.

"Straddle . . . Straddle. Up three . . . Up three. No change."

The next salvo has the range but is off in deflection due to some expert zigzagging on the part of the enemy.

"No change . . . No change. Right two . . . Right two." Then his radio goes dead—enemy planes are attacking and machine gun bullets have apparently found the radio! The pilot zooms to cover the tail of a brother officer's plane and signals to take over observations. A quick glance at the enemy warship gives him a great feeling of satisfaction, for his last observation has made possible a direct hit. The raider is down by the bow, all guns silent.

The enemy aircraft suddenly lose interest in the air duel; they no longer have a mothership to fight for, nor a place to return when their fuel runs out. And so the scout-observers herd them back to their own mothership.

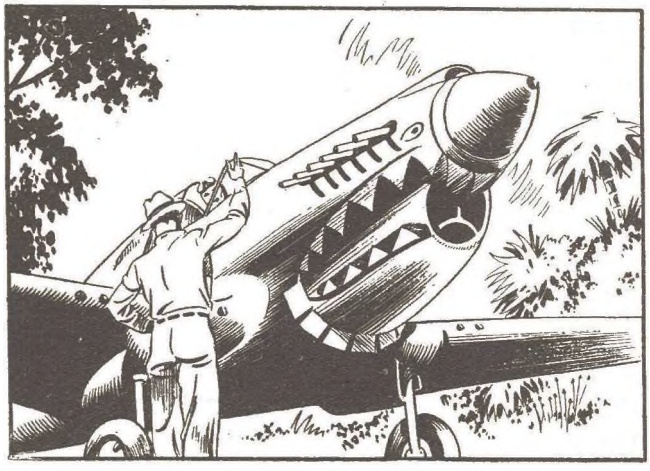
"Well-done!" is flying from the bridge of the ship. The pilots grin happily as they slap the water with their pontoons to be lifted back aboard by crane.

Yes, it's a dull and uneventful job, being a catapult pilot! THE END

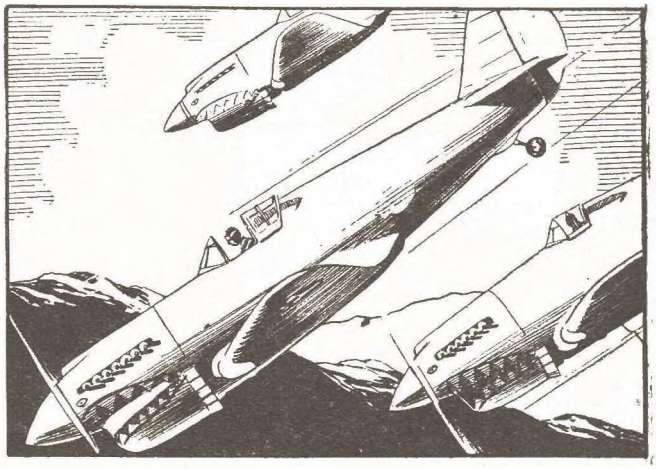
AMERICA'S NEWEST ACES

V—JOHN V. K. NEWKIRK—ACE AVG JAP-SMASHER

BY ALDEN McWILLIAMS

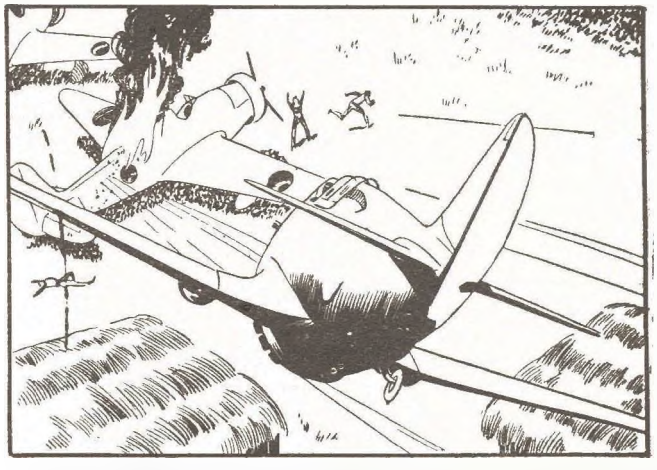


1—A squadron of American Flying Tigers on March 24, 1942, left its Chinese base and rode the dawn into a Japanese-controlled Thailand airport. "Scarsdale Jack" Newkirk, the AVG's ace of aces, was at point on the daring raid. Everything had been worked out perfectly to catch the Japs.

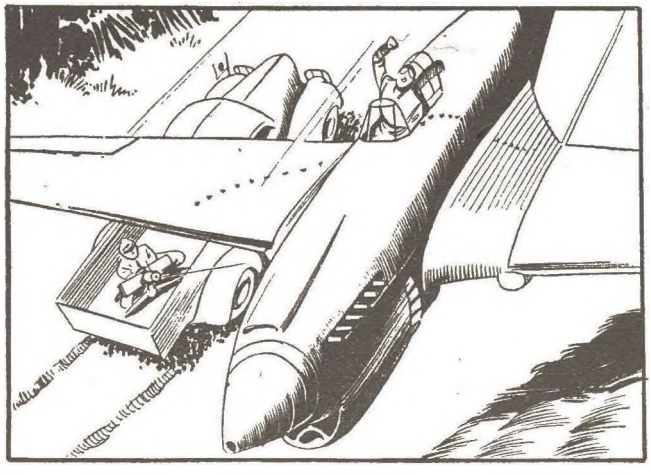


2—The attacked airport was at Chiengmai, and it was announced that the raid caught the Japs by surprise. Newkirk's outfit, more than three months ago, had bagged 136 enemy craft, accounting for more than 300 trained Japanese pilots, gunners, bombardiers, and navigators.

3—Dropping down from the sky at 7 a.m., the U.S. airmen caught the Jap pilots as they were running to their cockpits and pumped 3,500 rounds of ammunition into both grounded planes and personnel. Several Japanese ships were seen bursting into flames, and the remainder were riddled.

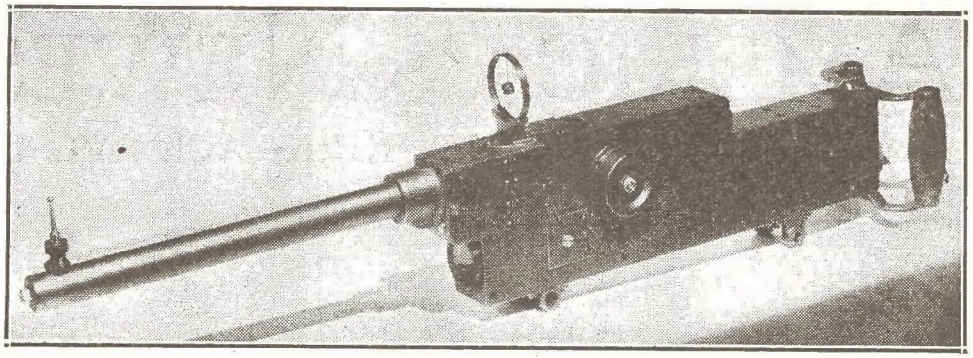


4—The attack continued until the outfit was completely eliminated. By official count, 40 enemy planes were destroyed, along with numbers of men and huge supplies of essential war materiel. It is reported that the Japs were so startled that their defense was all but futile.



5—But even though this was one of the most successful missions undertaken against the Nipponese, the Flying Tigers returned to their base minus their leader. Newkirk was last seen in a crash dive, after being hit by machine gun bullets fired from a parked truck.

6—Earlier in March, Newkirk had been decorated with the British DSO; he had destroyed a full 26 Japanese aircraft before his untimely death. When Brig.-Gen. Clair L. Chennault, commander of the AVG, learned of Newkirk's death, he stated: "It won't be easy to find his equal."

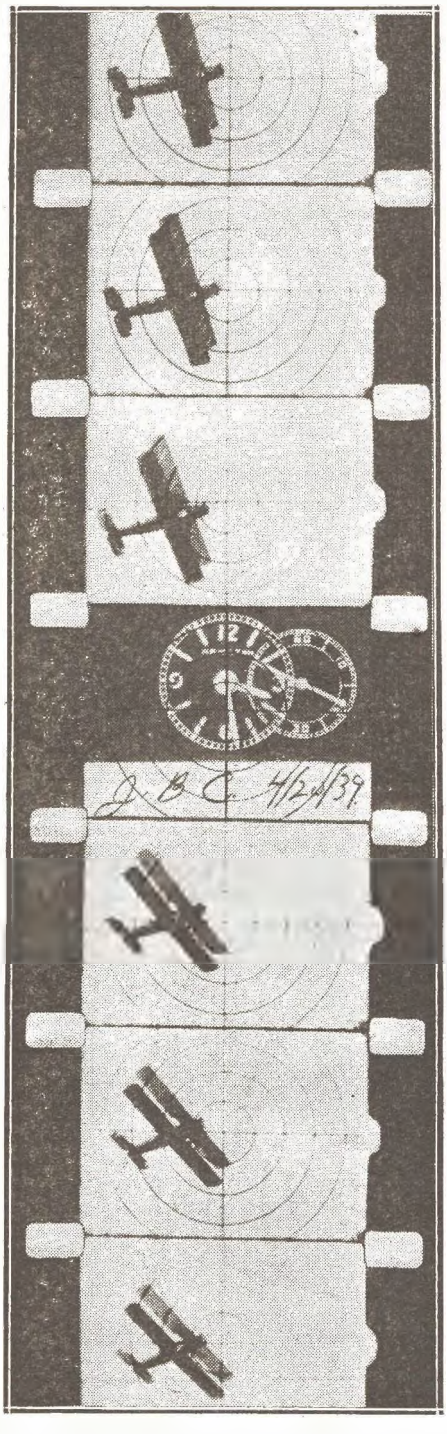


Fairchild CG-16 camera machine gun. This type is used extensively by U.S. Air Corps for flexible rear-pit installation.

THE CAMERA GOES TO WAR!

by Ray Gill

Photographs courtesy of Fairchild Aviation Corp.



Below: Enlargement of strip of 16mm. film from a gun camera. Image of stopwatch is photographed at end of each burst of fire.

THE USE of gun cameras for training pilots in actual aerial gunnery dates back to the first World War, as does the use of machine guns. But just as the armament of heavy-caliber machine guns and aerial cannon now in use on our newest planes is far superior to the hand-operated guns of the first World War, so the new training equipment is far more efficient than the first gun cameras.

Today the Air Corps is putting into use its new gunsight aiming point camera, the GSAP, so named because of its optical system which shows in the finder not only the target of the gunner but also a picture of the sighting apparatus used; it records both of these on each frame of film taken. In addition, the new equipment has an overrun device, which keeps the camera going for a predetermined time, after the pilot ceases firing, to record what happens after he ceases to fire.

Earlier gun cameras were mounted on machine gun mounts, necessitating removal of part of the armament, but today's cameras are fixed behind the gunsights, so that the plane may carry its full complement of guns in addition to its recording device. By this means the camera may be carried into actual combat and work simultaneously with the guns to provide a record of the combat. Here again the overrun device is an advantage, for the pilot may follow an enemy plane down to its crash—after it goes out of control—and the camera will continue taking pictures after he has ceased firing.

The new Air Corps GSAP camera is electrically driven and is equipped with a 50-foot film magazine using standard black-and-white 16mm. motion picture film. The pilot may vary the speed of the camera, by a reset knob, from 16 to 64 frames a second. The machine compensates for atmospheric conditions by aperture controls, which are accessible in flight, for bright, hazy, and dull weather. But the film latitude is sufficient for the camera to produce satisfactory results if the setting is within the equivalent of a stop and a half of the proper setting. Like most aerial cameras, the focus is at infinity and the camera is equipped with a footage indicator.

The device is so designed that the optical system showing the gunsight in each frame may be replaced by a straight lens arrangement to get ordinary pictures without the gunsight. Also, provision is made to heat the lens electrically against the cold of high altitudes.

Oddly enough, if the picture shows the sight directly on the target, the shot is usually a clean miss. It is clear indication to the instructor that the student has not taken sufficient "lead" in aiming ahead of the swift-moving adversary. Only when the attacker is directly on the tail of the target, or when the two planes are flying directly toward each other, is such aim good for a hit. In any other flight maneuver it is necessary for the gunner to lead his target, making allowances for the distance between the two planes, the speed at which his ship is traveling, and the speed of the adversary. And it is in the measurement of the lead the gunner takes which gives the new equipment an important advantage.

EACH FRAME of film has four indice marks midway on the sides, the top, and the bottom. The camera is adjusted before take-off so that the sight, an electrically-lighted two-barred cross, coincides with these indice marks on the first frame of film. By this arrangement, if the sight shows the aim to be a certain distance ahead of the nose of the target, the guns of the attacking plane would actually be pouring a stream of lead into the opponent.

The developed film is projected on a small viewer screen equipped with a mil scale of fine shadow lines around the edges, so that the instructor can view the frame critically, measuring the amount of lead taken by the gunner; and with the known facts of the speed of both planes, he

can determine whether the frame should be scored as a hit.

After the instructor scores each strip of film, he can point out errors to the individual pilots. Frequently, the film is shown in a classroom to a group of pilots, so that the whole group can benefit from the discussion of hits and misses.

As a simple means of identifying each film with the pilot who shot it, the Wright Field armament technicians have suggested that each magazine be placed in a hand movie camera, with which a few pictures are taken of the pilot to use the film in his plane. The daylight-loading magazine is then taken out of the hand camera and fed into the GSAP camera for use.

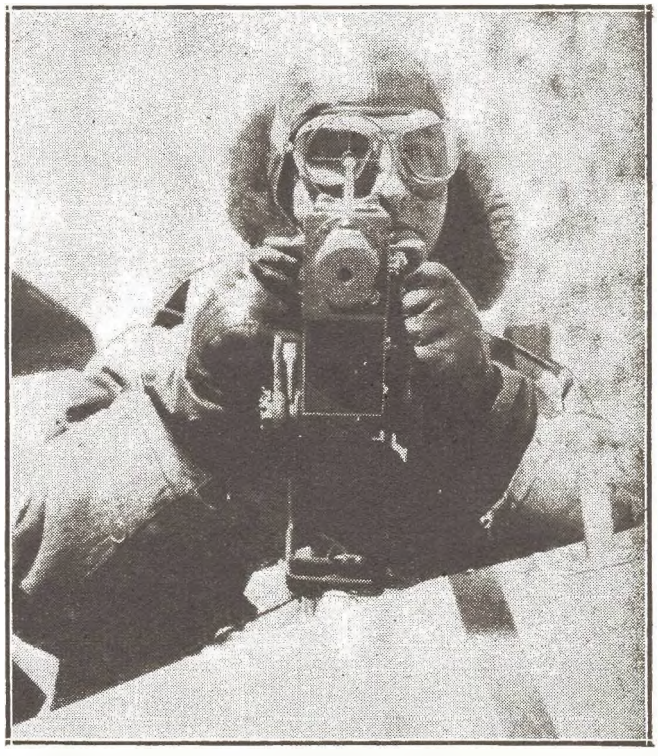
Early in the use of gun cameras it was learned that a principal advantage to a cadet was to see the results of his training flight as quickly as possible after it was made. So Wright Field technicians and camera manufacturers have developed a very nearly automatic process technique, which the armament mechanics can use without expert photographic knowledge. Without divulging the details of the processing, we may say that it develops the negative reversed as a positive so that it can be used in a projector immediately, and that it comes out of the process spooled on a reel ready to go into the projector in a very short space of time. Thus the student is enabled to see his pictures the same day they are made.

One gun camera developed at Wright Field in the late '20's was made of very heavy materials, simulating as nearly as possible the weight as well as the size of an actual machine gun. The usual Air Corps search for lighter metals was abandoned, and parts were made of bronze and other weighty metals. The flexible gun cameras were operated by triggers on the spade grips and were provided with regulation machine gun sights.

Even after the adoption of motion picture film, the gun cameras were loaded by the old-fashioned spool method, having opaque strips of leader and trailer for daylight loading attached to the actual film. This method was discarded with development of more modern magazine loading, which eliminated the laborious threading of the film through the camera.

With the improvement of electric motors for camera operation, gun cameras became electrically-operated about 1938. As photographic lens and films improved, the 16mm. film was substituted for the bulkier and more costly 35mm. film with little sacrifice in clarity of the pictures. This, too, was a factor in making possible the switch to the magazine form of camera loading.

About this time the fixed gun camera changed its shape, as the armament designers decided there was no point in making it look like a gun since, operated by remote control, the gun suggestion was valueless to the pilot. The new fixed gun camera, using the same mechanism as its flexible brother, was built into a long, cylindrical shape. This was the immediate predecessor of the GSAP camera, which was developed after a comprehensive survey of the problems of aerial gunnery instruction by Wright Field technicians.



Made to simulate actual weapons, flexible cameras have the usual bead-and-wire sights. Lens is below the gun's barrel.

First prepared for fixed mounting, the GSAP camera is now also being adapted for flexible gunnery practice. Here the Air Corps engineers are confronted with a new problem, since today's flexible gunnery consists of the manipulation of multi-gunned power turrets instead of the single, manually-operated machine gun of the past.

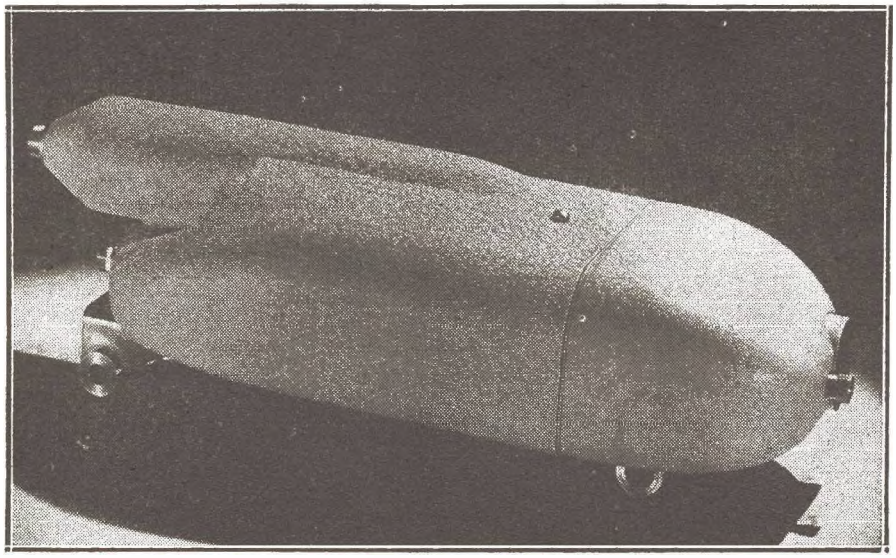
IT IS BELIEVED that the first gun cameras were employed by the British and French during the first World War, about 1915 or 1916. The first British gun camera had a film with six exposures, which could be divided in 12 frames, and each time the camera was fired a cocking operating was necessary. Developed in an effort to solve the training problem of judging the distance from the moving base of fire to the moving target, the idea was received very skeptically by the British army officials until the training showed results in greatly increased accuracy of fire.

The French camera was a large box type which took a picture about four by five inches. It also had to be cocked after every operation.

The first American gun cameras, produced by Eastman about 1918, were in many respects similar to more advanced British types. Built to resemble machine guns, they had long barrels and spade grips. They were powered by spring-wound motors and had regulation gunsights. They used 35mm. movie film and were equipped with stopwatches. The stopwatches were so installed that every time a picture was fired the face of the watch showed, recording the time.

(Continued on page 80)

One of the latest for fixed installation, the Fairchild W-7 camera machine gun is used to photograph actual aerial battles as well as practice fights.



ON HAUNTED WINGS

Swashbuckling Eric Trent faces the strangest mystery of his career as he combats his own image and German Stukas over the heart of Washington!

by Donald E. Keyhoe

Illustrated by Alden McWilliams

CHAPTER I

The Hooded Ace

ERIC TRENT was almost to the phone booths when he saw the three-striper. The Navy man had halted just inside the doorway of the Washington Airport terminal. As Trent turned, the man flung up one hand, hastily shielding his face. Still keeping his face hidden, he wheeled and hurried out.

"Now, what brought that on?" pondered Trent. He stepped out into the night. A mist was falling, and the lights at the entrance were dimmed. The three-striper had vanished in the gloom.

Trent's dark eyes lost their amused twinkle. This began to look more than odd. There had been something tantalizingly familiar about that Navy commander, despite the attempt to hide his identity. Trent thought for a moment. Several officers had been disgruntled at his special assignment in Naval Intelligence. Two or three, he knew, had resented the appointment of Eric Trent, ex-magician and soldier-of-fortune, as senior air agent, with full commander's rank. That might explain cutting him cold—but it would hardly explain the man's precipitous flight or the guilty hiding of his face.

Trent gazed a moment longer into the murky night. A passing airline stewardess gave his tall, uniformed figure an appreciative glance. Trent had a dark, alert face and the smooth poise that comes with hours behind stage footlights. His mouth, under a close-clipped black musache, had a look of whimsical humor—a look that could, on occasion, become a politely impudent grin.

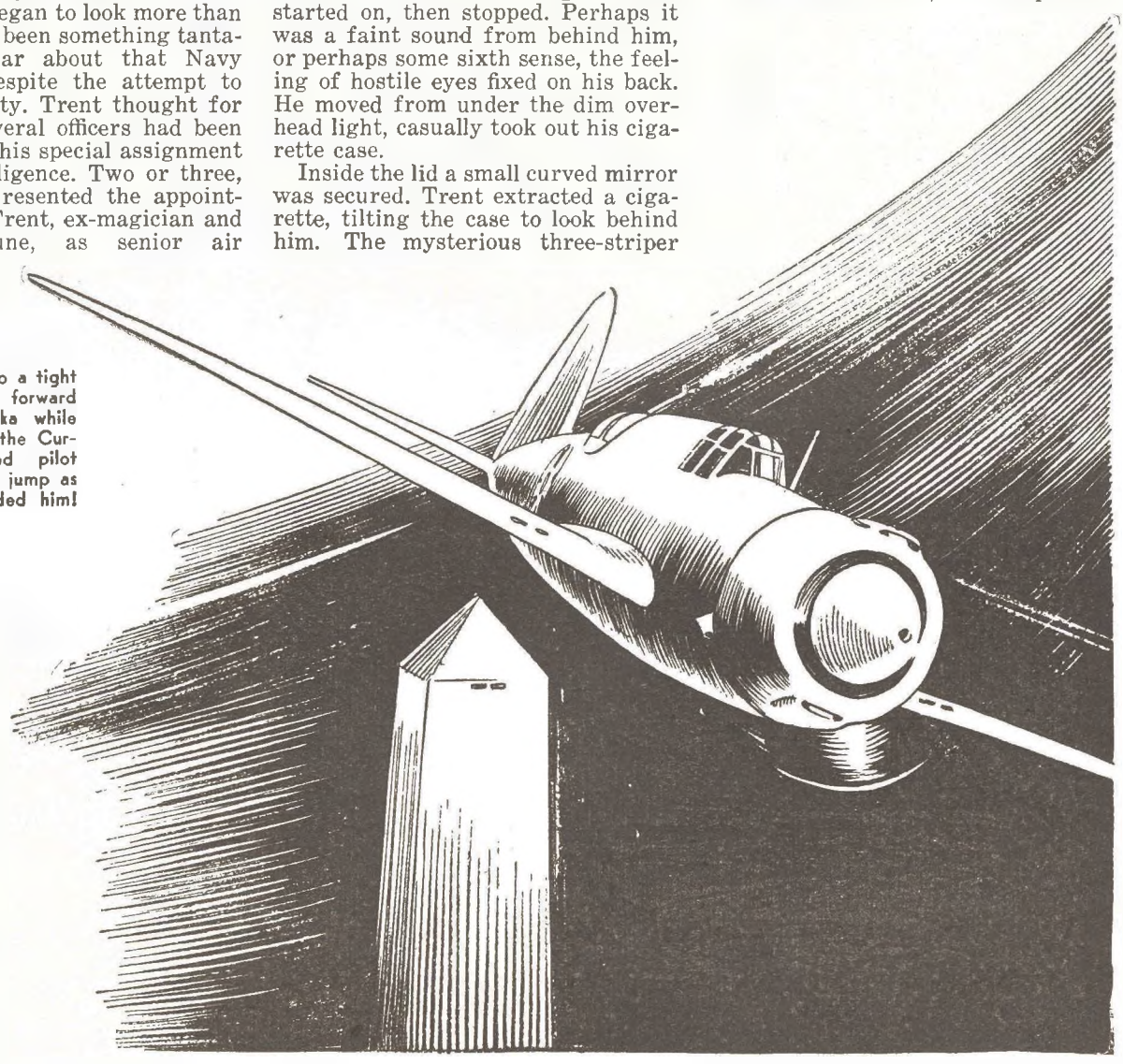
As Trent turned to go inside, a taxi drove up. Two business men got out, went into the terminal, and the cab rolled off into the night. Trent started on, then stopped. Perhaps it was a faint sound from behind him, or perhaps some sixth sense, the feeling of hostile eyes fixed on his back. He moved from under the dim overhead light, casually took out his cigarette case.

Inside the lid a small curved mirror was secured. Trent extracted a cigarette, tilting the case to look behind him. The mysterious three-striper was stealing toward him on tiptoe. In his right hand was an automatic with a silencer. His features were still obscured in semi-darkness.

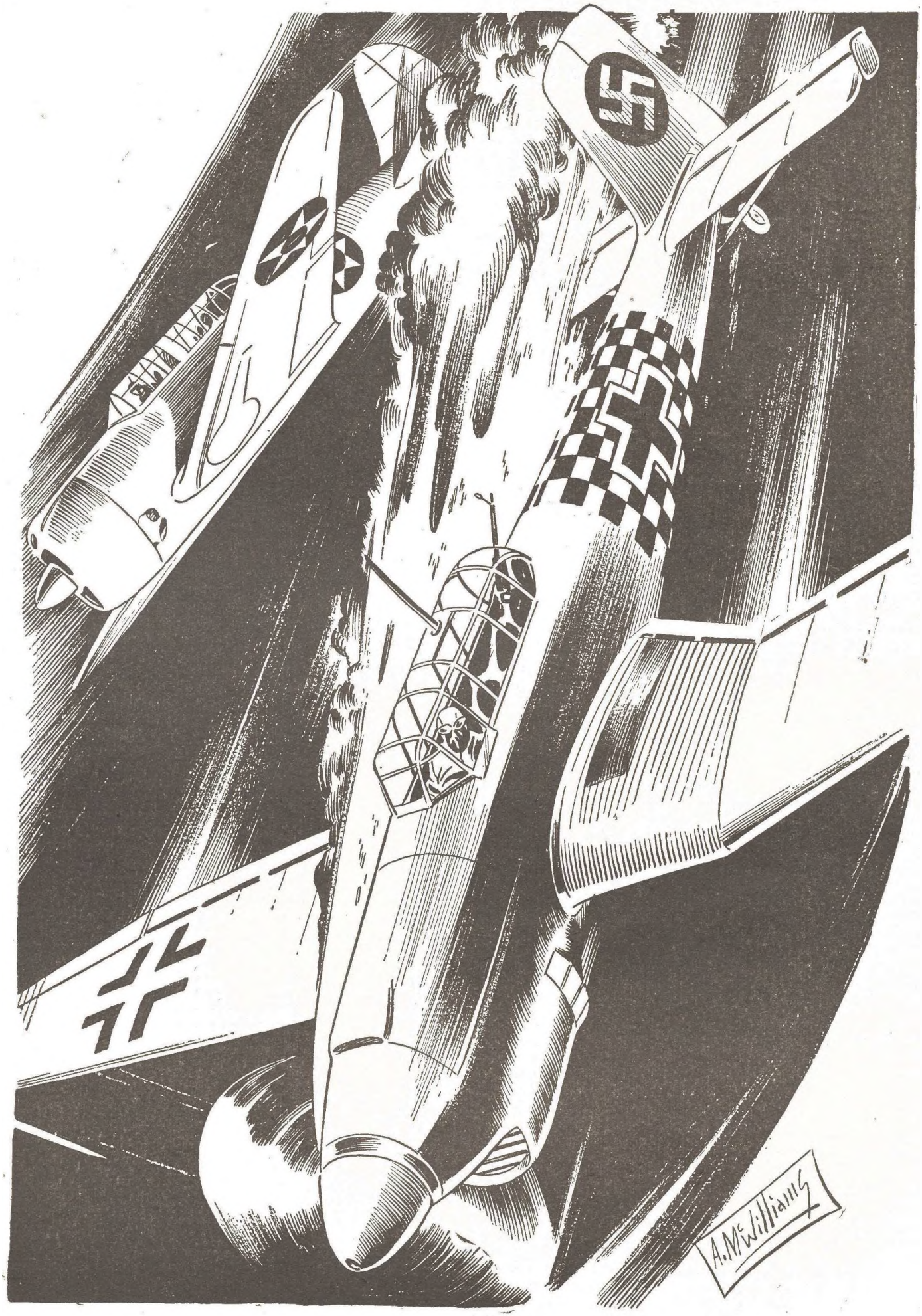
Trent idly dropped the cigarette case into his coat pocket. He bent his head as though about to light a cigarette, then spun around and dived in low. The other man jumped back with a stifled oath. Trent seized his wrist just as he pulled the trigger.

THE AUTOMATIC made a muffled grunt, but the bullet went into the air. Trent gave his assailant's wrist another hard twist. The three-striper dropped to his knees and Trent deftly flicked the gun from his loosened fingers.

"You don't mind, old chap?" he



Trent whipped into a tight bank, tripped his forward guns at the Stuka while Crabb drove off the Curtiss. The hooded pilot gave an agonized jump as the tracers pounded him!


A. McWilliams

said amiably. "Now, let's have a look at you."

The captive silently got to his feet. Trent pursed his lips in a soft whistle.

He was gazing on an exact duplicate of his own face!

At first glance, he could hardly discern a flaw. The clipped mustache was the same, the set of the lips underneath. Hair and skin had the same almost Latin darkness. Except for slightly higher cheekbones, and the murderous light in the other man's eyes, Trent might have been facing a mirror.

"My compliments," he told his double. "That's really an excellent job of make-up. You almost fooled *me* for a moment."

The impostor stared at him. "I must say you take it rather coolly."

"Why not? I have the gun."

"I should have shot you at once," muttered the captive.

"Oh, I wouldn't blame myself too much," said Trent. "Some one might have come out. It would look a bit odd, Trent dragging off his own corpse. Probably spoil the impersonation act."

"Very funny," the impostor said bitterly.

"I wonder how long this has been going on," mused Trent. "Mort and I have been away for a month. By the way, you haven't anybody impersonating Mortimer Crabb? That *would* be something."

"You'll learn nothing from me," snapped his captive. "Not even if—" He broke off as a blurred figure came toward the entrance from a car that had just stopped very close to them.

"Get back out of the light," ordered Trent. The impostor obeyed, and Trent turned so that the pistol would not be visible. The approaching figure was a short but powerfully built man, with a close-cropped head that seemed to grow right out of his shoulders. He was making for the doorway when he saw Trent. He wheeled back, and his heavy, brutal features took on a quick relief.

"Von Zenden!" he said hoarsely. "I just got the message from—"

"Hermann—it's Trent!" the impostor burst out. "Use your blackjack!"

Hermann's jaw dropped, then he leaped at Trent. With a quick sidestep, Trent landed a left to the stomach. Hermann doubled over and let go his blackjack, but the false three-striper had seized his opportunity. Hurtling against Trent, he knocked the pistol aside.

The silenced automatic grunted again, twice. Glass crashed from the nearest swinging door, as the bullets went wide. The impostor was clawing at the weapon when a clamor of voices arose from inside. An armed airport guard charged out into the vestibule. The tall masquerader instantly fled, with Hermann at his heels, wheezing for breath. Trent started after them, the gun shining faintly under the light.

"Halt, you!" bawled the airport guard. Trent stopped, but Hermann lurched around, and a snub-nosed revolver blasted. As the guard fell, Trent pitched a shot at Hermann, now only a shadow in the night. The German's gun blazed again, and a bullet smacked the stone wall behind Trent. The next instant he was hidden behind the car he had driven up.

The impostor was already at the wheel. Trent sent a bullet after the machine, heard the slug ricochet from metal. The car was swallowed up in the darkness before he could aim again. There was no sign of Hermann. Evidently he had jumped onto the running-board and escaped.

Three or four frightened porters were bending over the wounded guard. Trent hesitated, out in the screening mist, then he saw a crowd swarm out from the huge waiting-room. He made his way swiftly around to the north door, near the luggage room. The guard would be given full attention without him; and to appear there now would only delay action.

Trent put the gun in his belt, so his uniform blouse hid it. Then he straightened his cap and went into the terminal. Everyone was running toward the south entrance. He trailed along until he saw the mournful visage of Lieut. Mortimer Crabb, the engineering expert of Naval Intelligence. Crabb, a New England inventor, had been his reluctant partner in numerous tricks against the Axis before the war. After Pearl Harbor, Trent had signed up with the Navy, and Crabb, though still dolefully complaining, had followed him in the Service.

MORTIMER CRABB was about forty years old. Even in a two-striper's uniform, he was still a gawky figure, thick-waisted legs a trifle too short, long arms dangling. His face was long and gloomy, and his general philosophy was to expect the worst.

Trent found him at the edge of the phone-booth alcove. Crabb eyed him with dismal suspicion.

"And just where have you been?" he demanded. His voice had a sepulchral sound, as though it came from the bottom of a well.

"Oh, I dropped up to see Johnny Groves, the airport manager," Trent said blithely. "What's going on here? Some celebrity arriving?"

"Somebody shot a guard," growled Crabb. "Shot the glass out of that door, too. Nobody seems to know what it's all about."

"How badly is the guard hurt?"

"He got it below the right shoulder, one of the porters said. They just carried him down the hall."

"Say anything about who shot him?" queried Trent.

"Nope," grunted Crabb. "Say, why are you so anxious?"

"Never mind. Did you get Captain Blaine?"

"He wasn't in," Crabb said testily. "Here he yanks us back from Australia on rush orders, and then doesn't even leave word—"

"Calm down, old bean. I think I've spotted the leak in Air Intelligence."

"Ha!" scoffed Crabb. "I suppose you pulled it out of your hat, like one of your stage rabbits."

"My dear Mort, the rabbit-and-hat trick was passe years ago. During my career as the Great Mysto I never once produced a bunny."

"Skip it," snorted Crabb. "I want to get home, where I can sleep in a real bed once more. I suppose it's too much to hope the garage people sent our car out here. And there won't be any taxis a rainy night like this."

Trent grinned as they went outside. "Good old cheerful Mort. You'll never know how you buoy up my spirits on dark days."

They found the car, a big convertible coupe, parked in the officials' reserved section. Trent climbed in behind the wheel, took the silenced automatic from his belt, and laid it on the seat.

"Where'd you get that?" exclaimed Crabb. "Don't tell me that's the gun that shot the guard?"

"No," said Trent, "this one just drilled the door."

"I knew it," groaned Crabb. "We aren't in a place five minutes before we're in a jam. What have you done now?"

Trent started the car. "Mort, remember that quick-change artist we saw in the Pintzstrasse Theater, in Berlin, back in '39?"

"The German who did all the impersonations? Sure—what of it?"

"His name was Kurt von Zenden. His father was Karl von Zenden, the notorious World War spy who was stopped so often by Capt. Philip Strange. Karl von Zenden was also a professional before that war broke out; he used to call himself the 'Man of a Thousand Faces.' It's obvious he's trained Kurt to follow in his footsteps and serve Hitler."

"What's that got to do with tonight?"

"Quite a lot. I met the gentleman back there. We had a little argument. He was using my face, and I'm a bit particular about those things."

"He was *what?*" sputtered Crabb. "You mean he was made up as you?"

"Right. And a good job, too." As Trent swung into the airport road leading toward Washington and Arlington he gave Crabb a brief summary of the encounter.

"This is terrible," moaned Crabb. "Lord knows what he's done, posing as you. You'll probably—"

He jumped, and Trent put on the

brakes as the rising howl of air-raid sirens filled the air. The airport lights began to go out. Ahead, the misty glow from the Memorial Highway faded into blackness. Across the Potomac, where the wail of Washington's super-sirens was now audible, street and house lights hastily went dark. Trent cut off his headlights and ignition, climbed out.

He had stopped on the crest at the west side of the airport. Below and back nearer the terminal he could see Army mechanics starting three Airacobras, by the faint glow of shielded lanterns. Just beyond, two Navy ships were briefly illuminated by the flitting lights. One was the Brewster SB2A-1 dive-bomber in which Crabb and he had flown from the West Coast. The other was a Curtiss SB2C-1. Apparently it was not kept there for defense, like the Airacobras, for it was not being manned.

"I'd give a month's pay to get into this," said Trent. "That is, if it's a real raid."

"You'd get your pants shot off," Crabb said sourly. "Those Army guys will be firing at everything but their own ships."

The Airacobras roared down a darkened runway, swept up into the murk. From across the Potomac came the thunder of other interceptors taking off from Bolling Field."

"Probably just a test," grunted Crabb. "Bombers couldn't see to hit anything, a night like this."

THE DRONE of engines diminished, as the Army fighters climbed on up to get on top of the overcast. Trent took three small hollow steel balls from his coin pocket, began to juggle them in the darkness. It was one of his habits when thinking over some problem—juggling, palming coins, while his brain kept pace with his fingers. He looked back at the terminal, remembering Hermann's tense expression and his reference to a message.

"Mort, I've a hunch this isn't a test. That gorilla of von Zenden's acted as though something were about to pop."

"Maybe so," Crabb said, staring up into the night. "Sounds like something right now."

The drone of an unseen plane had changed to an angry snarl, as it suddenly picked up speed. Trent thought he heard a muffled pound of guns. The snarling roar abruptly died out. A few moments later ground guns hammered, somewhere across the river. A searchlight angled through the dark, jerked back.

"What's that?" ejaculated Crabb, as the beam caught something in the mists.

"It's a Stuka!" said Trent. Even as he spoke, the ground guns cut loose with a furious barrage. Tracers from five directions flamed toward the Nazi dive-bombers. But the Stuka never swerved. Slowly, almost majestically, it glided over the Highway Bridge. But no bombs fell. One wing tilted under a machine gun blast, then, with a sharp dip, the Stuka plunged into the river.

Searchlights were focused on the spot before the seething waters had time to settle. The Stuka's tail was visible for a moment in the glare, then it slowly went under.

"The pilot must've been dead or out cold, the way it came in," muttered Crabb.

"Notice anything odd about that ship?" said Trent.

"Only the way it came down."

"It didn't have a landing gear. Either they dropped the wheels or—" Trent swiftly put the steel balls in his pocket, turned to the car.

"What's up?" erupted Crabb.

Trent pointed up into the gloom. The faint glow reflected from the searchlights on the water revealed a descending parachute, with a figure dangling beneath it.

"He's going to land near the edge of the field." Trent started the engine. "If we move fast we'll nab him before he can run."

He sent the coupe racing toward the junction of the airport road and the boulevard. The searchlight from the terminal, probing toward the Stuka, was barely enough to guide him.

"Slow down, you lunatic!" howled Crabb. We'll hit something."

Trent gazed up through the windshield-wiper arc. The man in the chute was a hundred feet from the ground. He was going to land near a boundary light standard, about ninety yards from the boulevard.

"Hang on, Mort." Trent skidded off the road, up onto the flat earthen dyke which formed the airport boundary. The descending figure struck the ground, and the chute suddenly collapsed over him. Trent braked the car, jumped out with the silenced gun in his hand. Crabb helped him pull aside the folds of silk.

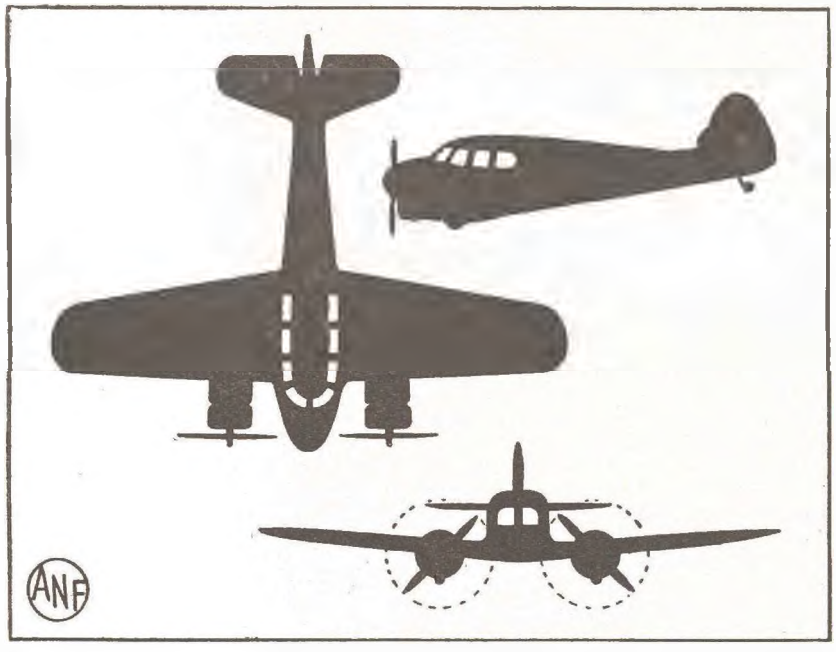
"Well, burn my breeches!" Crabb said in amazement.

The Nazi airman's head was almost

(Continued on page 62)

Know America's Planes

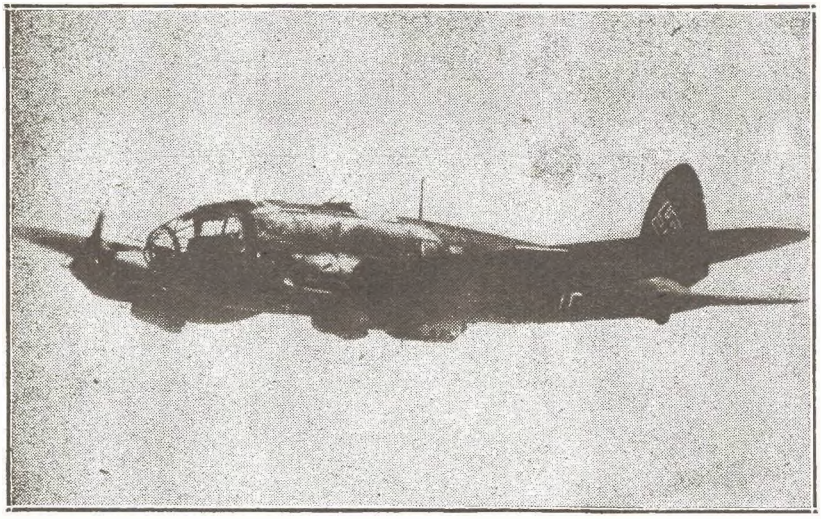
NUMBER SEVENTEEN



LATEST MODEL of the Cessna Aircraft Company of Wichita, Kansas, is the T-50, a twin-engined, five-seat transport. It is powered by two air-cooled radial Jacobs engines of 225 h.p. each and has a cruising range of from 750 to 1,000 miles, depending upon load. The ship features a continuous cantilever wing of spruce construction and a fuselage of welded chrome molybdenum steel tubing, both covered with fabric. This construction lends itself to ease of maintenance and repair, as well as to rapid and economical fabrication.

An extremely versatile aircraft, the T-50-type in military service can be used as a trainer, an ambulance, a personnel transport, or a photographic airplane. Also, it may be mounted on floats or skis instead of the usual wheel landing gear. The plane is called AT-8 by the Air Corps; Canadian models are called Crane.

Other data: Span, 41 feet 11 inches; length, 32 feet 9 inches; height, 9 feet 11 inches; wing area, 295 square feet; loaded weight, 5,100 pounds; cruising range, 1,000 miles; service ceiling, 22,000 feet.



With service squadrons, the He. 111K is classed as a medium bomber. Adaptations have also been made for carrying a torpedo for use against Allied merchantmen.

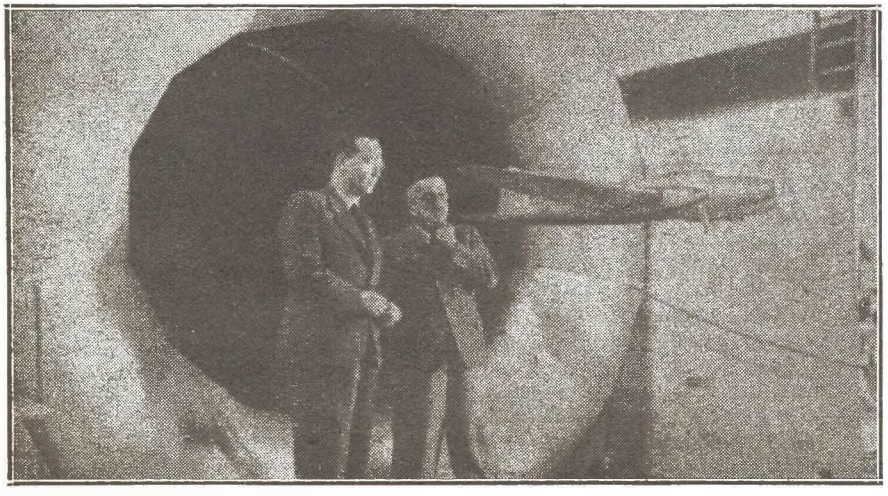
A DAY

ONE OF the most famous of all German aircraft manufacturers, Heinkel *Flugzeug-und Moterenwerke* builds all types of war craft from fighters to bombers. The He. 112 is probably the most famous ship the concern has turned out, but the most destructive is the He. 111K bomber, the production of which is portrayed on these pages. The plane is well built, regardless to contrary reports, and has proved conclusively that it is a well-bred bird of war comparable to similar types in service with the United Nations. The Heinkel plant, located at Rostock, has recently been bombed heavily by the RAF.

Above: Mass production. To supply needs of the German war machine, three shifts are used by aircraft companies. Planes are turned out in a minimum of time.

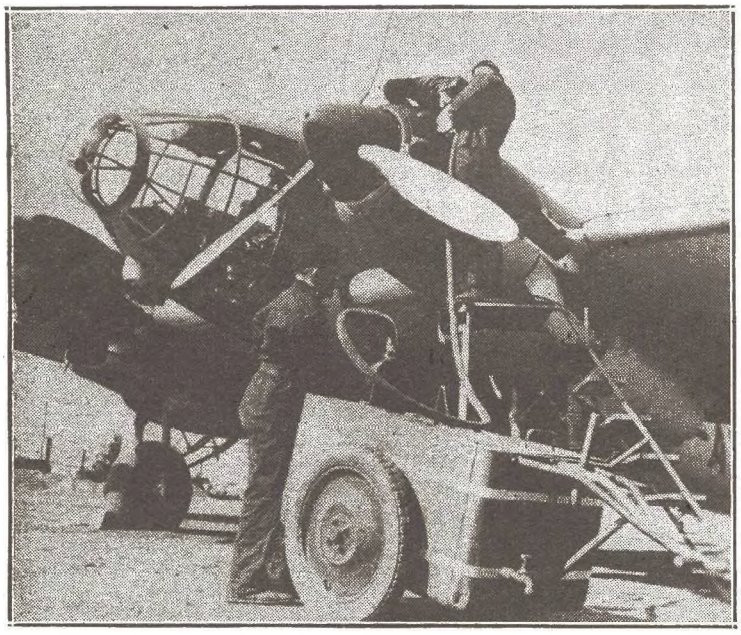
The last stroke, and she's finished. Production at Heinkel is so rushed that jobs such as painting are left until the very last. The main thing is to get 'em done.

Below: As with other countries, Germany is constantly seeking to improve designs. Here, Prof. Ernst Heinkel confers with one of his engineers in a wind-tunnel.



Last-minute adjustments. Before a test flight, Dzus-type fasteners are twisted and metal cowls are locked in place. Note large exhaust ports on Daimler-Benz.

WITH HEINKEL



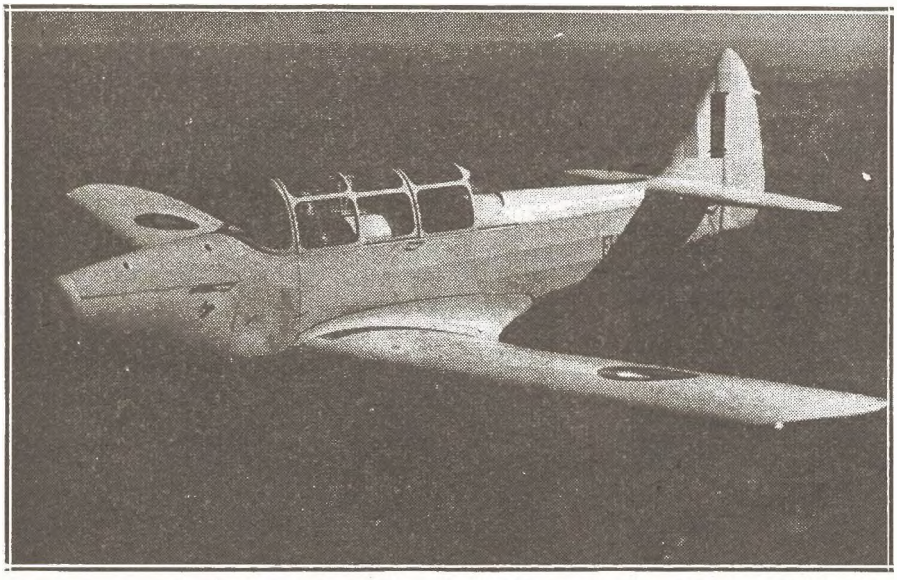
For the first time, oil is poured into the tanks of a newly-completed machine. Just off the production line, no time is lost in preparing it for flight and early delivery to a service squadron. The Germans are very proud—and rightly—of their highly efficient production system.

Professor Heinkel inspects the new ship before its maiden flight. With him are Chief Engineer and test pilot. Note generous panelling of the gunner-bombardier's station in the ship's nose.

"Wunderlich!" exclaims the test pilot after a shake-down flight. With his Okay on the ship, the Luftwaffe ferry pilot climbs up and takes it to the front—ready to go on a bombing trip.

Ernst Heinkel rewards employees who perform faithful service, such as turning in ideas to help speed up production. Awards are made monthly. Below: Herr Heinkel, though aging, keeps fit by daily mile run. It is reported he can out-race many younger employees in anything over half a mile.

MODERN PLANES ALBUM



FAIRCHILD CORNELL

FAIRCHILD CORNELL

IDENTICAL to the Army Air Corps PT-26, which was developed from the earlier PT-19A, the Fairchild Cornell is being delivered in large numbers to Canada where it is to be used as the standard RCAF primary trainer. The machine is being manufactured not only by Fairchild but also in Canada under license.

The Cornell has been completely equipped for night and instrument flying and thus offers the combined advantages of a primary and basic trainer. The ship has a quickly-removable blind flying hood in the rear cockpit, generator for electrical equipment, and complete blind flying instruments and equipment.

The fuselage is a simple welded steel tube structure with fabric covering on the sides and bottom; the engine is faced with removable metal panels, and the turtle deck consists of a metal structure which may be removed. Stowage space is provided under the forward section of the turtle deck. A truss-type crash protector is located between the cockpits, to protect the crew in case of accidental turn-over while landing.

The cantilever wing is placed in the low position and is faired smoothly to the fuselage. Covering is plywood, and two spars are used in construction. The ailerons are welded steel tube structures and are faced with fabric.

Power is supplied by an air-cooled in-line Ranger 6-440C-5 engine of 200 h.p., which is an increase of 25 h.p. over the PT-19A. Performance figures have not been released, but it is believed that the top speed is about 150 m.p.h.

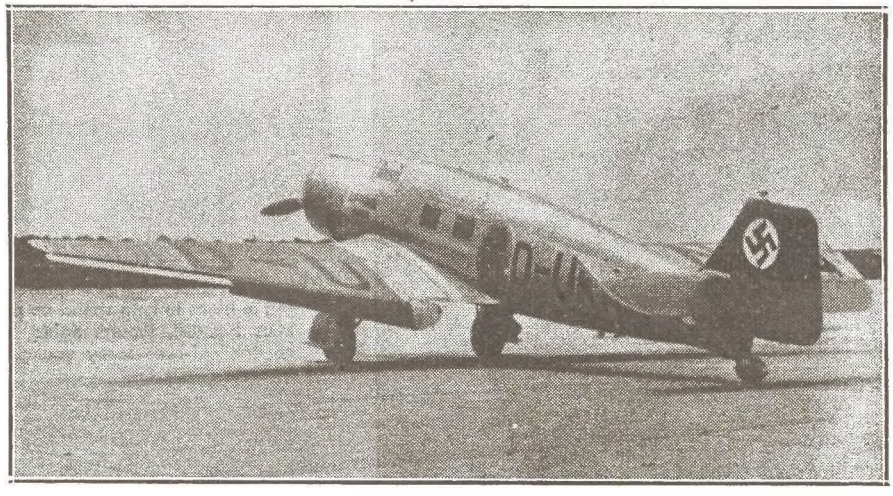
Other data: Span, 35 feet 11 inches; length, 27 feet 8 inches; height, 7 feet 9 inches; wing area, 200 square feet; range, about 500 miles; ceiling, approximately 17,000 feet.

JUNKERS JU. 160

ORIGINALLY DESIGNED as an express transport, the Ju. 160 is now used by the German Air Force for communications and military transport purposes. The ship is very similar to the Vultee V-1A of several years ago.

The oval-section fuselage is a metal monocoque structure consisting of four longerons and transverse frames; covering is smooth metal sheet. A crew of two and six passengers are accommodated, entrance and exit being through a swinging door on the left side of the body aft of the wing trailing edge. The horizontal stabilizer is braced externally by inverted "V"-struts. Note how the vertical fin and rudder have been chopped off almost straight on top. This undoubtedly makes for poor airflow around the tail.

The all-metal cantilever wing is attached in the low position and is covered with corrugated metal sheet. Construction consists of two girder spars and main and auxiliary ribs. The entire trailing edge is hinged, in the usual Junkers fashion, the outer portions acting as ailerons and the inner sections as flaps. The landing gear legs are fully retractable folding up and in to the wing center section. Retraction is by hydraulic pressure, but a manual system is installed for use in the event of damage to the automatic method. The tail wheel is fixed and streamlined.



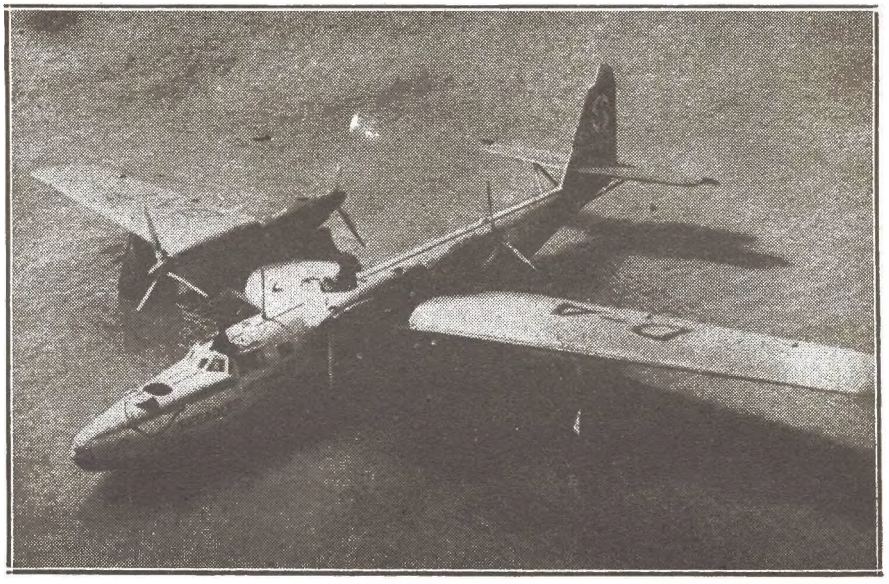
JUNKERS JU. 160

Power is supplied by an air-cooled radial B.M.W. 132A engine of 670 h.p. at 2,050 r.p.m. at 2,950 feet, giving a top speed of 211 m.p.h. at 3,000 feet. Cruising speed is 180 m.p.h. at 6,232 feet, and landing speed is approximately 68 m.p.h.

Other data: Span, 46 feet 9 inches; length, 39 feet 4 inches; height, 13 feet 2 inches; wing area, 377 square feet; empty weight, 6,105 pounds; loaded weight, 7,810 pounds; rate of climb, 885 feet per minute; cruising range, 745 miles.

DORNIER DO. 26

GERMAN INGENUITY is certainly apparent in the design of this machine. For while the hull is of somewhat orthodox lines, the power plant arrangement is unique. Two tractor and two pusher engines are installed; the tractors are set in the wing leading edge, at the apex of the gull, and the pusher plants are immediately behind and streamlined with the tractors. These pusher engines are not faired or braced to the wing to their full length, as in usual arrangements, but are mounted free aft and may be raised 10 degrees to avoid water spray on take-off. From a head-on view, the Do. 26 may easily be mistaken for a twin-engine flying boat. Like many other German seaplanes, it may be catapulted from a mother ship. The military conversion is called the Do. 26K.



DORNIER DO. 26

The hull is a two-step affair and is of all-metal construction with eight water-tight compartments. A crew of six is normally accommodated in the military model. The front gunner is in a covered turret and is provided with a single 23mm. cannon on a swivel mount. The control cabin is directly to the rear, with provisions for pilot and co-pliot. The radio operator and navigator are aft of the control cabin, and on a line with the pusher engines are two machine gun blisters, one on either side of the hull sides. As far as can be determined, no channel guns are mounted to protect the bottom of the plane. Complete living quarters are provided for the crew.

The wing is attached in the high position and is fully cantilever. The center section, which is integral with the hull, has two spars, with the engines mounted at their extremities. The leading edge of the outer panels is tapered and the trailing edge is straight. Lateral stability when the plane is at rest on the water is provided by retractable floats. The vertical fin is balanced and the horizontal stabilizers are braced by inverted "V"-struts. The tail group is covered with metal and fabric.

Power is supplied by four liquid-cooled in-line Junkers Jumo 205C engines of 600 h.p. each, giving a top speed of 210 m.p.h. Cruising speed is 140 m.p.h., and landing speed is 68 m.p.h.

Other data: Span, 98 feet 6 inches; length, 80 feet 6 inches; height, 22 feet 6 inches; wing area, 1,290 square feet; empty weight, 22,490 pounds; loaded weight, 44,100 pounds; cruising range, 5,600 miles; service ceiling, more than 25,000 feet.

HEINKEL HE. 116

HEINKEL HE. 116

LIKE the Dornier Do. 26, the Heinkel He. 116 was originally designed as a commercial plane. It was built by Ernst Heinkel *Flugzeugwerke G.m.b.H.* and was sold to Japan and Russia in large numbers. As a commercial plane, it carries a crew of two and eight passengers. Employed as a communications machine by the *Luftwaffe,* it is said that both Japan and Russia are using the type for bombardment purposes.

The oval-section fuselage is of all-metal construction and is built-up on the usual transverse frames and longitudinal stringers; covering is smooth metal sheet. The nose is well streamlined, and the pilots' windscreen fairs smoothly with the fuselage. Night flying instruments and two-way radio are installed. The tail group is cantilever on some models and externally braced on others. The rudder and elevators are balanced and are faced with fabric.

The elliptical wing is attached in the low position and is of metal construction. A cantilever unit, the wing uses two spars and main and auxiliary ribs; covering is smooth metal sheet. The center section is integral with the fuselage and carries the engines and undercarriage, and the outer panels are bolted on at a point slightly outboard of the engine nacelles. The entire trailing edge is hinged, the inner portions acting as flaps and the outer sections as ailerons. The landing gear legs retract by hydraulic pressure.

Power is supplied by four in-line Hirth HM. 508G engines of 270 h.p. each at best operating altitude, giving a top speed of 233 m.p.h. at 9,840 feet. Cruising speed is 198 m.p.h., and landing speed is near 70 m.p.h.

Other data: Span, 72 feet 2 inches; length, 44 feet 11 inches; height, 12 feet 5½ inches; wing area, 677 square feet; empty weight, 9,592 pounds; loaded weight, 15,686 pounds; rate of climb, 820 feet per minute; cruising range, 2,795 miles.

In the Slipstream

That Yank-Jap Ratio

Seems that our air service experts differ when it comes to rating Mr. Yank Sky Fighter. One declares he's shown himself to be the match of any three Jap airmen, another says any five, and still another any six. For us, this is a disagreement where we all win—because it's poison to the Hon. Hiro no matter how he slices it.

New Aero Curricula

We're especially pleased to report that the ATCA—Air Training Corps of America—is really revvin' up a topflight aero program for you lads. Fully 500,000 high school juniors and seniors in the East will start these technical aviation studies in September, and a national program is to follow. Looks great! What's more, another plan is under way to teach aero fundamentals in all grade and high schools. Yes, it took a war to wake up the "powers that be." But give 'em a hand. They're now going to see to it that you fellows get solid aviation schooling.

"They're Wrong" Department

Military Writer Fletcher Pratt says: "In the last war, A-A fire shot down one plane to every five downed by fighters." He's wrong. Actually, it was a rarity when A-A's knocked off any aircraft in World War I. . . . Columnist Sid Skolsky writes: "Nevil Shute designed the R-101 dirigibles in the last war, when England was trying to compete with Germany's Graf Zeppelin." He's mistaken, too. The R-100, R-101, and G.Z. were all products of the late '20's, not of the last war. . . . Joseph Rubin, of New York, suggests that main power station switches be pulled to douse lights and thus warn people of air raids. He's 'way off. Even if it could be done (which is doubtful) too many electrical services needed at such a time would be gummed up, for the lights aren't the only things on power circuits. And what if a raid came when home people had no lights on?

Salient Slants

It now comes out that Jap planes flew over the Philippines several nights before December 7, were picked up by detectors, and on one occasion were chased by Yank pursuits—which makes the doze of our Army and Navy chiefs at Pearl Harbor more screwy than ever. . . . Have there been other Ace-in-a-day men besides O'Hare? Telling of initial successful action with new B-17 tail-stingers (twin 50-cal. guns), Lieut. R. Meyer says: "One of our Fortresses alone got five and perhaps six Zeroes within a few minutes." And the implication is that a single tail-gunner did this job. If so, that man, whoever he is, should quickly be given top public honors. . . . Of one Yank bombing show, a war correspondent reports: "Our flyers were in formation and determined to keep it even if it meant going through more anti-aircraft fire, though all except the leader had dropped their bomb loads." Comment: Formation flying is swell—but this seems like one case where the risk wasn't worth it. Planes and pilots are too precious. . . . We like Secretary Hinckley's pointed new slogan for Victory in the air. Cold, but effective, it's just three words: "Fly or die!"

Lighter Bits

Some New York lads who were practicing "bombing" by dropping loaded paper bags off the Brooklyn Bridge have, sad to say, met the "enemy." We mean cops snagged 'em. . . . Special American Eagle Squadron citation is the "Order of Prang" (Eagle lingo for crash). It's a large wooden cross, which must be worn for a week by any flyer who damages a plane as a result of bone-head tactics. . . . "I was never nervous, up there flyin' and fightin'," said an RAF pilot the other day, "until after I saw that movie, *A Yank in the RAF*." . . . Workers at North American of Texas are admonished not to be "Ferdinand Fuddlebrains." Ferdy, they say, is the sort of guy who'd bring a plane off the line with two left wings. . . . New York stores now bear air raid placards reading, "Illumination is required to be extinguished, etc." My gosh, some places may be wrecked before the owners have time to translate that. They should've used plain English, like "Lights must be turned off."

About Aces

Ryan School Cadet to Lieut. Colonel in three years! That's the record of *Ches Peterson*, Eagle Squadron Ace now joining up with our AAF. . . . *Bob Sewell*, of Boston, 9-victory man with the RAF in World War I, is now an AAF captain. . . . *Capt J. Villamor*, Filipino Bataan DFC man, was brought out by that Royce flight and will have more cracks at the Japs. . . . Reported earlier as killed in action, *Helmuth Wagner*, Nazi Ace with 47 victories and the man said to have bombed Buckingham Palace, is now figured to be prisoner of the Russians. . . . Nazi Aces reported killed on the Eastern Front: *Lieutenant Rieder* and *Squadron Leader Hegen*, both 50-victory men, and *Lieut. Edouard Meyer*, who held the Knight's Cross of the Iron Cross.

On the Fighting Fronts

As of April 3, the AVG "Flying Tigers" were credited with more than 200 Nip planes with a loss of but six. . . . Those red discs at the center of the star insignia on U.S. warplanes are being removed—so there'll be no confusion with the Japs' red-ball cocarde. . . . Russia claims a toll of 221 Nazi planes for the two days, April 4-5. . . . More than 18,000 Indian students responded to a recent call for 350 Indian Air Force volunteers. . . . The RAF now drops 2-ton bombs containing 30 times as much explosive as 15-in. shells. . . . Malta's defenders are breaking all the A-A records. It's said they've "frequently shot down entire formations of dive bombers!" . . . According to Nazi prisoners, Adolf's airmen are now getting but three to six months of training. There are said to be 74 German pilot schools. . . . A new method of aerial attack is reported to have been used in that memorable February 20 engagement in which fighters from one of our carriers accounted for 19 Jap bombers. The technique is a secret.

On the Home Front

Several coastal sub sinkings are now credited to tip-offs by patrolling CAP flyers. . . . U.S. paratrooping, gliding, and the rest, are now combined in a single Air-Borne Command. Top man is Col. Bill Lee. . . . Our major Pacific Coast plane makers have banded together in a special Production Council. Cooperation for Victory! . . . Flying Fortress production has been doubled since Pearl Harbor. . . . Men who should know say we'll really build more than 60,000 military planes this year. Production was put at about 3,500 per month as of April 1. It'll soon be well over 5,000. . . . Nearly 90 of the country's 350 airliners have been given over to the War Department to carry military cargoes and personnel. If you get to fly on one of the remaining 260, you'll find your window curtain pulled down when passing strategic areas. . . . To save valued metals, Curtiss will turn out wooden war transports and North American a trainer (the AT-6) needing less than 2 percent of scarce alloys. And Timm's plastic-plywood "Aeromold" trainer seems a good bet to get the Navy's okay.

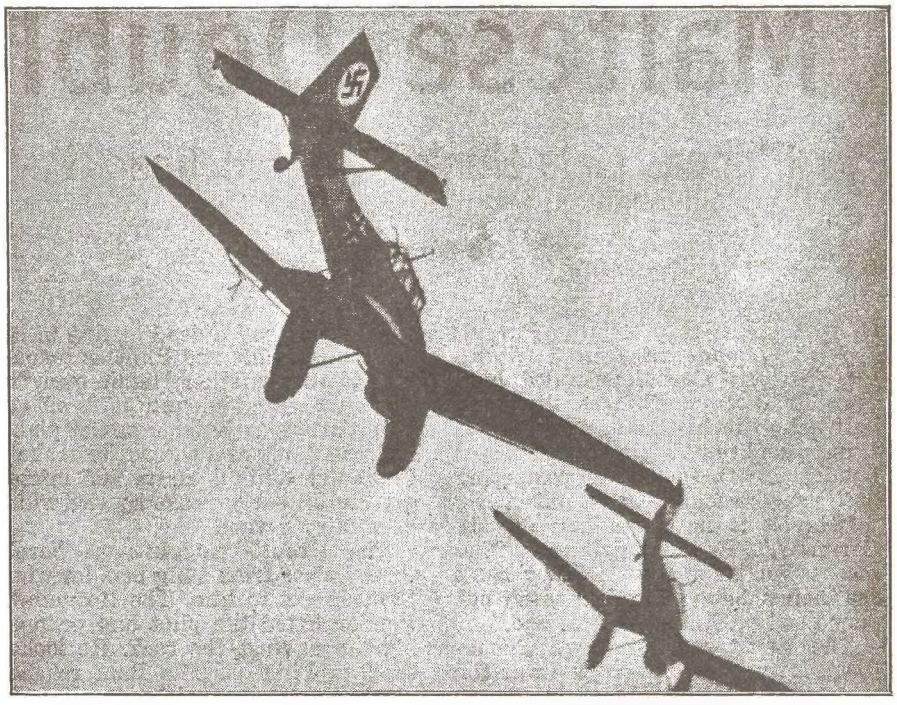
Personal Patter

Major General Fechet, Army aero veteran and second chief of our Air Corps, has been recalled to duty. . . . *Wrong-Way Corrigan* is now ferrying planes for the Army, "and," says he, "I'm flyin' 'em the *right* way." . . . *Tyrone Power*, who recently tried to get into our Navy sky service, was mighty surprised when he learned his being married would keep him out. He should have stayed on as the *Yank in the RAF*. . . . *Fritz von Opel*, pioneer German rocket-plane builder, has been nabbed in Palm Beach, Fla., by the G-Men. . . . *Major von Parseval*, dirigible inventor, who built those "sausage" observation balloons for the Kaiser in World War I, died the other day at the age of 81. In peacetimes, he sold his motor-driven non-rigids all over the world. . . . Dead

(Continued on page 70)

Penetrating the years following this war, our author visualizes gigantic air attacks of the next great World War!

by CHARLES YERKOW



Although effective in the present conflict, dive-bombers will in the future be outmoded. Emphasis will undoubtedly be on heavy machines.

Nothing but Airwars in the Future

NO WEAPON exists which is actually effective against mass air raids. Properly carried out, initial air attacks clear the path for the next wave of bombers which can at will destroy communication and transportation centers. The next wave can blast at supply depots, personnel training grounds, and sectors of mobilization. Official accounts prove that airpower has been the most devastating weapon in this second World War, and the supremacy of the warplanes over surface weapons has also been definitely established.

The role of airpower is all-important because of the nature of modern warfare. The enemy must be overcome swiftly. This rule has not evolved through humanitarian instincts of military strategists but is merely a necessity caused by the many changes in war equipment. Today an army must reckon against mobile units possessing heavy fire-power, making trench warfare almost entirely obsolete.

The importance of overcoming the enemy as swiftly as possible was demonstrated in the very early part of the war between Germany and France. German motorized divisions cut through France in a matter of a few days, then proceeded to hammer against poorly supported and poorly equipped British divisions at Dunkirk. Throughout these German thrusts the responsibility for ultimate victory rested on the shoulders of the German Luftwaffe. If the planned moves and attacks of the ground forces had suddenly found themselves without support and cooperation of the air force, it is doubtful whether Germany would have ever found the time and manpower to open her eastern front.

Airpower alone *will not win wars.* In order to hold a newly won position it is necessary to use surface forces—infantry. However, airpower is the one weapon which can facilitate invasions of the enemy territory and which can drop parachute troops and which can see to it that air-borne troops arrive in time as reinforcements.

In a talk a few months ago a U.S. Army officer maintained that airpower is over-rated, and he proceeded to outline the importance of foot troops in time of war. Recently this same officer again spoke, and *again* he maintained that airpower is over-rated—*again* stressing the importance of infantry. Whether his opinion was a biased one is difficult to determine; he was an officer in the first World War, serving in the infantry, and at present commands an infantry division. He might be talking, then, to instill confidence into his men—yet who can deny that every major successful offensive in the war has been carried out under full or part support of air forces?

Airpower has the farthest short-time reach of any military weapon. The only effective counter-weapon is a greater or more effective air force. Such being the theorem, it is but natural for every conquest-minded nation in the future to exert every effort toward building up vast resources, training centers, manufacturing plants, maintenance and repair depots, laboratories—all for the ultimate goal in out-doing all other nations in creating and maintaining vast and powerful air fleets.

Airplanes in the present war are known to reach speeds of four and five hundred miles per hour; a war twenty years from now might unveil long-range heavy bombers with speeds of eight hundred miles per hour in lever flight. Imagine the type of interceptor needed to fight against such a bomber, and, better yet—imagine the forms and methods of air raid warning necessary under such war conditions!

Characteristically, air fleets will be the first to open offensives in the wars of the future; two-thousand-pound bombs might rain down on cities as the two-hundred-pounders rain today.

The picture truly takes on gigantic proportions the longer one mulls over it. Perhaps a man with a fiction mind could paint a ghastly or an inspiring canvas, perhaps he could write an intriguing story or article as to how the wars of the future will be fought and won and lost. But whatever he paints or writes would include some form of powerful air weapon streaking across the skies in units probably numbering thousands.

The airplane has jumped a long way from the days of Kitty Hawk, and it will jump a longer way in another ten or twenty years—when the *third* World War shatters everything we were capable of imagining in the first and second World Wars! THE END

Maltese Double-Cross

Phineas Gets Hunk as a Hunchback!

by Joe Archibald

"A FLIGHT, Ninth Pursuit Squadron, United States Air Corps, patrolled high over Thiaucourt. Phineas Pinkham, half asleep in his Spad, wondered if it happened to be some kind of Kraut holiday, for there were no competing battlewagons visible to the naked eye.

"Maybe it is groundhog day in Germany," Phineas grinned. "The mechs won't come out if they can't see their shadow. The sun wasn't out very good until ten minutes ago."

The flying wonder from Boonetown, Iowa, forgot about the war for a moment and thought of his financial worries. Babette was having a birthday in just a few days, and here he was as flat as the proverbial flounder—and as far as he could see there was no immediate opportunity in which to promote some coin of the realm.

"It is a disgrace the pay we get," Phineas groaned and followed Captain Howell back toward Bar-Le-Duc. "For riskin' our lives we git a bar on our shoulder and a ribbon clerk's pay. They make us buy our own chow and our clothes. We should write our congressmen. Huh!"

Phineas suddenly saw Howell waggle his wings. He broomed the sky with his big optics and saw a couple of enemy crates diving on a balloon that rocked on its moorings near Lerouville. "A" Flight sailed in and Howell popped a Jerry that tried to climb after pulling out of his dive, and the Teuton found out that the Law of Gravity threw the book at a citizen who had a dead engine in his lap. Bump Gillis and Phineas teamed up and rode another Heinie over the Meuse, knocked enough parts off the Kraut's bus to build a model plane, and the Jerry went down to make a fair catch at real estate and missed getting an early grave by the width of a fairy's wand.

The Kraut's noggin was barely three inches from a big boulder when Phineas got to him. The Boonetown wonder lifted the pilot and propped him up against the rock. He looked dead to Phineas. The Bam reached inside the man's tunic and pulled out a big wallet. In it was a picture of a blonde and a little wad of Heinie currency.

"I'll make sure if his skull is fractured," Phineas said and unstrapped the Kraut's leather casque. "This is another scalp I will hang up in my hut as a souvenir, anyway."

The Potsdam pilot stirred, opened his eyes when Phineas took the helmet off his little square head.

"Wee gates, mine hair," Phineas grinned. "One guy has to lose, huh? Wass is lost except your memory?"

"*Ach*," the hostile pilot gulped out. "You need nodt stay so far from me, *Amerikanischer* I haff nodt der Luger undt if I did I vould not haff der strength to pull der drigger."

"Why, I am right beside of you." Phineas looked at the Heinie's peepers. "Haw-w-w-w, that descendu crossed your lamps and stigmatized them, didn't it? Well, if you do not git cured, you can git a tin-cup and some pencils and find a good corner near the Wilhelmstrasser, huh?"

Several Yank troops came down a hillside and hurried to the wreck of the Halberstadt.

"Take Fritz to the nearest healing hacienda," Phineas chirped.

"*Himmel*, I am lucky yedt," the little pilot said as he pulled something from the pocket of his leather flying coat. "They did nodt break, mine spectacles."

"They must be short of Krauts over there," Phineas opined. "As long as they have a seat to put in a crate's office, and two arms and two legs—well, I must be gettin' home. I'll see you in the next war, little chump."

"You vill never liff until der next one, *mein freund*," the Kraut spat at Phineas. "You are Pingham, *hein?* I tell by der funny face mit der teeth like der keys off der piano. Der Baron von Heinzhund vill kill you vhen he fights you. Only for your death does he liff. So far you run efery time you see him, *nein?*"

Phineas felt a tingling in his pate. He looked at the wrecked Halb and made out the insignia on the crumpled fuselage—a three-pronged pitchfork jabbed through Uncle Sam's hat. The Halberstadt Hellions from Homberg, the Allied pilots called the Baron von Heinzhund's Circus. Up to June, 1918, the Baron had personally accounted for 60 Allied planes. Within the next three months, it was prognosticated by pilots who had been lucky enough to duck his bullets that he would kick the late von Richthofen's record into the alley.

"Your tricks, *mein freund*," the Kraut pilot said. "Bah! More than so many times ist der pitcher carried to der vell before it comes dry, undt once too many times a bummer like you cries der volf vhen there ist no volf. Ha! Der Baron he is ready for all der tricks."

"Take him away," Phineas yipped at the doughs. "Say, Sarge, could you lend me ten francs?"

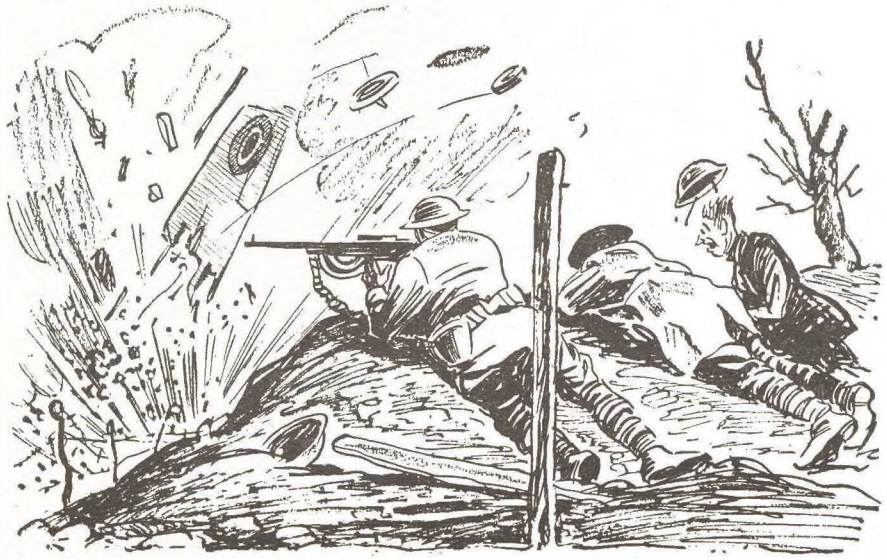
"If you can't live on a looey's pay," the big non-com sniffed, "how have I got dough to lend you? Look up the insult I git every month."

"I only asked and you don't have to git sore," Phineas mumbled and trudged through the goat pasture to his Spad. Half-way across, he stopped and stroked what little chin he had. He eyed the white horse in the field. A full-grown idea walked up to him, rolled up its sleeves, and hit him squarely between the eyes.

"Napoleon had a white plug," Phineas mused. "Huh, I wonder if— I saw that new ackemma combing out a rabbit's foot last night. Casey always throws dirt over his right shoulder before we go out on patrol. Well—"

Lieutenant Pinkham climbed a

Car-r-r-ump! The Big Bertha hate-pellet landed flush on the Spad's empennage and sent the sky buggy flying in a thousand pieces. Phineas had just landed the ship!



"Haw-w-w-w!" laughed Quasimodo Pinkham as the forest caught fire. "Archimedes didn't do no better against those Syracuse sluggers than Pinkham has against the Heinie hurtlers!"

fence and approached the dobbin. It was docile enough as Phineas stroked its nose. Having struck up an acquaintance with the Frog equine, he took out a jackknife and went around to the rear of the horse. He cut off some of the tail and put it in his pocket.

"MAYBE BABETTE will get that string of pearls now," Phineas said later as he flew to the drome. "I ought to raise the argent awright."

Lieutenant Phineas Pinkham cached his latest Boche scalp in his hut, then slicked up for mess. When he arrived, Major Rufus Garrity was discussing the Homberg Hellions. He was reminding the pilots that the Boche Circus had just about hogged the spotlight in the sector, that the Baron was a serious threat to flying morale, that even the pilots training at Issoudon were feeling the effects of his depradations.

"There isn't one man alive—I'll say two men—who can beat that guy in a dogfight," Garrity said, banging his fist down on the table. "He can do more with a crate than a cat can do with a chunk of liver. He's got to be stopped, understand? You got to get him in a pocket; gang up on him."

"Nobody is invincible," Phineas sniffed as he sat down. "Once the Waterloo High School had a fullback who couldn't be stopped. Me and another guy trapped him in the big game and put him out in the first quarter. If we knew ahead of time what was goin' to happen—"

"Huh?" Howell grunted.

"Oh, I was just thinkin'," Phineas said. "Babette told me of an old doll who can see in the future and tell what will happen to you long before it happens. She sells luck charms, too. They are guaranteed to work."

"Nuts!" the C.O. said. "That is all so much bushwash."

"Yeah? Wouldn't you want to know where you were going to die?" Phineas countered.

"So what?" Garrity howled. "Would that save me?"

"Sure. You wouldn't have to go near the place," Phineas grinned. "Haw-w-w-w-w-w-w-w! I just mentioned it, is all. I'd like to see the old dame, anyway. Every little bit helps when you are losin'."

So Phineas sowed the seed, for he knew that there is a grain of superstition in every human being. That night he rode into Bar-Le-Duc on a bicycle and called on Babette.

"Bon saw," Phineas greeted his torch. "I need help, mon cherry."

"So they try you in ze courts encore, *oui?*" the French girl said, shaking her head. "Who you keel or rob now?"

"It is only some clothes I would like to borrow," Phineas said. "I am going to have ze fun with my pals out on the drome. Here is what you have to do, as I am supposed to be your aunt. Comprenny?"

"*Non.* It sounds vary stupeed. Some day you get Babette in ze basstile," the girl said.

Phineas put on an act that softened Babette's heart. He told her he was sure he was getting the air, that she had given her affections to another. He would end it all. Babette was a pushover for Phineas when he put on the Barrymore stuff, and in a few moments she was in his arms and assuring him that she would stab the mayor in his bathtub if Phineas asked her to.

"That is like my Babette," Phineas said, and he got down to brass tacks.

Three nights later, Lieutenant Bump Gillis entered a little empty house a block away from Babette's flat and nodded to a little old French woman who had taken over for a while. There was a sign on the wall that said:

MADAM APPOLINAISE
Palmist, Chiromancer, Mystic and Medium
I Read Your Mind, Your Palm, Your Head
Prices Reasonable

"Yeah, I don't believe all this mullarkey," Bump said. "I just am curious. Will I live through the guerre?"

"You are of Scotch descent," Phineas, alias Madam Appolinaise, said in a falsetto voice. "So you are stingy with your life, it will be a miracle if you give it up."

"Say, I *am* Scotch," Bump grinned. "You are no fake, I bet. I heard you got luck charms to sell that—"

"*Oui, mon ami.* Little tufts of hair from ze horse of Napoleon," Phineas chirped. "Just two or three, but ze

price ees so reasonable, yes, no?"

"But he didn't have no luck," Bump said. "He got licked and was sent to Elba."

"*Oui*," Phineas replied, thinking fast. "But ze horse didn't, *non?*"

"Uh huh," Bump said. "How much is ze horse's hair?"

"Feefty francs," Phineas said and pulled his hood closer about his head. "Ah, eet ees cheap."

"Okay, it is a deal. A guy's got to make sure in a war."

"Notheeng weel harm you now, mon brave soldat," Phineas said and consummated the deal. "But you got to keep eet ze secret. Show eet to anyone an' ze charm dies."

"I will remember, Madammey," Bump said and made his exit.

"Phew!" Phineas tossed out. "What a sucker. That von Heinzhund has them gaga. I wish I knew what would save me from him."

TWO OTHER customers came to see Madam Appolinaise that night, Captain Howell and Major Rufus Garrity. Then Phineas closed up for keeps, returned the clothes to Babette, and walked out of Bar-le-Duc with 180 francs in his pocket.

Two hours after the dawn patrol, in which the Ninth Pursuit had taken a pounding from the Halbs, "A" Fight got ready to carry on. Bump Gillis and Captain Howell grinned expansively as they walked to their Spads. The C.O. stood in the doorway of the farmhouse, pounding his chest with his fists.

"Ah, so they lick us the first time," the Old Man exclaimed. "So does that mean they'll keep winning? No! Let's not be downhearted! We *can't* lose!"

"Gits me," Sergeant Casey told a mech. "Up until this morning the Old Man looked like his mother-in-law had moved into a Nissen next door to him. Now he is as sure of winning as a gorilla is when he backs a little ant eater into a corner. And look at them guys there, Howell and Gillis. They look like they was startin' out to attend a party in a Vassar dormitory."

"Wonder where they got the cocaine," the mech said.

"Let's go," Bump yelped at Phineas. "Let's rip 'em up an' tear 'em up."

Bump Gillis took-off, did not clear the trees at the edge of the drome. He turned over twice and pancaked in a clump of bushes. The C.O. ran across the tarmac, fell over a dog that had managed to get into the drome, and landed on his prop boss. He broke his upper plate and smashed his pipe into little bitty pieces. Sergeant Casey helped pick him up and take him to a medico. The Old Man was a little delirious when he submitted to first-aid. How the iodine burned!

"I'll see the authorities in Barley Duck! It is a disgrace that fakirs are allowed to rob the A.E.F.! I will expose that old rip! Eighty francs—oh!"

Lieutenant Gillis was brought in for repairs ten minutes later. A coil of horsehair hung from around his neck and the Yank first-aid expert eyed it curiously.

"A lock of a dame's hair, huh?" he said. "This guy must be goin' to marry a grandmother of a daughter of the revolution when he gets back. Oh, I am sorry. Maybe it is his mother's, or grandmother's, hair."

"Herr Dobbin, ol' boy," Phineas said to the Frog equine, "you won't miss these tail feathers an' they'll help me!"

The C.O. saw the luck charm, too. He fished into his pocket and drew out an exact duplicate.

"Yeah! Luck charms from that old crone in Barley Duck!" Garrity roared. "By-y-y cripes, I'll— Oh, if the whole outfit fell for that! Give me some aspirin, quick!"

Captain Howell did not get back until sunset. He rode in on a truck. His Spad, he told his superior, just went dead on him at the top of a loop. The next thing he knew he was in a Frog barn with the luck charm in his mouth.

"The Frog wants damages to his barn," the flight leader reported. "Five-hundred francs. Well, here is the charm to put with the other two. Were we suckers!"

"Let's have her arrested!" Bump yelped. "All that dough for—"

"It serves you right," Phineas said, grinning at the C.O. "Payin' eighty francs for some horsehair. Why, I never heard of such—er—I mean, I get you—"

Major Rufus Garrity got up slowly. His eyes narrowed to slits, he took two steps toward Phineas.

"Nobody knew how much I paid for that charm," the Old Man roared like the bull of Bashan. "How did *you* know, Pinkham? How did you know it was eighty francs?"

"Why, it was a guess. I am good at— You put that chair down!"

"GRAB HIM, Gillis!" Garrity said. "Come on, Captain. He was as broke as a seven-year-old draft horse two days ago. Search him. Search his hut! We'll prove somethin' here."

"This is an outrage," Phineas howled and tried to get through a window. Six husky pilots smothered him and Garrity made sure of it by getting on top of the heap. Two pilots were assigned to the Pinkham Nissen. They came back with a roll of currency amounting to $150.

"There you are!" the Old Man yelled when they had dragged Phineas to his feet and thrown him into a corner. "Grand larceny! Swindling! Impersonating a fortune teller without a license! This cooks you!"

"It is c i r c u m s t a n t i a l!" Phineas protested. "No jury will convict me." His tongue banged against the sides of his mouth, tripped over his wisdom teeth, and couldn't get up for a few moments. Then: "It is like a boy passing a church and he drops the groceries he went after and spills part of a sack of rice. Does that mean a weddin' took place at the church the night before? That is my defense!"

"Yeah?" the C.O. yelped. "Where would you git clothes to dress up in like a dame? Only one place, you crook! Captain, you go into Bar-Le-Duc after mess and hunt through that French trick's flat for a striped skirt and a red and blue shawl. That'll convict him. This time he gets a transfer to Leavensworth."

The scream of the siren cut in on the preliminary court martial. Everybody ducked for cover when the roar of alien props filled the sky over the drome. The machine gun out in the pit began to stutter. Phineas thought it was a good idea to escape during the confusion until he realized that Bump Gillis and Howell had each grabbed a leg that belonged to him.

"Give a guy a chance to run," Phineas yelped. "I was goin' to give you the dough back."

"Sure," Bump said. "And them planes overhead belong to Switzerland. You would steal sheep."

The Halbes strafed the drome, set a hangar on fire, and shot the heel off Casey's left shoe. The Nissens looked like the drome of the Ninth Pursuit had gone through an invasion of termites. The Homberg Hellions had struck again!

It was Sergeant Casey who

brought the old Kraut army boot into headquarters. It was filled with little rocks, and after these were dumped out a roll of paper fell out. It was a letter from Baron von Heinzhund and he wanted to know if Leutnant Phineas Pinkham would care to settle a little difference of opinion high over Triaucourt on Friday afternoon at 5:30.

"Too bad you have to disappoint him," the C.O. said. "Lucky you are going to get busted, as this saves your face and also your life."

"It will make me seem like a coward, and that will lift the German morale," Phineas argued. "They will not know their own strength and will wash you all up. This is psychology and Chaumont won't stand for—"

"You are a lousy lawyer," Garrity bit out. "Oh, don't try to crawl out. We will drop an answer for Heinzhund. We will say you was shot down and are no more."

"And he will take credit for me," Phineas choked out. "That is an outrage!"

"Why, you would think nobody could fly but him," Bump Gillis yelped, caressing his 50 francs. "I'll fight that Baron and will use a Spad with your insignia on it, you big swindler. So we will take care of our morale without anybody knowing you got disgraced and went up the river."

"Nobody but me could get him," Phineas howled. "After every game, who had his name in big letters in the box-score? It was me. Oh, I was desperate," Phineas wailed. "My dame had a birthday comin'. Give me one more chance. Sniff-sniff."

"I am touched," the C.O. said. "I feel as sorry for you as a wolf does for a lamb it caught A.W.O.L. from the flock. Boy, I am going to sink my teeth in you this time."

"Awright," Phineas said. "I have tried everything to see if you have got a heart. Haw-w-w-w-w-w! I will be safe in a nice jail while you are gettin' knocked off by the Homberg Hellions, one by one."

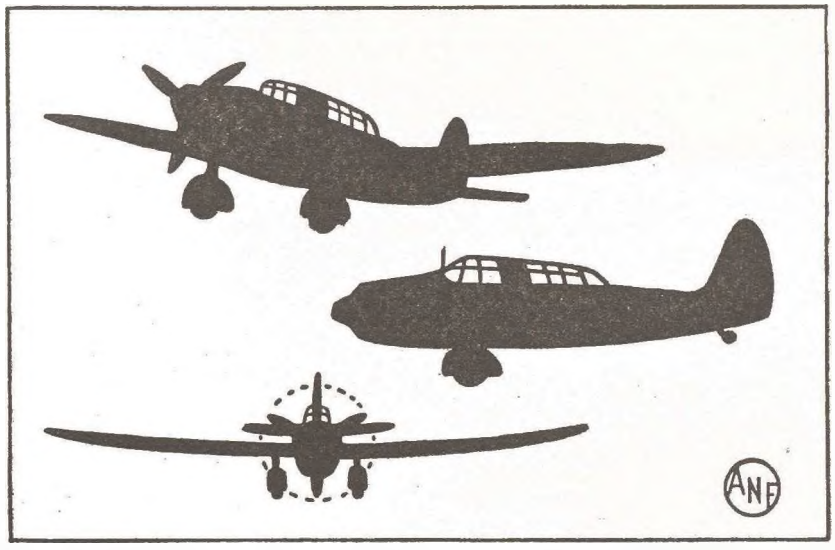
The C.O. made sure that Phineas could not get loose from the drome. He took away his flying coat, helmet and goggles, and boots. "Let him try and get into a Spad, if he happens to be able to steal one," he said. "I bet even a hillbilly hasn't got bare feet tough enough to pilot a Spad. You are under arrest, Lieutenant Pinkham!"

Phineas went to his Nissen to think things over. Everything looked jaily, all right. And just when he had begun to formulate a plan of attack against the Homberg Hellions!

There had been a dry spell throughout the continent. A couple of wells had dried up not far from the drome. Frogs were stranded on the banks of little streams and were gasping for breath. You could hear them croaking at night. Phineas thought of a certain landmark not far from Metz. When you yank a limb off a tree, it dies and gets brown, especially when Jupe Pluvius is on a prolonged strike.

Know the Enemy's Planes

NUMBER TWO



LITTLE is known of the performance of the Kawasaki 97 light bomber. A low-wing monoplane with fixed and streamlined landing gear, this machine appears no larger than the U.S. Air Corps' North American AT-6A advanced trainer, which has a wing span of 42 feet 8¼ inches, weighs 5,248 pounds, and has a maximum speed of more than 200 m.p.h.

Externally, the ship appears to be just a modification of the Mitsubishi Karigane, the main difference being the substitution of an in-line liquid-cooled engine for the air-cooled radial A.14 used in the former type and half-pants instead of full wheel streamlines. Also, it is generally conceded that the plane is really nothing more than a relatively good copy of the old Air Corps Northrop A-17 attack-bomber. A crew of two is carried under transparent canopies.

The Kawasaki 97 has been used in large numbers by Japanese forces operating against the United Nations, and it is said that the type has acquitted itself quite well, regardless of its somewhat ancient vintage. No details are available concerning its armament.

PHINEAS sauntered over to "A" Flight's hangar and a sentry kept an eagle eye on him. He went into the hangar and Sergeant Casey jumped up quick. Four ackemmas froze on their haunches and then let out pent-up breaths.

"Whew," Casey said. "I thought it was the C.O. He threatened to bust anybody who played with dice, after that last argument in the groundmens' barracks. I thought for a minute I was goin' to lose this 80 bucks I just won."

"You can trust me, old pals," Phineas said. "Maybe I'll try a practice shot. Leave them lay there, Sarge, as I pick them up myself. It is bad luck to have anybody hand you the dice."

Phineas picked up the cubes of iniquity and started to shake them in his hand. "You groundhogs beat it, as if the Old Man ever sees you—anyway you have no argent left."

When the mechs had gone, Casey said: "I'll bet you a sawbuck you can't toss a seven."

"Faded," Phineas said. He threw the dice. It was a seven. He threw another seven, and another.

"Eighty bucks, huh?" Phineas said and examined the dice. "Okay, Casey, you crook! Fleecin' poor airplane mechs. I'm goin' to take these loaded dice over to the C.O. right now. I don't mind games that are on the level but cheatin' is somethin' I won't stand for. You are a disgrace to the air corps. Sorry, Sarge, but—"

Flight Sergeant Casey was indignant. He knew very well the dice were on the level. Yet he had sense enough to know that he could not prove it to the C.O. Phineas had switched ivories and he knew it, but he would never be able to prove it.

"Have a heart, Lootenant. I got a chance to try for my wings at Issoudon," Casey pleaded. "Look, I'll do anythin' you want."

"Awright," Phineas said. "You will find somethin' wrong with a Spad in about two hours. You will wheel it out and poke into it. You will lend me a pair of them clodhoppers you wear. You have the prop turnin', and don't forget. I am desperate, Casey! I will stop at nothing. I promise to throw you these crooked dice just as I take-off."

"It's a deal," Casey groaned. "Oh,

(Continued on page 74)

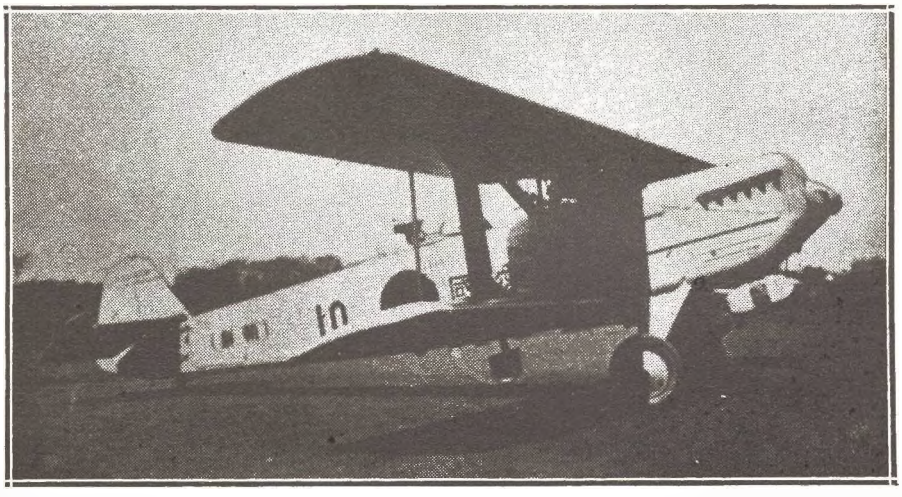
WAR PLANES OF THE AXIS

A condensation of the most recent book by F.A.'s editor, a companion volume to "War Wings."

by
David C. Cooke

A 243-page book, "War Planes of the Axis" contains 50,000 words and 172 photographs.

Right: Now obsolete, the Japanese Kawasaki 88 is still used in China. The wing span is 49' 10" and the length is 36' 11".



THE GERMAN AIR FORCE

GERMANY'S AIR FORCE was not officially constituted until February 26, 1935. And while it was then composed of only a few formations consisting of units trained in secret and in a most elementary manner during the period of demobilization, it became in the span of just four short years a powerful instrument of attack—more powerful, in fact, than the combined strength of France, England, and Poland at the outbreak of the second World War.

This expansion of German airpower was not, however, undertaken in any haphazard fashion, utilizing any planes of any make or design. Rather, it was realized in a methodical and highly efficient fashion after the Luftwaffe was at last officially organized by Hitler on March 1, 1935.

While the German Air Force was in the formative state, it is true that civil aircraft were converted to military types, and the first war pilots were drawn from the *Deutsche Lufthansa* airline company and from pilot and ex-pilot organizations whose members had been trained for transport flying by *Lufthansa* or had been given regular refresher courses. At the same time, hundreds of sport and sailplane clubs, with memberships of several hundred thousand, formed a tremendous reservoir from which future air crews and ground personnel could be drawn. From this, then, it is apparent that the so-called "mushroom" growth of German airpower was not, as far as pilots were concerned, a military miracle but actually a well-planned scheme whereby flyers were trained to some extent for war duties through the use of peacetime sailplane clubs which were, on the surface, organized for sport purposes.

By the same token, the aircraft situation is by no means a miracle as far as numbers are concerned. While this country was building a possible 53 machines of a certain design, the German experimental models were given thorough testing and, if found suitable, their designs were "locked." The ships were then put into production on a mass scale, with several factories in some cases building the same type.

Because of the Nazi conception of state government, Field-Marshal Hermann Goering had an almost free hand in developing and expanding the German Air Force. Huge sums of money were expended, completely without interference, for the mighty air armada that had been envisioned. Therein is probably the main reason for the amazing growth of the Luftwaffe into the most powerful air arm the world has ever seen. Indeed, when the English Sir John Simon and Anthony Eden visited Berlin in 1934, Hitler told them that the German Air Force was as strong, if not stronger, than Britain's Royal Air Force.

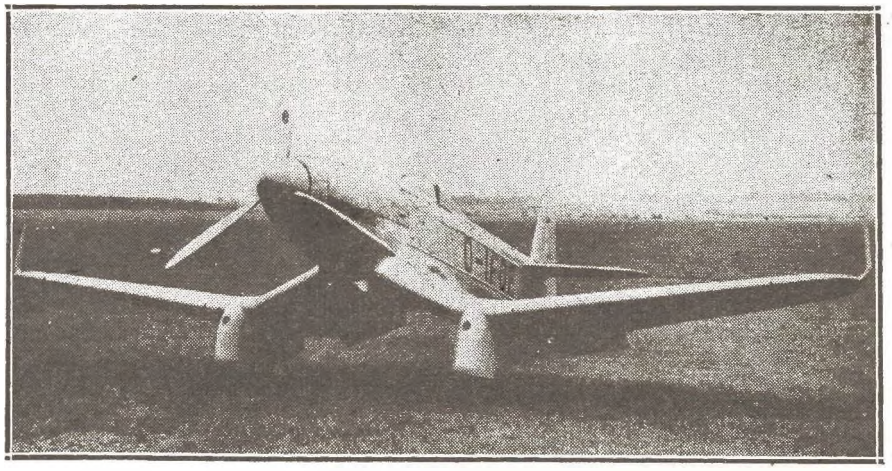
By joining General Francisco Franco's Spanish forces in 1936 the Luftwaffe was able to utilize an actual war proving-ground for testing the military versatility of German aircraft. The Nazis did not participate in that war merely out of love for Franco; they had to know if their planes were as good as they believed, if the tactics their military strategists had worked out were really effective, and if airpower was really a potent factor in modern warfare—as potent a factor as they had believed, that is. Barcelona and other Spanish cities, towns, and villages were bombed by German forces during that war, not so much to show their strength against defenseless civilian positions as to determine once and for all whether dive-bombing and pattern-bombing could be done with devastating effectiveness. They could —and the lessons of Warsaw, Coventry, and Rotterdam proved that the German line of reasoning had been correct. It is estimated that more than 50,000 German airmen saw service in Spain, thus gaining valuable experience which pilots of other countries had not. When that war came to an end, the Nazis had a well-seasoned air army and planes and tactics which had been proved in actual combat.

When the Battle of Poland began on September 1, 1939, the Germans threw an estimated 5,000 planes, or approximately 75 percent of their total airpower, into combat against some 800 Polish machines. With perfect cooperation between the Luftwaffe and other units of the *Wehrmacht*, Germany was able to dominate Poland in four weeks. Dive-bombing was specialized to a greater degree than before, and it was discovered that attacks against fleeing civilians were also highly effective. According to the German plan, modern warfare is not necessarily a battle merely between armed forces; any means to achieve complete victory were and are not only permissible but necessary.

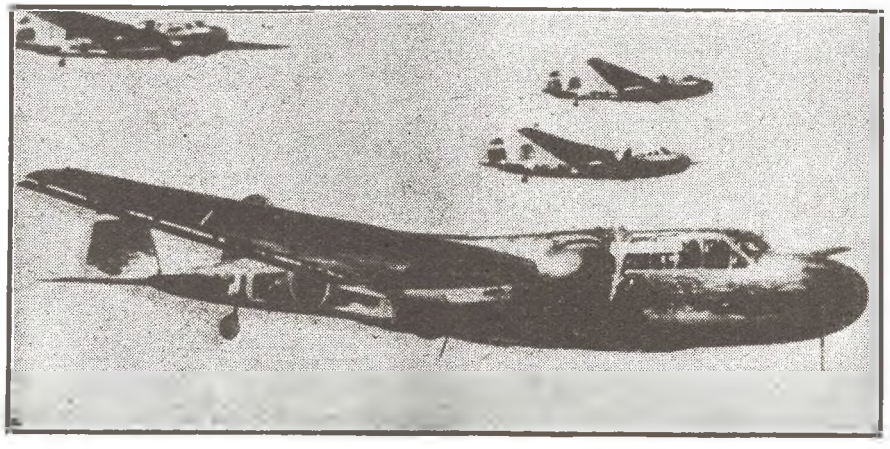
The part German aviation played in the Battle of France is well known by all who have followed newspaper accounts of the war. Aircraft were sent in droves to bomb, strafe, and

destroy all military objectives, even though they left the majority of villages and towns untouched. And it is usually said that airpower was a major factor in the defeat of France.

As even Prime Minister Winston Churchill admitted, the biggest mistake that Hitler made in prosecuting a final end to the war was the lapse of time between the fall of France and the aerial offensive against England, for the first large-scale attacks against Britain were not made for nearly two months after the defeat of France. In that period, after the evacuation at Dunkirk, the British had reorganized their beaten forces and were thus able to offer effective resistance. Too, it is admitted by the British that, had the Nazi attacks continued, despite heavy losses, the Germans would have been able to beat the English to their knees because of the overwhelming quantity of airplanes at the disposal of the Luftwaffe. Such, however, was not the case, and the British were able, through American help, to reequip their almost-depleted Royal Air Force and turn defense into offense. Further, the British strength grew to such an extent that they were able to ship 9,000 military airplanes abroad in 1941.



A single-seat dive-bomber, the Blohm and Voss Ha. 137 has a top speed of only 205. Rate of climb is 1,640 feet per minute.



Left: Classed as a long-range bomber, the Mitsubishi 96 is a military model of the commercial Soyokaze. Its top speed is 250.

The German Luftwaffe, at this writing, is made up of some 1,500,000 men, and, according to T. P. Wright of the War Production Board, more than 40,000 airplanes. (In a German-language short wave radio broadcast of recent date, the Nazis stated that they have more than 50,000 war planes in service and that new machines are being built at the rate of 2,500 per week. While this production rate may sound too incredibly high to be plausible, it must be remembered that even at the beginning of the war German factories were said to have been turning out between 2,000 and 2,500 planes per month. With factories now operating in all occupied countries, it seems logical, if this earlier figure was correct, that production could have been stepped-up to 2,500 machines per week. Germany has been geared for war production much longer than the United States, and this country's plan calls for 60,000 planes in 1942 and 125,000 in 1943, meaning a ship every eight minutes during 1942 and one every four minutes during 1943. If we are able to do this, it is entirely possible and even probable that the Germans can complete a plane every four minutes to make the 2,500-per-week figure a reality. Also remember that at the end of the last war Germany turned over to the Allies approximately 16,000 aircraft and was building at the rate of 2,100 per month. And that was before the days of pre-fabrication, mass production, or machine-made parts.)

In most countries aluminum and aluminum alloys are used to a great extent in the fabrication of airplanes, but in Germany that metal is very scarce. Because of this fact, many people could not understand how the Nazis were and are able to build so many airplanes. The answer is magnesium. While metallurgists in other countries had been experimenting with magnesium, but only sparingly because of its highly corrosive properties, the Germans developed a magnesium alloy that was highly successful for aircraft use. Magnesium salts are plentiful in Germany, and, under the German system, their utilization is very simple. This metal is only about two-thirds the weight of aluminum, so it was only logical that the Germans turned to its use for aircraft production, where weight is a premium. After France was defeated, of course, that country's aluminum deposits were exploited by the conquerors, because magnesium has its drawbacks and is not as adaptable as aluminum for many installations.

Finally, another secret of the astounding German successes in operations against France and other countries is the first law of military strategy: decentralization. There are more than 1,000 military air fields and landing areas within the boundaries of pre-war Germany alone, and this figure has been greatly increased by existing or newly built fields in occupied countries, especially in Holland, Belgium, Denmark, France, Norway, and Poland. Squadrons change their bases frequently in order to make enemy reconnaissance and attack more difficult. Because of this, it is not surprising that many Luftwaffe pilots shot down over Britain were found to be carrying suitcases; they had received orders to land at new bases instead of returning to the old ones.

Under no circumstances should we in this country underestimate the strength of the German Air Force or the ability of Nazi pilots. While it is true that the Germans lost very heavily in operations against Britain, that was only because they were on the offensive. Now that the Royal Air Force has taken to offensive missions over Germany, the list of English casualties has been almost double the losses of the defending Germans, as revealed by British Air Ministry figures. Combat records prove that German men and machines are good, and we must constantly remember that now that we are in this war to the end.

The Italian Air Force

SOME OBSERVERS have estimated that the total air strength of the *Regia Aeronautica* at the beginning of the war was approximately 4,500 machines, and still others have put the figure as high as 10,000. It is apparent from events that have occurred since that time, however, that the Italians had no more than pos-

sibly 3,500 aircraft, of which only about 900 to 1,000 were first-line combat types.

But even though the Italian airpower proved under the test of action to be almost nonexistent—or ineffective, in any event—the threat of that airpower in 1935 won for *Signor* Mussolini the first victory over the heretofore unchallenged British navy when the English tried to frighten *Il Duce* out of his Ethiopian policy with the greatest concentration of seapower since the first World War. In reference to this international chess game, Maj.-Gen. James E. Fechet in 1938 wrote the following:

"Italy began to move into Ethiopia. England disapproved. First she threatened, then she started the parade of her fleet into the Mediterranean, an old trick which had worked so well so often. The mistress of the seas had for generations a magic wand which she could wave at any peace table. She could arrange a parade of her proud fleet past the window where the diplomats sat at council at the psychological moment, and she could be sure that things would be decided her way.

"So, when Mussolini proved recalcitrant, England decided to give him the old medicine: she steamed up with the water wagons and rowed them down past Gibraltar on a leisurely cruise toward Malta and the Eastern end of the Mediterranean, with serene confidence that soon all would be well, truant Italy would be properly impressed.

"But Mussolini had a counter trick. He paraded, too. He ordered out his submarines, light torpedo sleds, and bombing planes to pass in review. What was the result of these competing parades on the same street on the same afternoon?

"England decided instantly that the cruising was much better in the Western end of the Mediterranean. The water seemed much smoother up Alexandria way.

"Try this experiment. Take the range of an Italian bombing plane as the length of a piece of string; put one end of this string down on a map at a point indicating the westernmost Italian airdrome; with that string as a radius, strike off an arc across the Mediterranean. Now you will know where the British fleet went—just outside that circle."

But why were the Brtish so dreadfully defeated in this bloodless battle? Why didn't they steam right up the Mediterranean and blast the Italian forces to bits? The answer is, largely, airpower.

The English, apparently, had not correctly estimated the importance of the Italian Air Force. Many British officers still thought of war in terms of infantry divisions, tanks, machine guns, and seapower. But then, suddenly, the realization dawned upon them that there was still another aspect to be considered—airpower. And that threat of $40,000 worth of airplane against a $60,000,000 surface vessel sent the English fleet scurrying to harbor for protection.

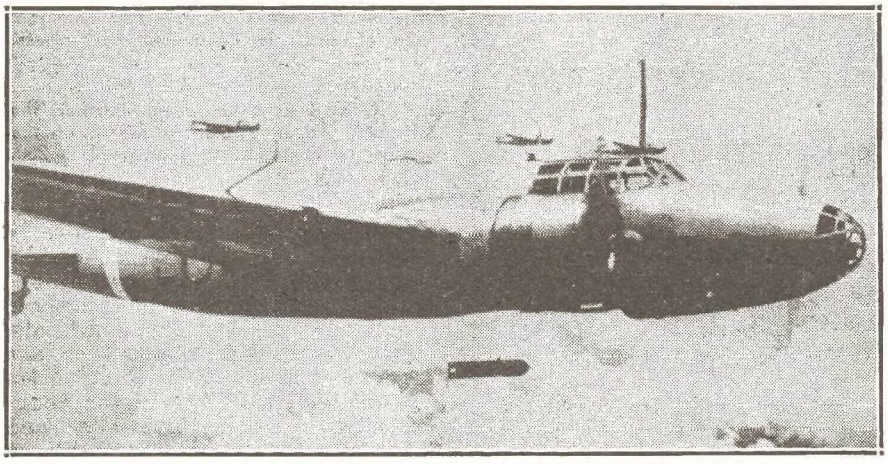
When the British made known their plan to bluff the Italians into submission, it is reported that Mussolini ordered his Air Force chiefs to call for 70 volunteers to pilot an equal number of bombing planes, each to be loaded to capacity with high explosives. The Italian Air Force commanders assigned each of the 70 chosen pilots—700 are said to have volunteered, incidentally—to a particular English battle vessel. Each flyer was to stand his bomber on its nose, dive from 25,000 feet, and crash squarely down the smokestack of a British battleship. This group later became known as the *Desperata Squadron,* and it is still in existence.

The true story of the Ethiopian campaign was never actually told outside of the council rooms of the Italian Air Ministry, but it has been learned that there was plenty wrong with the sky service as a military organization. Although it was adequate to bomb helpless tribesmen and run supplies across Ethiopia, this experience did not prove that the same machines and men could stand up against air fighters with equal training and equipment.

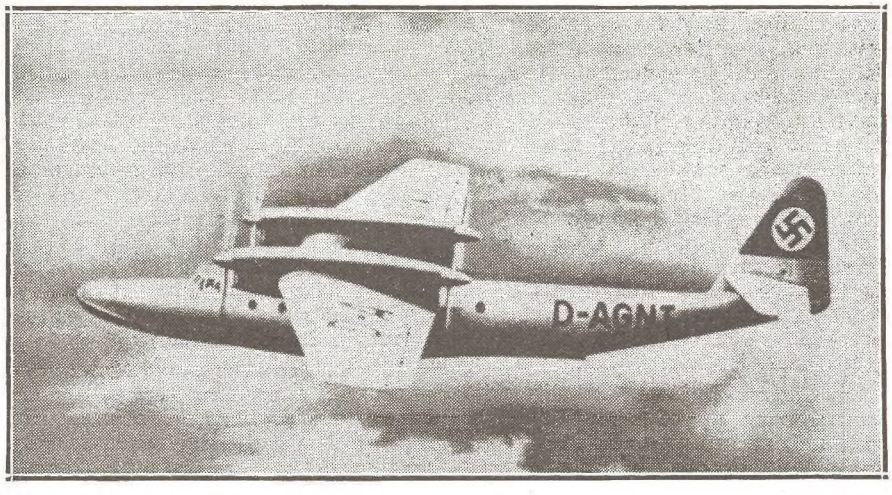
It was in Spain, not Ethiopia, that the Italian Air Force learned its real lesson. The fighter planes did not prove satisfactory; the bombers, on the other hand, were splendid, but they did not have *real* bomb sights. What was more, the Italian Air Service was let down by its engineers, although the planes themselves were excellent and the training the crews received was as good as that offered elsewhere. But because of this early power plant difficulty, today many of the newer Italian aircraft are fitted with engines of foreign design.

A study of the Italian Air Force discloses that it was not designed for home defense as much as territorial expansion. And because the Alps in the north form a natural barrier against invasion by land there were in service virtually as many seaplanes and flying boats as landplanes.

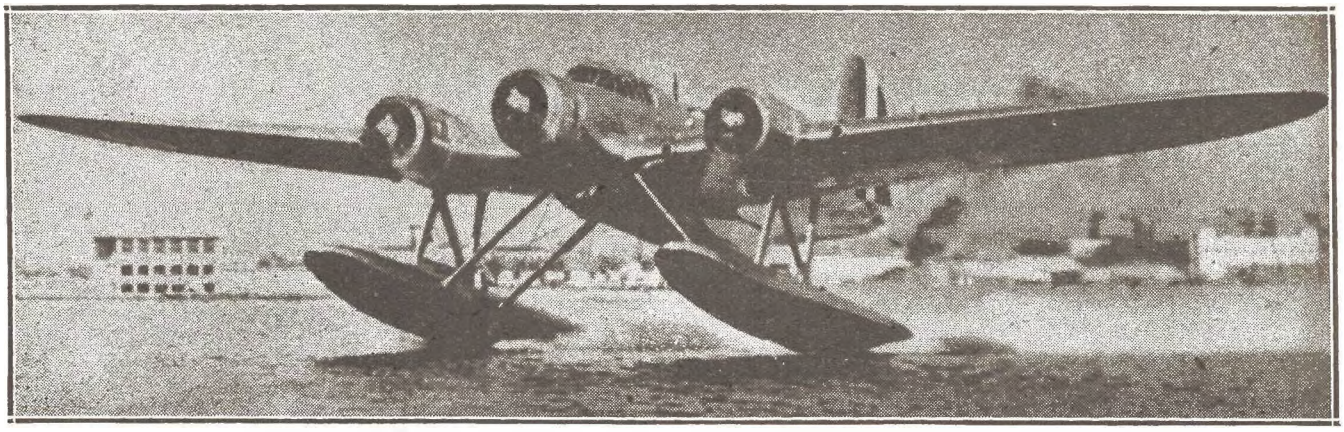
The general structure of the Italian Air Force is interesting. The elementary tactical unit is the squadron. Two or more squadrons, depending upon their location and duties, make up a Wing. There are two or more Wings to a Group and two or more Groups to an Aerial Brigade. Next come the Aerial Divisions, which are composed of two Brigades, and, finally, the Air Fleet, which is



One of the most modern Jap bombers, the Nakajima 97 is of all-metal construction. Overload cruising range is 2,960 miles.



Right: Adapted for catapult operations, the Dornier Do. a6 uses for in-line Junkers Jumo 205C engines of 600 h.p. each.



Largest of the Italian coastal-defense marine aircraft, the Cant Z. 506B has an overload range of 3,100 miles. It may be used for bombing, torpedo-dropping, or reconnaissance.

composed of two or more Aerial Divisions.

The squadrons of the Italian Air Service are classified as follows: *Stormi da Caccia* — Pursuit and Fighting; *Stormi da Ricognizione*—Reconnaissance; *Stormi da Bombardamento Diurno*—Day Bombing; *Stormi da Bombardamento Notturo*—Night Bombing.

To compute the air strength of present-day Italy requires more than simple addition, for there are other important factors to consider. In the first place, it cannot be ignored that Mussolini is a great personal power in Italian aeronautics. He is a flying man himself—a real flying man who can personally take the controls of a modern bomber and fly it with more than average ability. The Italian air arm, too, is a unified and independent service and is entirely free of the Army or Navy.

Italy has no aircraft carriers of the flight-deck type—which is probably the main reason for England's great successes against the Italian fleet—but they do have the *Giuseppe Miragla*, a seaplane carrier which accommodates about 20 aircraft. At the beginning of the war Italy had 19 cruisers and 10 battleships equipped with catapults. In addition, the submarine *Ettore Fieramosca*, a vessel of 1,788 tons, carried a folding-wing seaplane in a hangar aft of the conning tower.

At least half of the *Regia Aeronautica* is made up of seaplanes. It is estimated that about a third of the landplanes are fighters, with the balance of combat types being bombers. In all of Italy there are only 29 airfields open to civilian planes, and 15 of these are of a semi-military nature.

As to the number of pilots available for military service, estimates range from 10,000 to 20,000, with the former generally considered more accurate. At least 75 percent of all Italian military flyers are said to be on active duty.

THE JAPANESE AIR FORCE

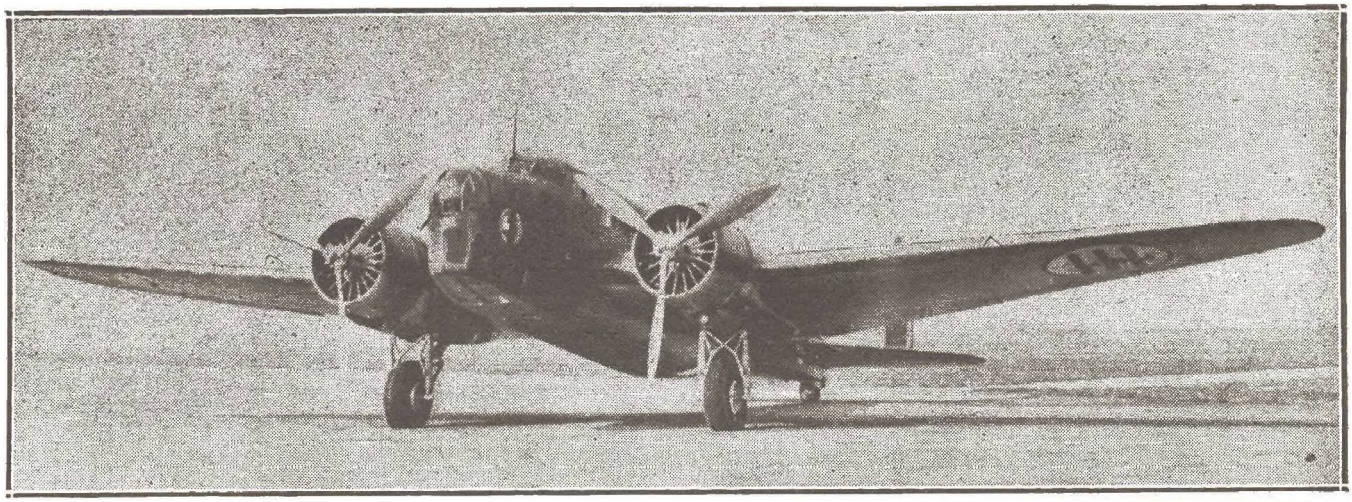
DIFFERENT TACTICS certainly could not have been expected of Japan at the outbreak of hostilities. The Japanese army is patterned directly on the German system and uses fundamentally the same methods, because it was in the first place organized and schooled by German officers. The Japanese are known to be exceptionally good at following, but they have always been notoriously short on leadership in military endeavors. So their offensive against the totally unprepared American and British forces was directly in keeping with the policies advocated by the senior Axis partner in their blitzkrieg tactics, even to striking on Sunday.

Japan is often called the "Volcanic Isle." Geological characteristics aside, this is true not only because the country can literally "erupt" with war enthusiasm, but also because the Island Empire, if attacked effectively, would in some sections literally burn to the ground because of the highly inflammable materials used for construction—that is, paper and wood. The relative smallness of the islands, the density of population, and the concentration of war factories within range of heavy bombers operating from Wake and Guam leave the nerve centers of the Mikado's military productive capacity open to attack. This is undoubtedly the main reason for Japan's early concentrated assaults upon Wake and Guam—to eliminate them as possible bases of operation for the U.S. Air Forces.

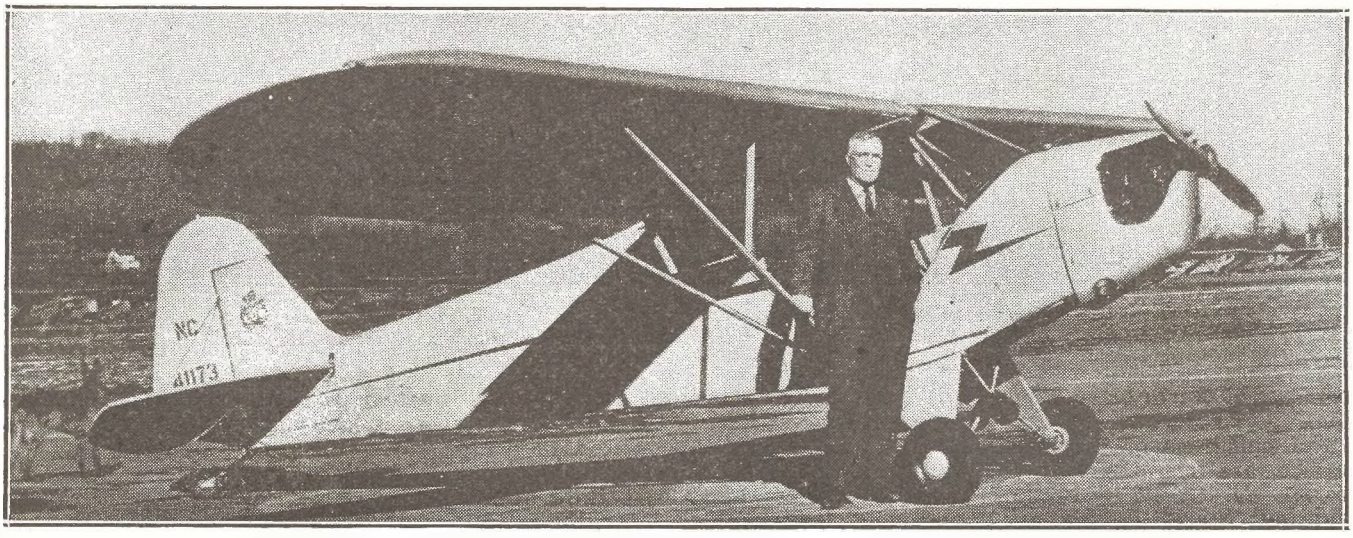
According to reliable information, Japan has some 16 army aviation regiments, of four squadrons each. This total of 64 squadrons is probably made up of one-third fighter and two-thirds bomber and bomber-reconnaissance types. Eight Army squadrons are located in the immediate vicinity of Tokyo, in addition to four navy squadrons equipped with seaplanes.

(Continued on page 72)

An attractive mid-wing heavy-duty bomber, the Fiat B.R. 20 carries a disposable load of 7,920 pounds. Top speed is 256 m.p.h. at 15,448 feet. The Japs are also using this ship.



On the Light Plane Tarmac



W. T. Piper, President of the Piper Aircraft Corporation, and the Piper Cub training ship in which more pilots have been taught to fly than all other commercial makes combined.

War-Worth of CAP

FOR YEARS private flyers have gathered in bull sessions and talked of their potential value to the country's military establishment in event of war. With the declaration of hostilities and the prospect of suspended civilian flying this talk swelled to a shout heard throughout the nation. Every civilian flyer believed his experience could in some way render a service, and he just as firmly believed that not to utilize America's private flyers was to disregard a definite advantage in the important field of aviation.

Now, of course, the opportunity has arrived in the form of the Civil Air Patrol; the private pilot has a real chance to help win the war and *prove* to the skeptics that the experience, ability, and courage of America's 186,000 civilian pilots and student pilots can make a real contribution to the country's safety and ultimate victory.

But willingness alone won't prove that private flying has "got the stuff." The Army and Navy will judge by their own standards whether or not civilian pilots can make a worthwhile contribution to the war effort. They will judge the Civil Air Patrol by its ability to perform its missions in an efficient, coordinated, intelligent, and military manner. The CAP's *desire* to serve must be matched by an *ability* to serve.

The success of the CAP is predicated upon the devotion of its members to the studying, drilling, and schooling necessary to function in a military manner. This means hours must be spent on basic infantry drill, instruction in first-aid, protection against gas, study of air navigation, radio transmission, and numerous other subjects which contribute to the value of the services of the group as a whole.

The successful accomplishment of flight-missions will be dependent upon the advance preparation acquired in ground schooling. And the manner in which those missions are carried out will be the basis upon which the military will judge the CAP. If they are performed in a precise, military manner they will lead to more numerous and more important assignments. But if they reflect the haphazard, hit-or-miss flying which many Army officers associate with private aviation, it is entirely possible that the Civil Air Patrol will be relegated to the background insofar as its use for military or civilian emergency missions is concerned.

It's up to the private flyers. The opportunity to prove themselves is at hand. It means study and hard work to do a good job. Civilian aviation can do it only so far as each individual is willing to do his part and make the sacrifices in time and effort to acquire the necessary ability.

CPT Plan Enlarged

ACCORDING to the *Civil Aeronautics Journal*, the entire training facilities of the CAA will be devoted to the war program, under a plan worked out in cooperation with the Army Air Forces. First priority in CAA training will now go to students who can meet the requirements of the Army Air Corps for appointments as Aviation Cadets and who are members of the Air Corps Section of the Enlisted Reserve.

All further flight training facilities of the CAA will be limited to students who, while unable to meet the requirements for appointment as Aviation Cadets, are qualified to train for CAA flying instructors' licenses. These must agree in writing to contribute their future effort to a field of aeronautics adapted to serve the national interest.

As part of the new plan, the facilities of the CAA will be greatly expanded. The present capacity of 25,000 students per year will be raised to 45,000. In addition, training will be provided for ground technicians—a new activity for the CAA. It is planned to provide this course for about 31,000 students annually. Applicants for training as ground technicians must be able to meet the requirements for entrance into the Air Corps Technical Schools and must be members of the Air Corps Section of the Enlisted Reserve.

The Civilian Pilot Training Program is being carried out at about 580 college centers and 135 non-college centers. Each center consists of a college or responsible civic body which conducts the ground school, and a nearby commercial flying school which conducts the ground school and are under Government contract and supervision and give controlled courses designed by the Civil Aeronautics Authority.

In 2½ years the CAA program has taught 70,000 young Americans how to fly. To meet the needs of the armed services, it is bringing some 4,000 of these up to instructor and commercial pilot rating this fiscal year. The CAA has also given refresher courses which brought more than 5,000 flyers up to standard as instructors. Most of these men are now teaching for the Army.

About 15,000 of the CAA trainees have joined the Army and Naval air services, while 9,000 others are in other branches of the armed forces. In recent months the Army and Navy have been getting one-third of their Flying Cadets from CAA ranks. Army records show that only 11.8 per cent of Cadets with CAA background fail in the Army primary stage, whereas 43.4 per cent of other Cadets are "washed out."

NEW CAP COMMANDER

EARLE L. JOHNSON, one of the country's most outstanding leaders in civil aviation and executive officer of the CAP for the last few months, has been named National Commander by James M. Landis, Director of the Office of Civilian Defense. Mr. Johnson succeeds Maj.-Gen. John F. Curry, who was called back to active duty with the Army Air Forces as Commanding General of the Fourth District, Air Forces Technical Training Command, with headquarters at Denver, Colo.

Prior to the organization of the CAP last December, Mr. Johnson organized Ohio pilots preparatory to national mobilization. With the organization of the CAP, he was named Wing Commander. His home State is now second only to New York in the total number of Patrol enlistments. Shortly after the first of this year, Mr. Johnson was called to Washington, D. C., to assume the duties of executive officer.

Commenting on the change in leadership, Director Landis said, "The Office of Civilian Defense has been fortunate in having the leadership of so fine an officer as General Curry during the organization period. More than 37,000 citizens, 80 per cent of whom are civilian pilots, already have enlisted to fly their own or rented planes on a wide variety of assignments, primarily planned to relieve military planes and airmen for other duties. Now organized with a Wing Command in every State, the CAP has proved itself a hard-hitting and effective organization, quick to carry out the missions which the Army and civilian defense units have entrusted to it."

AVIATION IN PUBLIC SCHOOLS

TO AID THE CAA program of training pilots in colleges and universities, the United States Office of Education and the CAA are joining forces to carry aviation into the elementary and high schools of the nation. The Army and Navy, through their respective Assistant Secretaries for Air, Robert Lovett and Artemus L. Gates, will work with the two agencies to form policies and draft plans of study.

Groundwork for the program was laid at a two-day meeting, March 24 and 25, at Newark, N.J., when educational and aviation leaders met with representatives of the Office of Education and CAA. Losing no time, the "emphasis-on-aviation" educational plan will be launched in many schools at the coming Summer session; others will follow suit next Fall.

A series of documents is now being prepared to acquaint educators with the importance of aviation in war and post-war eras. Basics of flying are outlined in an attempt to show how aviation material may be woven into existing curricula. Emphasis will be placed, starting in about the fifth grade, on model airplane building in crafts and manual arts classes. The Navy's project to secure 500,000 models this year inspired this phase.

Such courses as mathematics, physical sciences, geography, English, fine arts, etc., all have a definite relationship to aviation. The educational plan will be to place as much emphasis as practicable on aviation in these courses. Every boy and girl graduating from high school in the future, therefore, will have a background of basic concepts of aviation and flight.

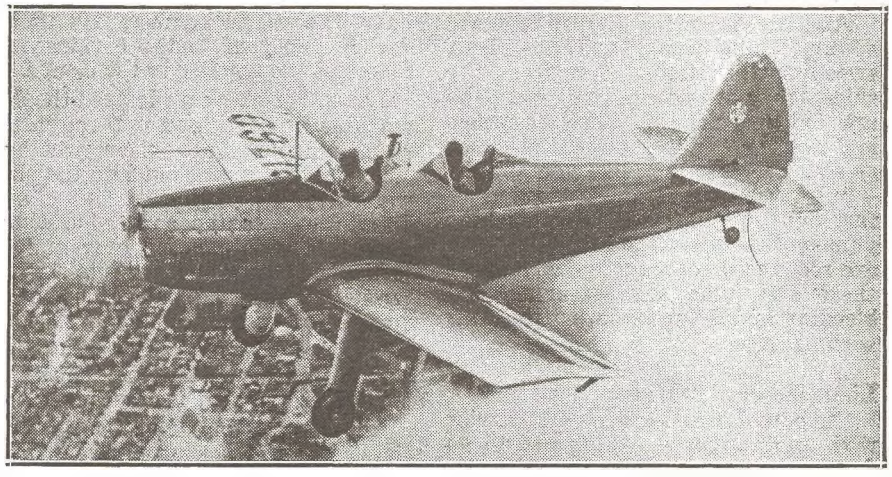
Also in prospect is the building up of a large reservoir of several million pilots for future commercial and military duties. If you teach a boy the basic facts about aviation you won't be able to keep him on the ground.

NEWSY NOTES

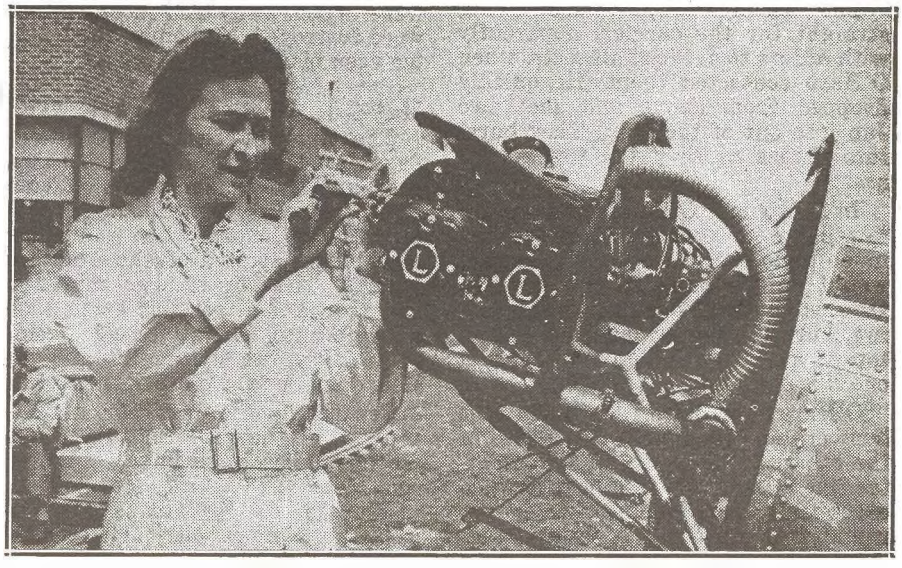
BEWARE of Spring Weather.—Although most experienced pilots, dispatchers, meteorologists, and other airmen familiar with the operation of aircraft, scheduled or otherwise, are well acquainted with the many phases of Spring flying weather, the CAB has issued a precautionary warning. The period of transition between Winter and Summer marks the season of rapidly changing flying conditions, when extremes are likely to be encountered most frequently. In view of war restrictions placed on the dissemination of weather information, the CAB Safety Bureau urges airmen and ground personnel to give more careful consideration to their flight plans. Warnings against cyclones, winds, thunderstorms, and icing conditions have been issued.

Pigeons Used by CAP.—Officers of the Alabama Wing of the CAP reported the successful use of carrier pigeons when released from a ship in flight while on a recent training mission. Covering 30 miles in approximately 35 minutes, a large carrier pigeon flew an unerring course to his home with a message written by the plane's pilot, telling where a ship had been located on the ground. Several other birds were also used, all successfully. Pigeons can be released from a plane in mid-air, provided it is slowed down to a stall and precautions are taken to prevent the birds from being struck by the plane.

Grasshoppers Get "L" Designation.—Because of the liaison and courier duties the small so-called grasshopper planes perform with the Army; the Air Forces have given them the designation "L," an abbreviation for liaison. The ships previously were designated with "O," standing for observation. THE END



Vega's all-metal, low-wing trainer is used by the CPTP for instructional purposes. It is similar to North American NA-35. Below: Helen Duffy puts the finishing touches on a top overhaul of a Lycoming 65 in a Luscombe Silvaire.



War Flyers in the Headlines

BEST BY TEST. Slow, weak on fire-power, hard to service—those are some of the reports made by the United Nations concerning American planes before we ourselves became engaged in the conflict. Now, however, Yank flyers have definitely proved, once and for all, that our war craft are not second-line. And as to servicing, it depends upon the ground crew and their mechanical knowledge.

By the same token, American flyers have established the fact that they can fly—and fight—with the best. Remember Wake, Hawaii, the Philippines, the Strait of Macassar, Australia, China. In those territories, plus many others, U.S. airmen have hammered at the Japs harder than any other flyers. They have not only hammered, but they have stabbed and slashed and literally cut the Nip forces to pieces. The little brown men continue to advance, true, but only because of overwhelming *numerical* superiority; at that, however, they plod forward only by sacrificing more than their powerful war machine can actually stand, if it is to continue functioning effectively.

And the American airmen who are accomplishing this grandiose job of sweeping the Rising Sun from the skies—they are peace-loving men who are fighting for the ultimate peace and not for the lust of battle or for spoils. They are men like you and me—only they are at the command of fast fighting ships and have machine guns and the means to kill. Following are recounted some of the exploits of these men who are swearing and bleeding and dying to defeat the Axis aerial forces.

Lieut. Edward O'Hare

On patrol over an aircraft carrier with another plane, which had to go down because of difficulty with its guns, O'Hare was left alone to attack nine approaching twin-engine Jap bombers.

The enemy ships were flying straight for the carrier, apparently with orders to get it at all costs, when O'Hare contacted them. He quickly dropped from above and shot two Jap jobs out of the fight. They burst into flames as they fell toward the sea.

In Lieutenant O'Hare's own words: "Actually, I figured there wasn't much to do except to shoot at them. I would go for one, let him have it, then pull out quick so that the exploding, burning plane would not fall on top of me. Then I'd go for the next one like the first."

O'Hare shot down five of the nine bombers and damaged one or two of the others. "The last Jap I went after," he related, "I could have downed except my guns stopped after ten rounds when I ran out of ammunition. My whole action took only three or four minutes. They tell me there were sometimes three falling planes in the air at once."

The lieutenant admitted that he was worried about the planes that got through. But by that time effective support had come from the carrier and had chased the Japs away. Although bombs dropped within 50 yards of the vessel, they did no damage.

Late in May, O'Hare was ordered to report to the White House, in Washington, D.C. There, President Roosevelt told him that for "one of the most daring, if not the most daring, single action in the history of combat aviation," he was receiving the nation's highest military award, the Congressional Medal of Honor. O'Hare's bride of seven months placed the medal around his neck. In added recognition, he was promoted to the rank of lieutenant commander.

Lieut.-Comdr. John S. Thach

On February 20, while operating from the same aircraft carrier to which Lieutenant O'Hare was attached, Commander Thach saw a huge Jap patrol bomber. He immediately reported to the carrier, and then lost the bomber in the clouds.

Later, Thach again located the Jap machine and followed it through the rain and out into clear weather. When he was a mile out into the blue, the Navy flyer attacked. After two dives, the Jap's upper wing burst into flames. The ship nosed over and its jettisoned bombs crashed into the water with a huge explosion. The entire crew of the enemy craft was killed.

On the way back to the carrier, Thach intercepted another enemy at 6,000 feet and sent it crashing.

Later in the day, Thach's flight assisted in an attack on nine Japanese planes, "beautiful, fast, twin-engined jobs looking like B-26's," according to the commander. In seven to ten minutes of fighting, all the Jap planes were driven away and most of them were destroyed. No bombs hit the water even close to the carrier.

Maj.-Gen. Lewis H. Brereton

The pilot of General Brereton's flagship, Maj. Cecil Coombs, was checking the bombardier's calculations and had turned the controls over to the General when a Japanese cruiser was spotted off the Andaman Islands. The big bomber roared in and scored a direct hit, setting the warship afire. The attack also resulted in damage to a troopship and possible damage to two other transports.

General Brereton said in his own account of the raid that the bombers did not catch the Japanese by surprise. They had an excellent spotting system in the Andamans and the American bombers obviously were detected as soon as they reached the northernmost tip of the islands. Japanese cruisers at Port Blair catapulted fighter planes into the air, but the interception effort resulted in only a few harmless bullet holes through one Fortress.

The Yank bombers continued straight on their course, Brereton said, apparently losing the Japanese fighters. The only subsequent opposition was from anti-aircraft guns aboard the ships under attack.

Lieut. Clarence Sanford

Chasing Japanese planes over the Pacific, Sanford's fighter ran out of fuel and he had to bail out. He landed in the water three miles from a small island and stripped off his clothes and swam ashore.

He collapsed from exhaustion when he reached the shore and was aroused some time later by three aborigines, one of whom held a spear to his chest and demanded: "You Jap?" The lieutenant said he was about to be impaled, when the native spied a crucifix about his neck and exclaimed, "Jesus number one man!"

The natives then led the nude flyer 25 miles afoot to the Bremer Island mission, and a pearl lugger brought him back to Australia.

Capt. Edward C. Teats

Awarded the Distinguished Flying Cross, Captain Teats was one of four Army officers cited for flying skill in completing a bombing attack on Japanese concentrations in Lingayen Gulf off Luzon. The mission kept them out 32 hours without rest and in the air for 13 continuous hours.

Staff Sgt. Joseph L. Lockhard

For voluntarily remaining on duty in charge of an anti-aircraft detector on the island of Oahu, Dec. 7, and detecting the approach of unidentified aircraft, which proved to be Japanese nearing Pearl Harbor, Sergeant Lockhard was awarded the Distinguished Service Cross. He detected the planes at 7:20 A.M. approximately 132 miles off Oahu. After rechecking the distance and aximuth, he reported to the duty officer and furnished him with complete particulars of his findings.

Subsequent investigations have proved conclusively that the planes reported by Sergeant Lockhard were the large Japanese air force that attacked Oahu at approximately 7:55 A.M. The service of Lockhard was also noted in the report of the Roberts Board investigating the Pearl Harbor attack.

Sergeant Lockhard was promoted from a private in recognition of his services and is now attending an officers' training school in the United States. THE END

JOIN THE FLYING ACES CLUB

Honorary Members

President and Mrs. Franklin D. Roosevelt
ex-Vice Pres. John Nance Garner

Casey Jones	Rear-Admiral Byrd
Wallace Beery	Col. Eddie Rickenbacker
Al Williams	Colonel W. A. Bishop
Col. Scaroni	Major G. A. Vaughn, Jr.
Major von Schleich	Willy Coppens
Lieut.-Col. Pinsard	Glenn L. Martin
G. M. Bellanca	Walter H. Beech
Capt. B. Serglevsky	Zack Mosley
John K. Northrop	Dwane L. Wallace
Colonel Roscoe Turner	Josef Veltjens
Charles W. A. Scott	Col. A. P. de Seversky
Richard C. DuPont	Donald W. Douglas
Maj. A. W. Stevens	Major C. C. Moseley
Capt. O. A. Anderson	Clarence D. Chamberlin
Major Fred Lord	Mrs. Charles S. Baylus

Lieut.-Col. Theodore Roosevelt

Official Charters

F.A.C. Flights and Squadrons are recognized at GHQ only after they have received their official charters. These illustrated documents, printed on fine paper and portraying various features in the field of aviation, are excellent for framing and display. Their inspirational text is in keeping with the high ideals and aims of our Club. Each charter application must include a full list of proposed group members and their addresses. Each of these members must hold his regular F.A.C. card, obtained by clipping and sending in the membership coupon printed on this page. If applications are approved, Flight Charters are issued for 25c, and Squadron Charters for 50c. Send the correct fee with your application. It will be returned if the Charter is not granted.

WIN YOUR WINGS

Save This Whole Coupon for
CADET OR PILOT
insignia of the F.A.C.

Gold finish — *Actual size*

All members with Official Membership Cards are eligible for Cadet Wings. This coupon, with two others and 10c, entitles members to Cadet Wings. Do not send this coupon alone. Save it until you have three. Then send them in all together with a self-addressed envelope and 10c to cover cost of wrapping and mailing.

Silver finish — *Actual size*

All enrolled members who have won their Cadet Wings are eligible for Pilot's Wings. This coupon, with four others and 10c, entitles Cadets to Pilot's Wings. Do not send this coupon alone. Save it until you have five. Then send them all together with a self-addressed envelope and 10c to cover cost of mailing.

Send the Whole Coupon

regardless of which kind of wings you wish. Separate sets of coupons are needed for each insignia. Canadians send 15c, or three International Reply Coupons. Overseas readers send 1/-, or five Reply Coupons secured at the Post Office. Only one pair of either kind of wings to a member. If yours are lost, send 25c for new ones (2/- overseas). [72]

Advance Aviation

TO advance the cause of aviation, over 50,000 men and women, boys and girls, have banded together to form the FLYING ACES CLUB.

It is the easiest club in the world to join. Just clip the membership coupon, fill out, and mail it to GHQ with a stamped, self-addressed envelope. Your official card will then be forwarded to you. After joining, you can quickly win promotion and the right to wear the various insignia of the Club.

In the FLYING ACES CLUB there are two kinds of local organizations, known respectively as Squadrons and Flights. A Squadron must have eighteen members, including its leader. A Flight must have a total of six. You can start either of these groups in your own community by enrolling your friends in the Club, then applying for an official charter as detailed in the column at the left. *Each member must hold an F.A.C. card.*

Awards and the Aces' Escadrille

After the membership card, and Cadet and Pilot's wings, comes the Ace's Star. This is awarded for enrolling five new members, using, of course, a separate coupon for each. As an Ace, you are then eligible for membership in the FLYING ACES ESCADRILLE. Then you may win truly handsome awards. Among these are the Distinguished Service Medal and the Medal of Honor, two of the finest decorations that have ever been designed.

Any member who has reached the rank of Ace is eligible for membership in the FLYING ACES ESCADRILLE, an advanced organization which replaces the old G-2 unit and opens the way for participation in a definite program contributing to the forward movement of aviation.

To enroll, an Ace must apply direct to Escadrille Headquarters, giving his name, age, address, rank, and highest award already won in the Club, and enclosing a stamped, addressed return envelope, If he is approved for membership his instructions will be forwarded. Membership in the Escadrille is limited to American and Canadian members only, at present.

DISTINGUISHED SERVICE MEDAL

Keepers of the Log

In order to keep in touch with GHQ, every squadron should appoint a member with a facility for writing as Keeper of the Log. It shall be the duty of the Keeper of the Log to send in regular reports of interesting doings of his squadron. His is an important job, because it is only by means of interesting squadron reports that life can be given to the Flying Aces Club News.

Photographs, too, are an important consideration for the Keeper of the Log. Either the Keeper himself, or any other member with a camera, should keep a photographic record of the squadron's activities, for reference purposes, to show prospective new members, and to allow a selection of pictures to be sent to GHQ for reproduction in our monthly Club News pages.

The cost of film, prints, etc., would be a legitimate charge against the squadron's own treasury or could be covered by members' contributions. A number of flights and squadrons, incidentally, send us prints which have been taken, and completely developed and printed by foto-fan members of the outfit.

Correspondence

In all correspondence with GHQ where a reply is desired, enclose a stamped, self-addressed return envelope with your leter. GHQ receives thousands of letters weekly, and cannot undertake to answer those who do not heed this rule.

Distinguished Service Medal and Citation

The Distinguished Service Medal is a monthly award for the best photograph of a model plane built from plans appearing in any issue of the FLYING ACES MAGAZINE. If in the opinion of the judges, Wing Commander, Model Editor, and the National Adjutant another photo places high, it is also entitled to a D.S.M.

In the event one happens to win a D.S.M. for a second time, he is awarded a PROPELLER which constitutes a citation in recognition thereof. The Propeller is designed with two prongs which enable it to be fastened securely to the ribbon of the D.S.M.

July Membership Application

I, the undersigned, hereby make application for membership in the Flying Aces Club. I agree to live up to its rules and regulations; to foster the growth and development of aviation; and cooperate with all other members in the work of spreading aviation information, building up confidence in flying for national defense and transportation. I will aim to build up the Club and its membership, and do my best to win the honors that the Flying Aces Club offers.

My name is .....

Age ....[72]

Street .....

City .....State .....

Do you build airplane models? .....

Mail this application, enclosing a self-addressed, stamped envelope. Canadian and overseas readers send the application, self-addressed envelope, and an International Reply Coupon worth 5c, secured at the Post Office.

FLYING ACES CLUB, 67 W. 44th St., New York

Flying Aces Club News

by Clint Randall
National Adjutant, Flying Aces Club

"Air Youth Today—Air Leaders of Tomorrow!" is the caption of this photograph supplied by the Model Industry Association. This is one of the most famous striking posters to be used throughout the country in stimulating air interest.

FOR THE BENEFIT of new club members who do not quite understand the various ranks, privileges, and other matters concerning this world-wide organization, we will devote as much space as possible this trip to settle a little unfinished business. As you know, much mail arrives each day for the FLYING ACES CLUB and your N.A. is forced to keep from answering some of that mail because they do not contain a stamped self-addressed envelope. What space can be given to reply to those letters is done through these pages, but it is impossible to get around to all of them.

First off, we'll start with a query from John Breen, Jr., of Hollis, N.Y. John asks whether it is possible to obtain the Ace's Star by enrolling five new members who happen to be members of his family. The answer to this is that relationship to the enroller has no bearing on the subject. If a member can get five new enrollees and submits an application for each one, he is entitled to the award of the Ace's Star.

Francis Frye, of Lansing, Mich., wants to know if it is possible to win the Distinguished Service Medal or Medal of Honor right after receiving the membership card.

As soon as one receives his membership card he is entitled to the various awards offered by this Club. The time element will take care of itself.

Paul McDermott of Flushing, N.Y., wants to know how to go about getting a distinguished person to become an Honorary Member of the FLYING ACES CLUB.

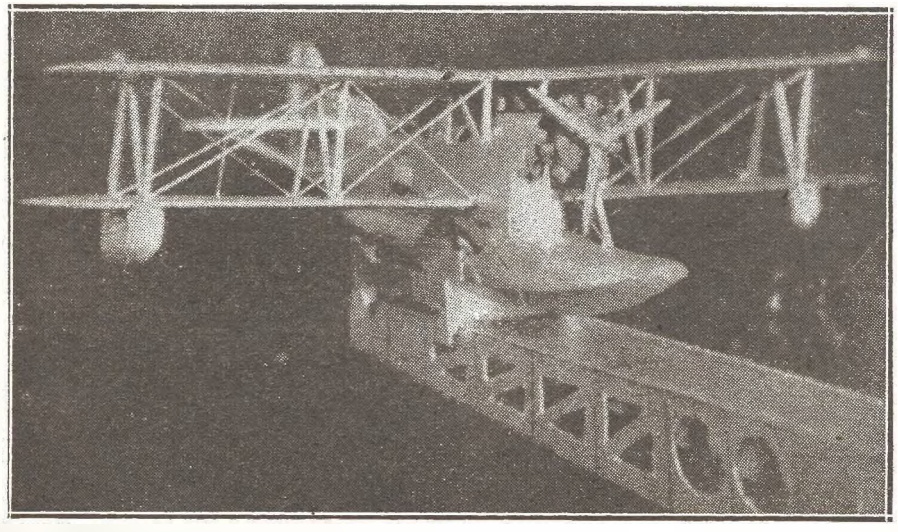
The simplest way as well as the only way to go about this procedure is to write directly to the person and ask him whether or not they would grant you the honor of accepting an offer on behalf of the F.A.C. to join the Honorary Membership ranks. If that person accepts, will he please reply directly to you.

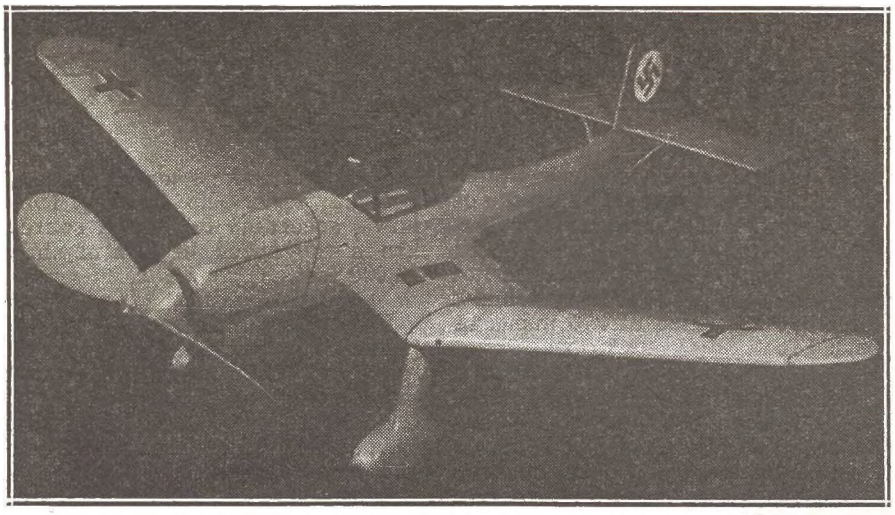
When the asker receives a reply accepting Honorary Membership, he is to forward that letter as well as a self-addressed stamped envelope direct to the National Adjutant, who will, in turn, list the new member's name on the ranks and return the original letter to the asker. For enlisting an Honorary Member, the asker's name will be filed away and awarded 250 points. When he achieves a total number of points amounting to 750 he is awarded a Distinguished Service Medal. Other ways to earn points are given in detail on a memorandum sent out by Escadrille Headquarters.

In short, after a new member receives his membership card, he sends in the required amount of coupons for his Cadet wings. After this, he sends for the Pilot wings. In order to earn the Ace's Star he submits the names of five new members each one on an individual application coupon. Upon receipt of the Star, the Clubster may apply in writing for membership in the Escadrille. His application is then taken up by the General Staff, and if accepted, the Clubster is notified by letter in which he is told how he may earn additional credits. Membership in the Escadrille is limited to American and Canadian members only, at present.

Jerry Troth, of Toronto, Canada, wants to know if a person can obtain his membership card, Cadet and Pilot wings all at once. The answer to this is that while it may be done, the unwritten rules of this Organization is that an applicant apply for his membership card first. After saving the required number of coupons for Cadet Wings he submits them with 10 cents. After Cadet, the next badge of

Winner of this month's Distinguished Service Medal goes to an unidentified modeler who built this Loening OL-9 on the catapult track from plans appearing in the June 1936 F. A.





Second winner of this month's D.S.M. goes to Augustus W. Springer of Bridgeport, Conn., for his excellent flying scale model of the Nazi Ju.87 Stuka Bomber.

recognition is Pilot Wings which may be had for five coupons and 10 cents. Bear in mind, however, that with all requests for Wings, enclose a self-addressed stamped envelope.

Persons desiring to become affiliated with the FLYING ACES CLUB are requested to read the page titled "Join the Flying Aces Club" which appears in every issue of this magazine. In it you will find full instructions, and if followed, one will receive more prompt attention to his queries.

THE WINNER of this Month's Distinguished Service Medal (that is the first choice of the judges) is a lad who failed to reveal his identity. Since he has been duly selected as the winner, he can claim his medal if he will be so kind as to write to the National Adjutant personally, and reveal some information on the construction of the model. We do have a bit of information on the Loening model, and by comparing, we can award the proper person.

Our second choice for this month goes to Augustus W. Springer of Stratford Avenue, Bridgeport, Conn. His excellently built craft was made from plans appearing in the January 1942 issue of F.A.

Congratulations Augustus. Your medal is being placed in the mail this evening, and by the time you read this announcement, your award should reach you, too.

As for the rest of you envious Clubsters, you *ought* to know exactly what to do about getting in on this monthly handout. All you have to do is build any type of model whose plans and instructions appeared in the worthy pages of this magazine, and then take several good snapshots of the entry and send to D.S.M. Contest Committee, care of this magazine. The address is 67 West 44th Street, New York City. We'll do the rest.

The judges, as you know, are Dave Cooke, Wing Commander; Jesse Davidson, Model Editor; and last but not least, your ancient and honorable National Adjutant. Harrumph! When the proper time of the month rolls around, "We Three" haul out the photo entries and spill 'em all over the table.

Those which appeal to our sore but still serviceable eyes are separated from the rest. Then, we get down to final selection. After a lot of hemming and hawing and arguing (tsk tsk tsk, you boys have no idea what goes on here) we pick a winner. Sometimes the competition gets hot and we settle for two. The results are published in the next issue. Now we've told you everything. The rest is up to you.

The Mercury Mites Model Airplane Club, of Brooklyn, N.Y., has renewed its membership drive and wishes to announce that any member of the FLYING ACES CLUB living in the vicinity of their headquarters who wishes to join an active flying club, contact Secretary F. Santore, 1592 Lincoln Place. The club has big plans under way for the coming flying season and this is the time to get in as a member. The Mercury Mites, as you know, is composed of members of the FLYING ACES CLUB, too.

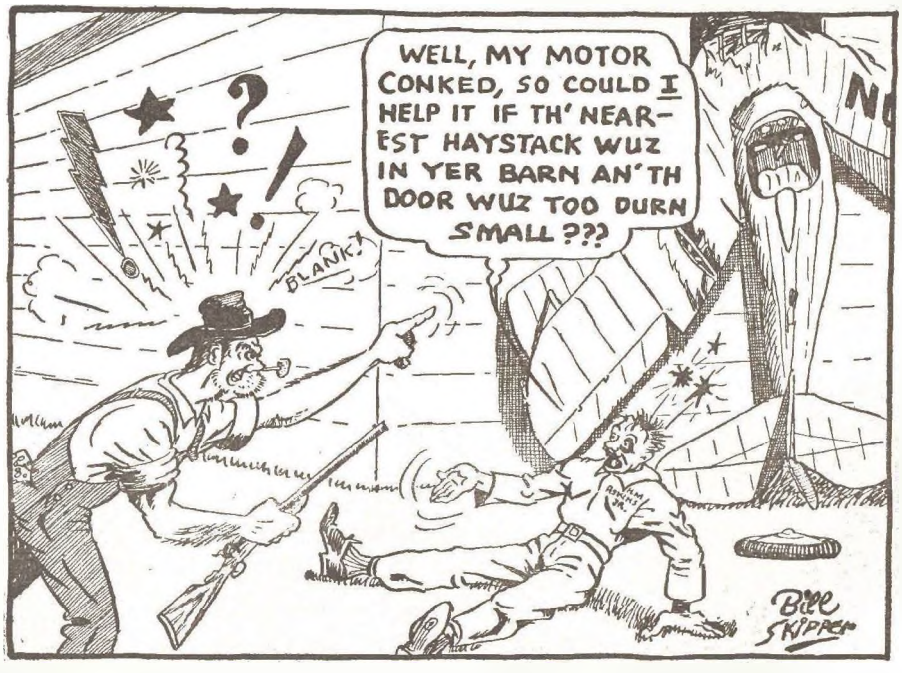
Aside to Stephen Tarbox, Collins City, N.Y.: The photo entry for D.S.M. consideration of your Russian I-16 "Mosca" solid scale shows that the model itself is beautifully made. The photographic quality of the entry itself is poor. If you will send in better shots, we don't mind telling you that your model stands an excellent chance to be picked as a winner. So why not try again?

David Parker, of No. 1 Cliff Street, Newcastle, N.S.W., Australia, finds it very difficult to get copies of FLYING ACES. The war, most naturally, has prevented us from making shipments to that far-off country and splendid fighting ally of ours. Dave would like to correspond with American aero enthusiasts and would certainly appreciate anyone sending him more or less recent copies of the magazine.

Herbert L. Green of 7214 McGee Road, Merriam, Kansas, would like to contact young men in his vicinity in order to establish a FLYING ACES chapter. Through these columns, Herb has struck up a very close pen-pal friendship with Bob Zilloix of 425 Ohio Street, Lawrence, Kansas. Herb is one of the many hundreds of enthusiasts who have written to your N.A. telling him that the presentation of the World War Three-View series is one of the best features of the magazine.

WE WERE RATHER short on space in last month's column and so we couldn't go into very much detail concerning that photograph of Freddie Lord, a favorite with the members of the FLYING ACES CLUB. Anyway, it sure does us good to see Fred back in uniform. Fred, as most of you know, is with the Air Transport Auxiliary Service of the Royal Air Force. For the same reason that rules and regulations ground many a good pilot out of active combat because of age, so has been Freddie.

(Continued on page 79)



All Questions Answered

John Stedman, Bronx, N. Y.:—Sorry, but that was a typographical error in the June issue. Copies of the September, 1931, number are no longer available, nor are any others of that early date; the year should have been 1941 instead of 1931. Your 20c has been returned, along with a letter explaining this error.

Bill Dales, Sudbury, Can.:—Frankly, I don't know whether the Republic P-47B will dive at 680 m.p.h., and I don't see how it makes any difference what the diving speed is. Even on dive-bombers, they have found it necessary to install diving brakes to slow the diving speed, and in some cases even reversible pitch propellers are used. Therefore, the diving speed means absolutely nothing—except perhaps nice headlines for a newspaper. Speed figures for the Thunderbolt have not been made public, but it is believed that the maximum at best operating altitude is well in excess of 400 m.p.h.

Dave Dean, Springfield, Ohio:—You are correct in assuming that an airplane doing from 600 to 700 m.p.h would not catch up with its own bullets, even though the bullets do not travel that fast. The best way of explaining this is that the machine gun is firing in relation to the plane and not to the earth. And while the plane is traveling at a certain speed in relation to the earth, this has no effect on the machine gun bullets. They fire as if from a stationary object. Many years ago it was believed that if a pistol were fired off the observation car of a passenger train doing 60 m.p.h., the bullet would fall straight to the ground since it had a similar velocity. This was not the case, however, and the bullet traveled as if fired from a stationary platform.

Bob Fineberg, Brooklyn, N.Y.:—Sorry, but I'm afraid that your friend is right in that discussion and you are wrong. For while flaps are usually lowered only while landing, they are also at times used on the take-off to make for a shorter run. It is impossible to say definitely that any one plane is the world's most effective fighter, but it is generally believed that the Republic P-47B is the best American job.

John Boyd, Holyoke, Mass.:—It is really impossible to state definitely what three planes are the fastest, since performance figures on many military machines are kept secret. As a rough guess, however, I might say that the Republic P-47B, Westland Whirlwind, and Messerschmitt Me. 209 are tops. The Me. 209 is the latest version of the Me. 109 and has a top speed in excess of 400 m.p.h. The September, 1941, issue of F.A. may be obtained from our Accounting Department for 20c. Speed figures for the Kittyhawk have not been released, but the Messerschmitt Me. 109F2 is rated at 375 m.p.h. at 22,000 feet.

Allen Hollinger, Butler, Ind.:—Gasoline does not flow from a carburetor, but from the tanks to the carburetor, and into the engine. The purpose of a carburetor is to mix fuel with air. Some engines, of course, use direct injection instead of carburetion. Yes, Brown racers were used in the movie "International Squadron."

James Narey, Cleveland, Ohio:—Hollywood's average aviation picture is aeronautically poor probably because they are making pictures for the general public and because actual foreign-type warplanes are not available for picture purposes. To the aviation fan, this seems inexcusable, of course; but the average movie-goer doesn't know the difference between a Ryan PT-20A and a Focke-Wulf Fw. 198.

Robert Brothers, Quincy, Mass.:—Sorry, but we cannot supply you with photographs used in F.A. Most of the pictures published are purchased from regular agencies, and we must keep them in our files for reference or future use. I suggest that you contact companies advertising with F.A. for pictures you may desire.

Ralph P. Willet, Holyoke, Mass.:—The only sponson-type gas model I know of that would suit your needs is Pete Bowers' " 'Duck' Gas Buggy," the plans for which appeared in our August, 1939, issue. While the plans do not actually show sponsons on the model, Pete Bowers later redesigned the "Duck" with sponsons. If your model *must* have sponsons, I suggest that you work from the original "Duck" plans and add the sponsons yourself.

Charles Lamor, New York City :—There are several stores in New York City that sell aviation books. For instance, we might mention Brentano's, Macy's, Scribner's, G. P. Putnam, and Gimbels.

Jack Corcoran, Ronan, Mont.:—We published plans of an autogiro in our March, 1940, issue, which may be obtained from our Accounting Department for 20c. Yes, it is true that the Fairey Battle is now used only for training purposes. It was found that the ship was far outclassed by modern German machines, and therefore it was no longer suited to combat work. The Curtiss Tomahawk, according to British sources, has a top speed of 360 m.p.h. at 16,000 feet.

Billy J. McKelvey, Clearfield, Iowa:—Your plans for converting the Martin B-26 into a fighter seem quite sound, but don't you believe that the Air Forces or the Martin company would have made these alterations if they deemed them necessary or even advisable? And since the changes have not been made, as far as we know, it is apparent that our Army is quite satisfied with results of our present fighting types.

Robert Reilly, Newark, N.J.:—I don't quite understand your problem. You say that you would like to obtain directions and materials for building model airplanes featured in FLYING ACES. Well, every month we give complete instructions for *every* model featured, and the supplies may be obtained from numerous model supply stores in your city.

Don Kohlhagen, Kenosha, Wis.:—Copies of the May, 1939, and April, 1940, issues are still available, but the others you mentioned are out of stock. Back issues may be purchased from our Accounting Department for 20c each.

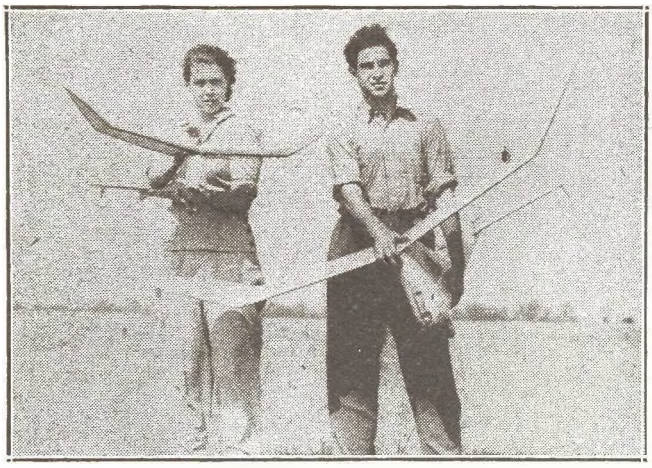
Ralph Stark, Minneapolis, Minn.:—I have no idea which Minneapolis schools feature Air Corps preparatory courses. I suggest that you contact the Army Air Forces, War Department, Washington, D.C., for this information.

Peter Grosz, 202 Shore Rd., Douglas Manor, N.Y.:—Sorry, but I believe you have about the entire list of companies dealing in first World War photographs. You might contact the War Department, however; I believe they have a few pictures for sale. We have absolutely no idea what happened to the Airspeed fighter. It just seemed to fade away. You say you would like to get in touch with book collecting fans. Well, perhaps some of our readers will contact you.

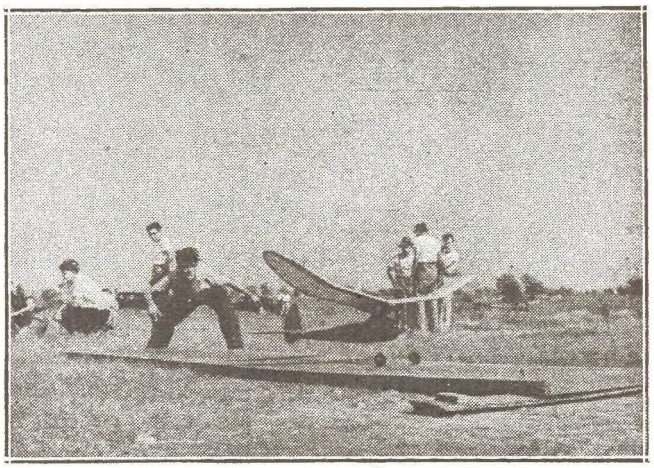
ERRATA

Public Relations of the Royal Canadian Air Force has informed us that the combat life expectancy of aerial gunners was misstated in our article "18-Minute Men of the Air" which appeared in the March issue. This figure was obtained by the Editors of FLYING ACES from newspaper accounts written by a columnist who is generally considered accurate, and does not reflect upon the author of the article.

THE END



A mutual love for model building and flying brought Marian Weidele and Leon Shulman together. They were married recently in New Jersey. Shulman was formerly director of the Kresge Model Club.



Sometimes photographs come to the Model Editor's desk without identification, as did this one. However, we're publishing it because it is one of the finest shots we've seen of a gas job taking-off.

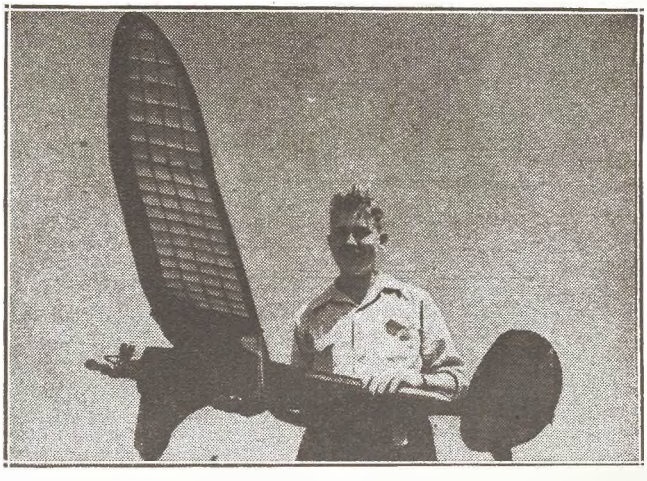
With the Model Builders

Another unidentified shot of a modeler who undoubtedly will recognize himself. His Ohlsson-powered polyhedral-flyer is also a good soarer. Note the absence of main rudder.

Jimmy Noonan, of Milwaukee, Wis., compares his rubber-powered Stinson 105 flying scale with another modeler who built a craft of similar design. Both ships are fine flyers.

Chester Lanzo, of New York, and his sensational Puss-Moth flying scale. This rubber-powered DeHavilland was consistently a high-time winner in every contest entered.

Kenneth Fisher, New York modeler, with his combination power plane-glider. Timer action retracts and extends landing gear wheel. Note polyhedral tail. Fuselage is planked and nose cowling removable.



Bob Batchelor with his Class "C" Carl Goldberg-designed "Sailplane" to which he added a wheel fairing instead of retracting gear. Note rudder skids. Bob Batchelor says the plane is more stable.

THE SHAPES OF THINGS TO COME

New and improved engine installations, wing forms, and propeller designs developed for military types, will be important factors in achieving speed and efficiency in the world race for super excellence in aircraft.

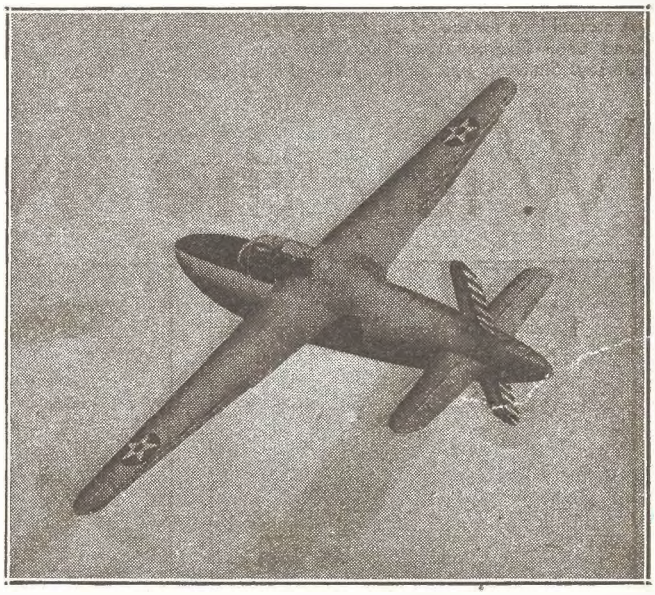
by Seton David, Jr.

Editor's Note: *These photographs and sketches present a few of the trends explored by American design. European trends parallel these in many instances as trends—the design of each nation differing in technical details. The details and the technical means by which they are achieved, form the secrets guarded religiously by each nation in the universal competition for aerial superiority.*

IF AMERICAN taxpayers want to know how some of their hard-earned cash is used to keep 'em flying, the Army Air Corps' Material Division is willing to give you a pretty good idea. They've allowed John Q. Public to have a look-see at some of the hottest ideas on the griddle.

This griddle is called, among other things, the "Jules Verne" or "Buck Rogers" department. For in this "idea hatchery" one can get glimpses of new aircraft designs which resemble fish, fowl, and rockets—or something that has never been seen before. The glimpses one gets serve to show the coming trend of aircraft design—planes with swelled wings, planes with knife-like wings, torpedo shaped bodies controlled by small rudders on their wingtips —noiseless perhaps, but swift, striking, and *more* deadly.

Yes, this year has presented one of the world's strangest paradoxes. On one hand we have the whole automotive industry in the U.S. — not only the world's largest and still expanding under the pressure of war, swinging into mass production of another type of automotive vehicle—the airplane. On the other hand we have the Air Corps' Material Division design engineers vying with the world's air laboratories and drafting rooms for the purpose of accomplishing the greatest aircraft advancement possible in a constantly changing picture.



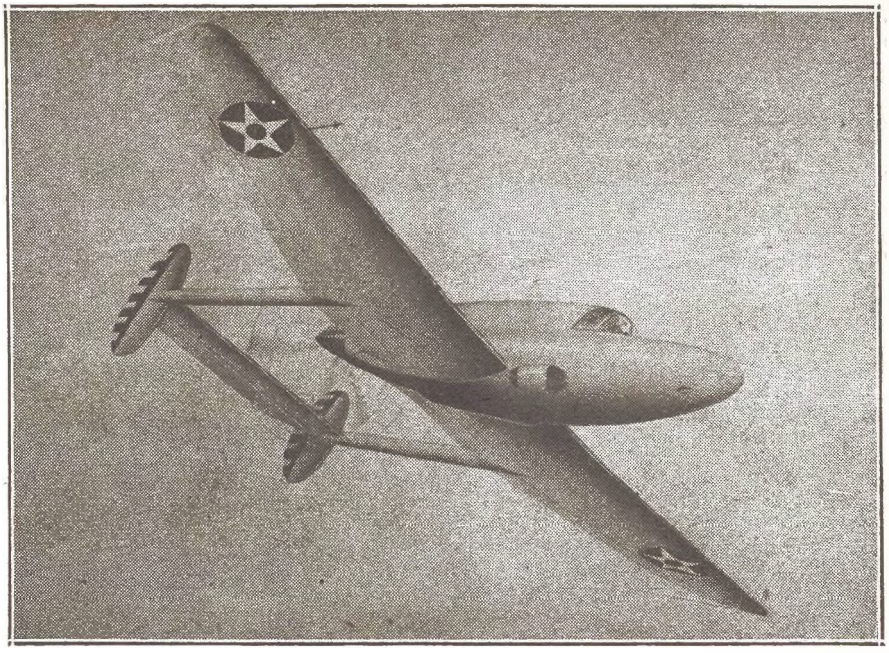
Resembling a "Buck Rogers" creation, the "Windmill" has a knife-like wing. By placing the engine in the center of the body, not unlike the Bell Airacobra, the propeller located at extreme rear rotates on an extended shaft. This eliminates turbulent airflow over the surfaces.

This four-engine bomber has its power plants arranged for the procuring of advantageous defensive fire-power. Note that the two tractor type engines are air-cooled while the pushers are water-cooled. From the size of this ship it might be dubbed "Air Whale."

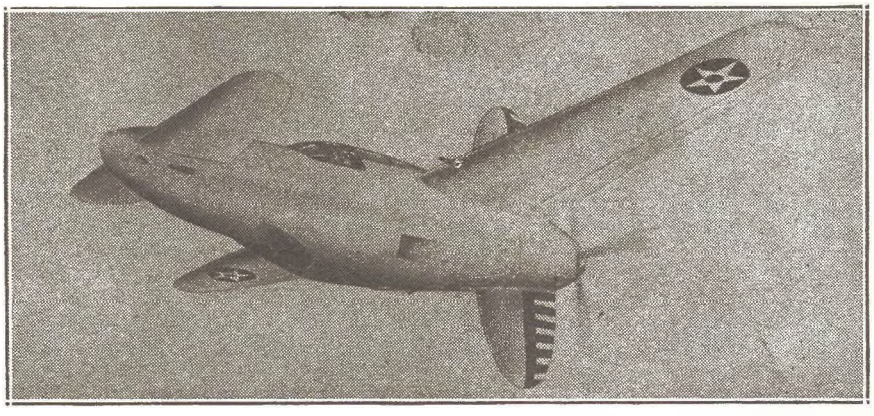
Mass production and experimental design! Paradox indeed! The tendency to first "freeze" upon an approved type fighter or bomber, and then, second, to flout these designs for the purpose of obtaining results beyond anything in the existing picture, are foremost Air Forces' objectives.

The production of airplanes upon which our nation's factories are concentrating at the rate of turning out an ever-increasing number each year rank with the world's best. Not "frozen" models, they are constantly under the study of engineers and technical experts for the incorporation of improvements which are planned and arranged for far in advance, "sneaked in" so to speak, so as not to interrupt the steady flow of the production line.

Nevertheless the United States dare not rest upon such laurels. For locked in laboratories of all leading nations, scrutinizing production procession, their own and their neighbors', are groups of scientists who look upon the most successful of current aircraft as already obsolescent. Sound aero engineers, the whole field of modern design is to them finger-tip



In the "Snipe" the single engine is completely submerged in the fuselage behind the pilot and drives oppositely rotating twin propellers. Vision characteristics are unexcelled for a pursuit ship of this type. Below: Another example of unobstructed vision for the pilot is shown in the "Cunard" machine. Conventional planes have a small wheel at the tail end while two large ones are up front. This type calls for reverse style.



knowledge. Their job is to conceive and create from the apex of present design achievement, the airplanes which are to fly *higher, faster, farther,* or more effectively, one, two, or five years hence.

THESE designers, in order to protect their own nations from surprise advancement in equipment on the part of other nations, let no design trends go uninvestigated. As with mass production, theirs also is a field of titanic competition.

In their search for the new and the superior they often deviate sharply from standard flying craft, producing designs resembling things as have never yet been seen over land or sea. Some of these radical flying shapes are studies of trends which may never appear in flight or be developed beyond the drawing board stages. However, the information gained from the exploration of such trends are invaluable.

In some few cases, an entire radical design is adopted and may seem quite commonplace by the time it is ready to be manufactured in production quantities. All are serious studies, based not on flights of the imagination, as might be supposed, but on known facts of past and present design and performance, tempered to a nicety with a knowledge of the limits in which it is safe to venture future possibilities on past progress.

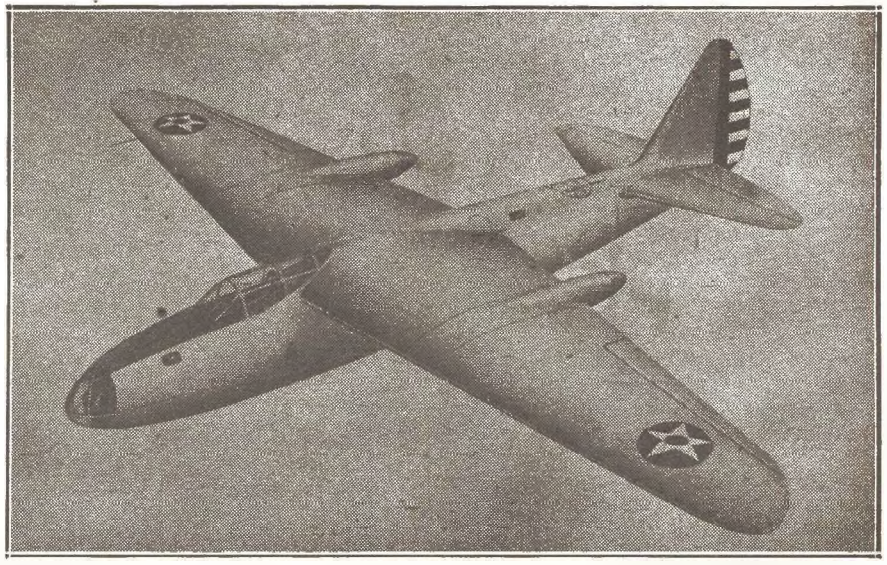
The agency which forms this guard of the future for the U.S. Army Air Forces is composed of a group of Air Corps officers and civilian engineers located at the Air Corps' Materiel Division, Wright Field, Dayton, Ohio. More specifically they are known as the DESIGN DEVELOPMENT UNIT OF THE AIRCRAFT LABORATORY. Fairly youthful and typically American in appearance, there is perhaps something of the dreamer in the make-up of each, but this element must be strongly superimposed by hard common sense.

By visitors privileged to glimpse at the work of these specialists, the organization has been dubbed invariably the "Jules Verne" or "Buck Rogers" department. As pointed out above, however, such titles are definitely misnomers, as no design is ever started, the details of which are not based on sound aeronautical criteria.

Basically equipped for his work with an extensive education in aeronautical engineering, flying experience, and definite mental acuity, the design engineer must know the oldest and newest information obtainable regarding the earliest and latest airplane development trends in this and every country in the world. The latest information comes to him in the form of reports, many of them confidential military intelligence documents.

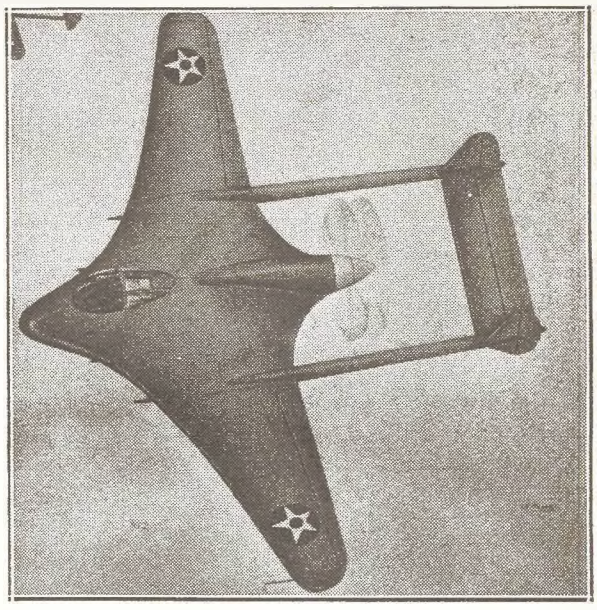
He has also at hand detailed studies of the design and performance of each individual airplane flying in the service today, under production for service, under test for production, and in the preliminary wind-tunnel model test stages. Published articles seldom have great bearing upon his work, for he has long since been well abreast of writers on his subject.

Based upon known facts of past and present aircraft performance, of strength of materials, of aerodynamic factors and their influence upon performance, the airplane he designs,



Bearing a strong resemblance to the Douglas A-20A, the "Eagle" is driven by two powerplants wholly contained in the fuselage, collectively driving twin pusher propellers.

The "Bat" is a single-seater fighter whose counter-rotating propellers spin from a shaft extension of a concealed engine. Enlarged center-section enables narrow chord wing panels. Nose and leading edges bristle with guns.



no matter how strange a freak it appears to be, is never the product of invention or rarely of an individual idea. It is rather an orderly and logical development. Individuals contribute ideas, but the result will become a pooling of individual ideas, and a compromise between technical and tactical possibilities, before the airplane flies. The time of flight is usually gauged at from three to five years from the start, because it is known from experience that to get a completely new and radical design sufficiently perfected for flight production, it cannot be hoped for in a shorter period of time.

DEVELOPMENT of a new design follows a rather interesting procedure. The DESIGN DEVELOPMENT UNIT may conceive from its knowledge of latest engine, propeller, and aerodynamic development, a bomber, pursuit, or other military type with definitely improved characteristics over the best current article. The performance curves and reports completed, the design is submitted through engineering channels to an Air Corps Board composed of experienced members of the tactical squadrons of the Combat Command. These are pilots who look upon an airplane as a practical flying weapon for use under highly specialized fighting conditions.

Perhaps in presenting the new design the engineers will have ready, with the curves, drawings, and technical data, a painting of the finished craft as it will appear ready for flight. This idea borrowed from the auto industry aids busy chiefs in gaining an immediate conception of how the new plane will look and operate, saving thousands of words of description. The assistant, in fact, who at present prepares these paintings for the Air Corps, formerly performed similar work for the Chrysler Corporation.

A second method of design development is that occasioned by the issuance of a directive by the Air Corps Board for a certain type of plane based completely upon tactical demands of the flying forces. The directive will specify one or more characteristics considered essential, such as range, speed, altitude, fire power, etc., all well in advance of those of current aircraft.

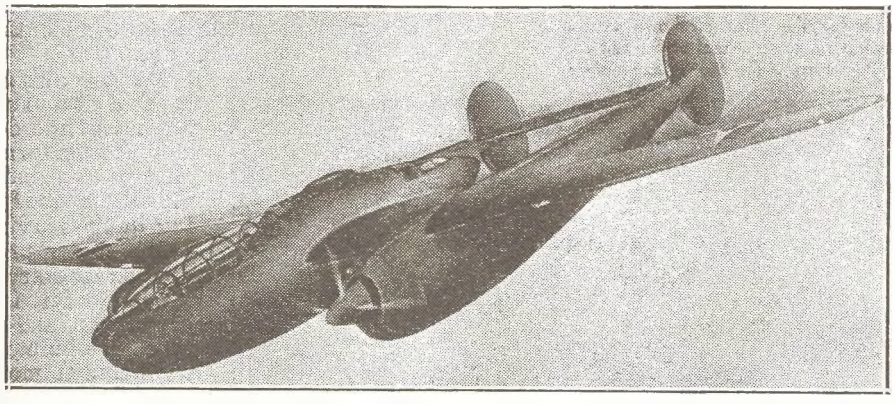
Where the design engineers submit an idea for an advanced plane, the Air Corps Board considers it from the point of view of tactical advantages; where the Air Corps Board issues a directive to the Design Unit for an advanced plane having certain characteristics, that Unit studies it from the point of view of technical possibility, Always there is, as put by an engineer, the "shotgun wedding" of military demand and technical possibility, the final termination of which is invariably a compromise.

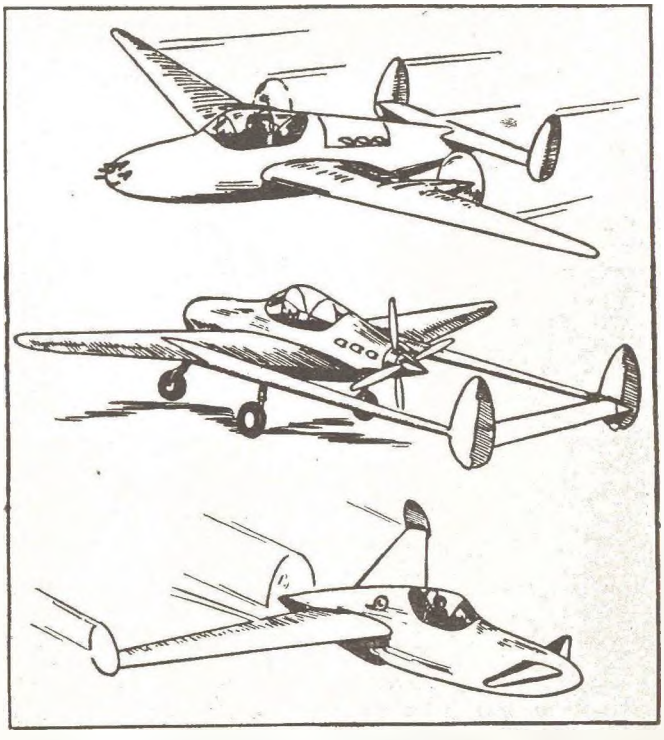
The military demand, for instance, may be for a certain high fire-power and a definite high speed. The design engineers know, founding their knowledge on the current stage of advancement and an allowable expectancy of improvement, the latter based upon meticulous calculations, whether or not the combination can be achieved. If not, one or the other element must be sacrificed to a certain extent, the sacrifice depending upon the tactical purpose or type of weapon for which the airplane is intended. Each type of airplane, however, has its own set of compromises which cannot be evaded in the face of hard technical facts.

To the designers it is the obtaining of desired characteristics which is important, not the form of structure in

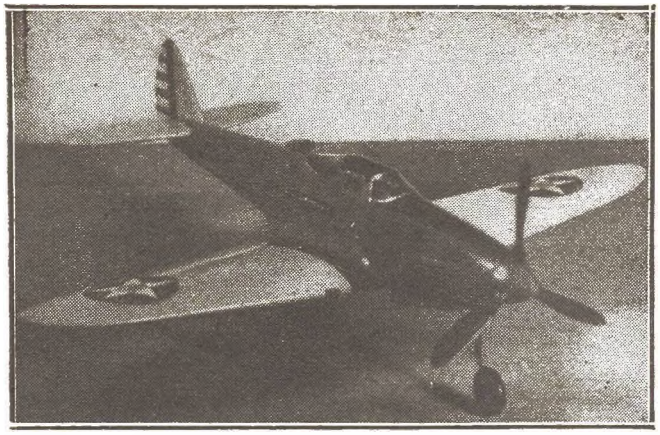
(Continued on page 79)

With tail surfaces supported on extensions of the engine housings, the "Shrike" design makes it possible for a heavy concentration of machine gun fire directly forward and aft. Power turret atop fuselage allows firing in full circle.





Not the doodling of an unemployed aero engineer, but shapes of things to come! These designs of tomorrow may become realities during the coming post-war period. Clarence L. Johnson, chief research engineer of Lockheed, envisions these speedy craft with these illustrations. Machines have commercial appeal, too.



Even as a scale model, the unpretentious Airacobra has a deadly look.

AIRACOBRA!

A hard hittin', hard shootin', cannon snortin' Bell P-39 is this month's presentation in our solid scale line.

by Harry Appel

AT THIS WRITING the Bell P-39 Airacobra is in action with both the British and Red Air Forces. Up to a certain height, the Airacobra is faster than either the Spitfire or the Hurricane, two of Britain's best fighting planes. In Russia, the Red pilots have used these planes to blast enemy tanks to smithereens.

In the U.S. the Airacobra has undergone some minor changes which have increased its speed and cruising range. Latest models are equipped with a bomb-shaped gas container slung beneath the landing gear. After the gas has been consumed the container can be dropped—or if the ship has been engaged in a dog fight, dropped to lessen weight and fire hazard.

Now in mass production, the Airacobra has been tested at speeds of 400 miles an hour at 15,000 feet—the level at which its engine gives maximum performance. A short time ago, however, a P-39 was tested with a 1,375 horsepower Allison and it hit 415 m.p.h. at 20,000 feet.

The P-39 packs a wallop as no single seater has ever packed before. It is equipped with either eight .303-caliber machine guns—or six guns .303 and two .50 guns plus a 37 mm cannon which fires through a hollow shaft protruding through the propeller spinner cap. The shell hurled through the cannon muzzle is about an inch and a half in diameter laden with high explosive—which is big enough to knock out of the sky with a single hit, any airplane ever flown. Another advantage in the Bell is that for an interceptor-fighter it carries more gasoline than most any other type planes—which in this case is 147 gallons or enough to take it 965 miles if not flown at full throttle.

Specifications of the Airacobra is as follows: Span, 34 feet; length, 29 feet, 9 inches; height, 9 feet 3 inches; wing area, 213 square feet; ceiling, 36,000 feet.

Fuselage and Tail Surfaces

IN TRACING the outlines of the fuselage in order to make stiff paper templates, do not include the propeller spinner cap, air scoop (D-D) or the vertical fin. The section where the wing fits to the body as shown by the dotted lines, is to be scooped out. The portion of the curved windshield may be made integral with the fuselage or left off and worked to shape with celluloid.

Trace the side view of the template onto a piece of medium-hard balsa and trim to shape including the scooped-out portion underneath. Plates 1 and 2. The top view is next to be traced. Complete by tapering the fuselage surfaces as shown. If the cockpit is to be a part of the solid body, the window outlines should be marked off and painted light gray or aluminum. If celluloid is used, the structure will have to be made in sections, bent and held with model pins and held so that clear cement will fuse with the joining sections.

The propeller spinner is carved to shape and blades added as shown in the front view on Plate 3. A small dowel is cemented in the center of the spinner cap to simulate the muzzle of the cannon. Vertical fin and rudder is made in one piece and cemented to the body. Plastic wood or other filleting material is applied around the joints and then sanded to look integral with the surfaces surrounding it. It is best to mark the hinge outlines on both sides of the rudder before mounting.

The stabilizer and elevators are made in one piece and streamlined as shown by the profile view on Plate 2. When completed, it is cut in half and cemented to each side of the vertical film. Filleting material is applied and shaped in the same manner as was done on the fin. If the modeler prefers, it is best to assemble the whole tail unit first and then apply the filleting material. The air scoop is fashioned from a piece of scrap balsa.

Wing, Landing Gear, Assembly

THE WING may be made in two methods. The first is shaping right and left panels individually, and the other is making the wing in one piece. The latter method was the one used on the model shown in the photographs above. Since the author finds this the easiest method, it is herewith described.

Obtain a medium-hard piece of balsa whose dimensions will accommodate front and top views of the wing. From the top view drawing on plate three, the modeler can make half a template of the left wing and then by turning it over, retrace the lines in order to get the full wing shape. Transfer the outlines to a stiff paper template, cut out, and then trace the shape onto the wing block.

The wing is carved in the usual fashion employing both a small block plane and knife and alternately, the use of sandpaper for smooth finishing. From the wing sections designated F-F and G-G, the modeler can make wing templates for true checking purposes. When the wing is complete, mark out the ailerons and wing flap outlines as shown on the plans.

The shaded area on the wing plan drawing indicates the filleting surfaces which is worked out in the same manner as was done in the tail section. Since this is an important feature of the model it should be made very carefully. Of course, this is done after the wing is attached in place. The wing step (shown in a criss-cross

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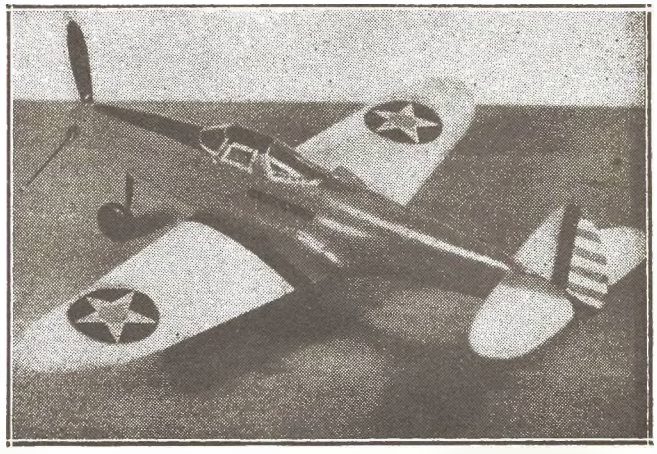
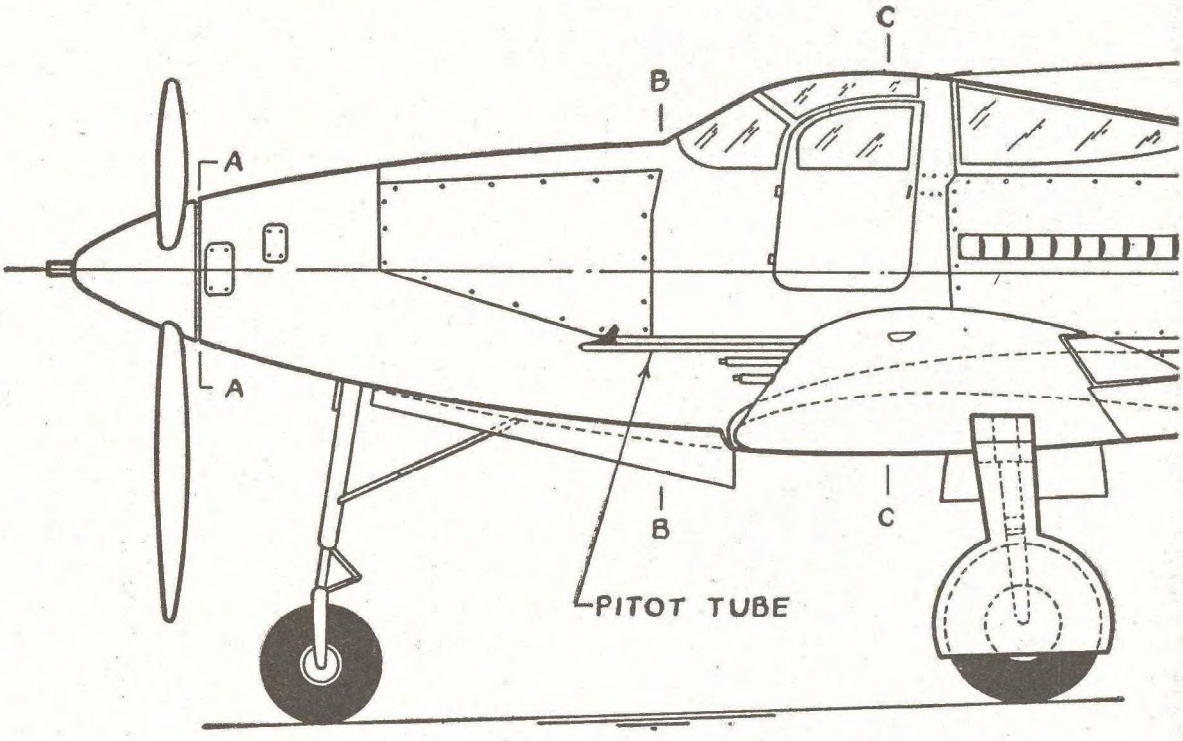
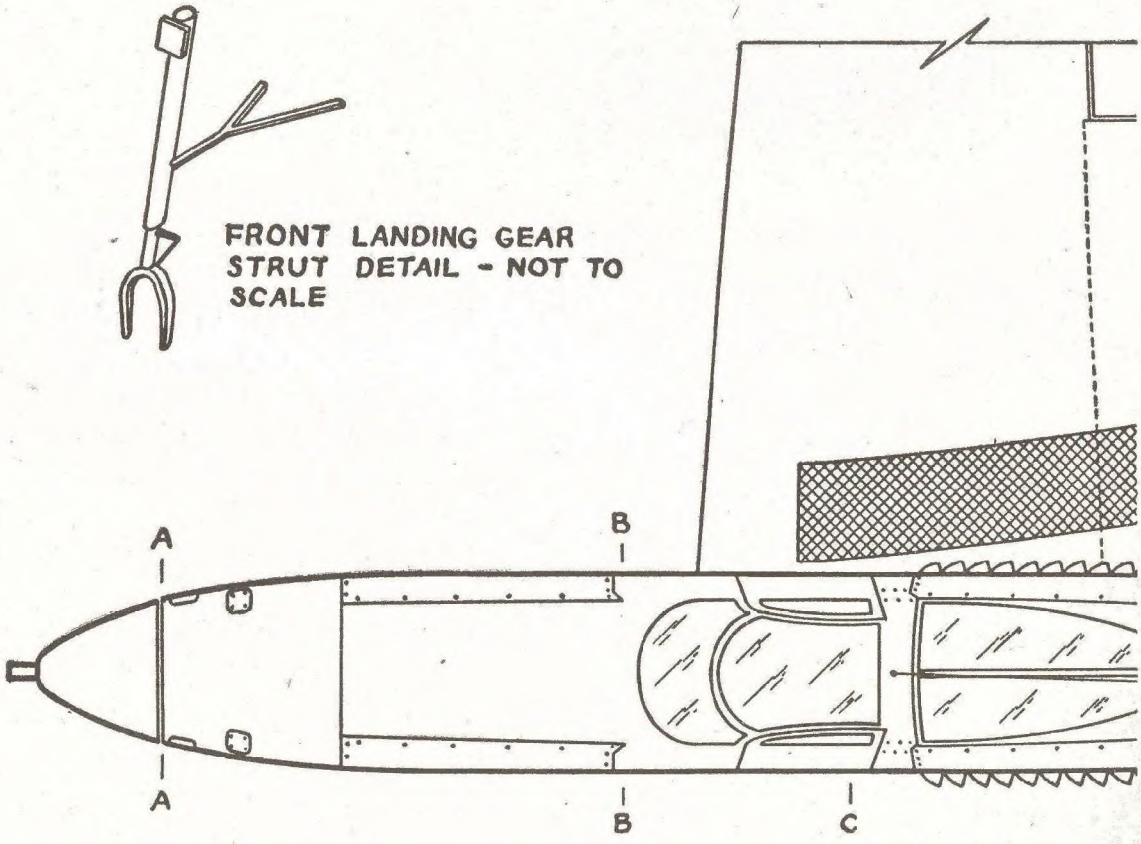
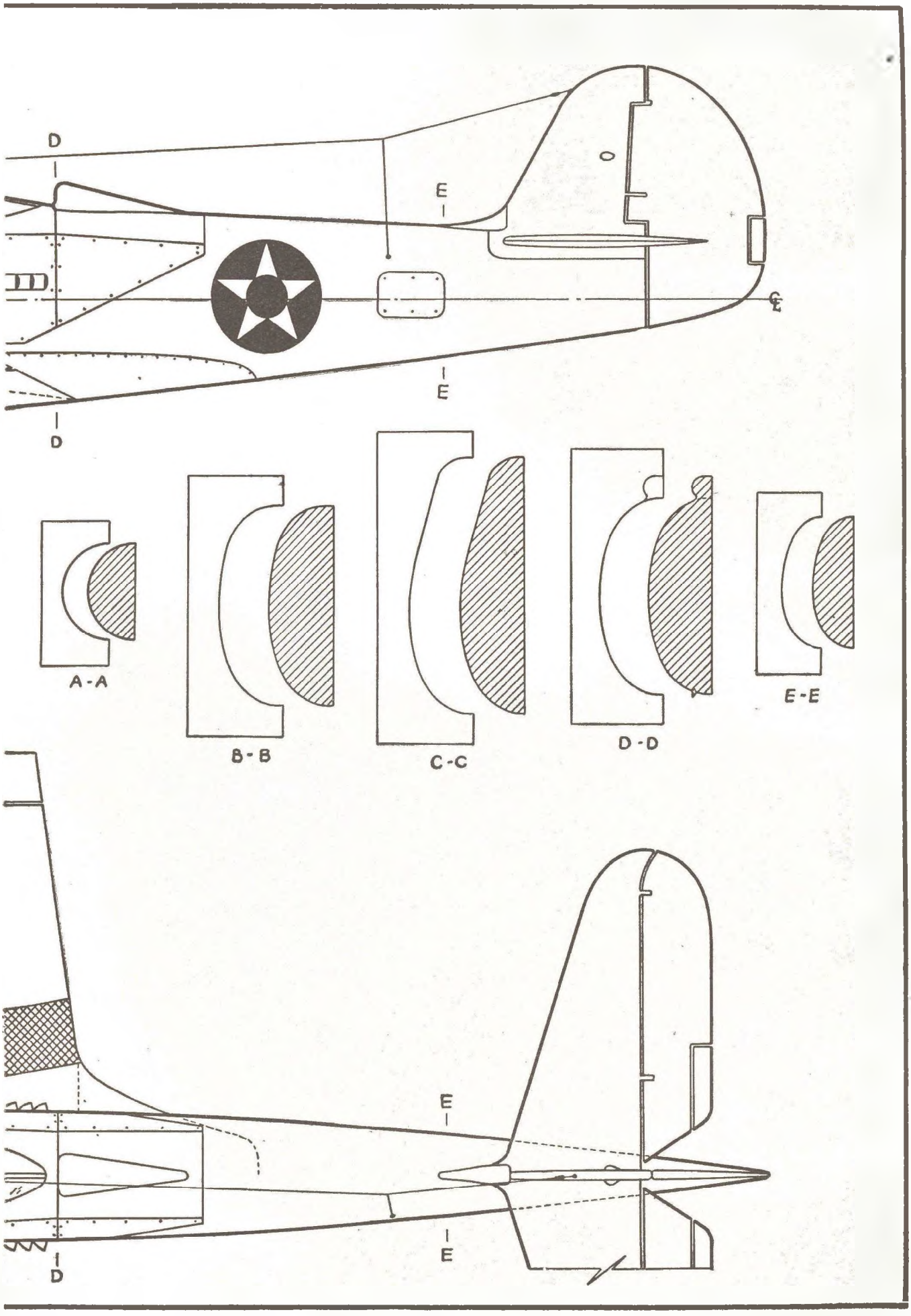


In take-off position, the Army Bell P-39 is a slick job for any admirer.



FRONT LANDING GEAR STRUT DETAIL - NOT TO SCALE

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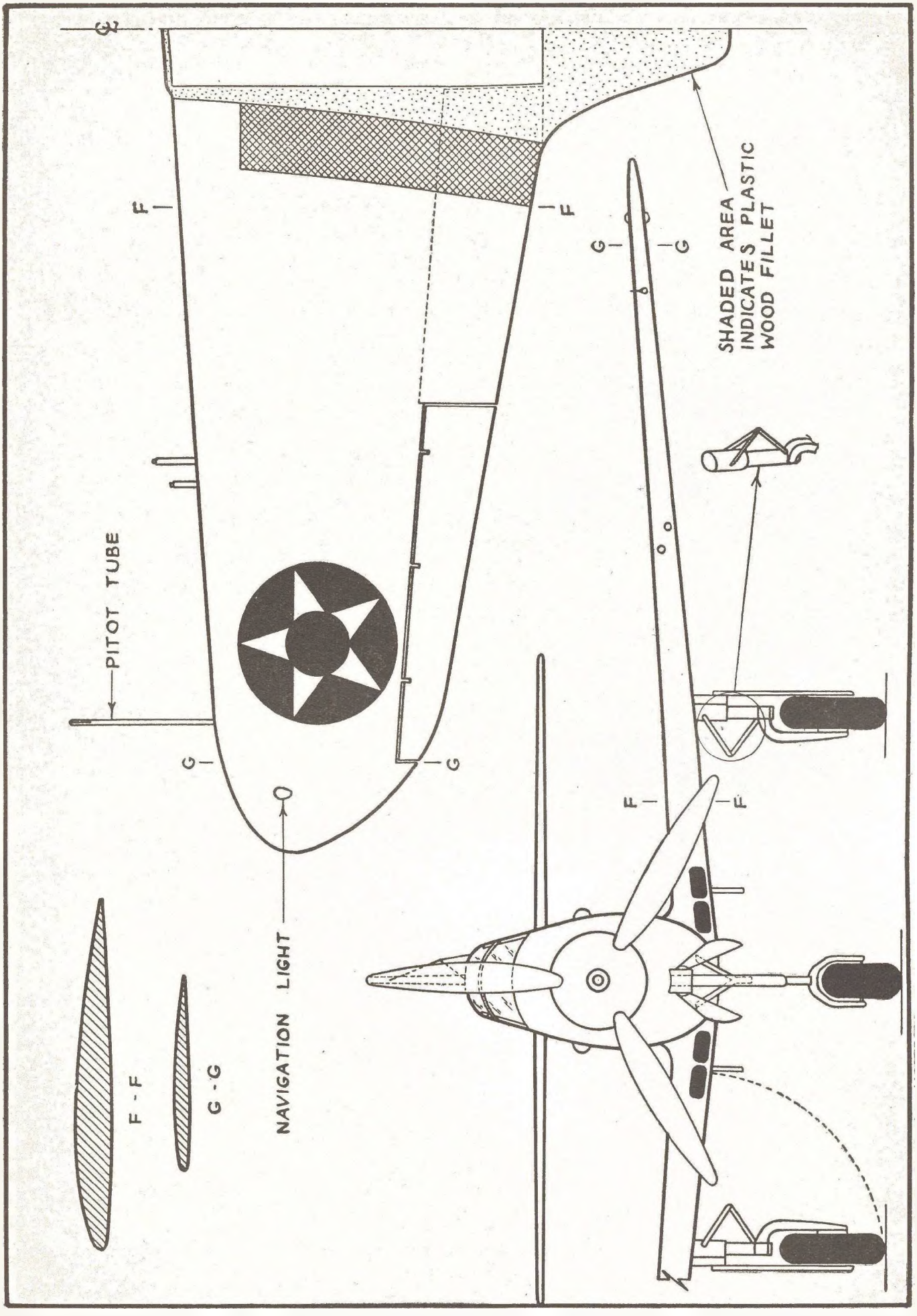
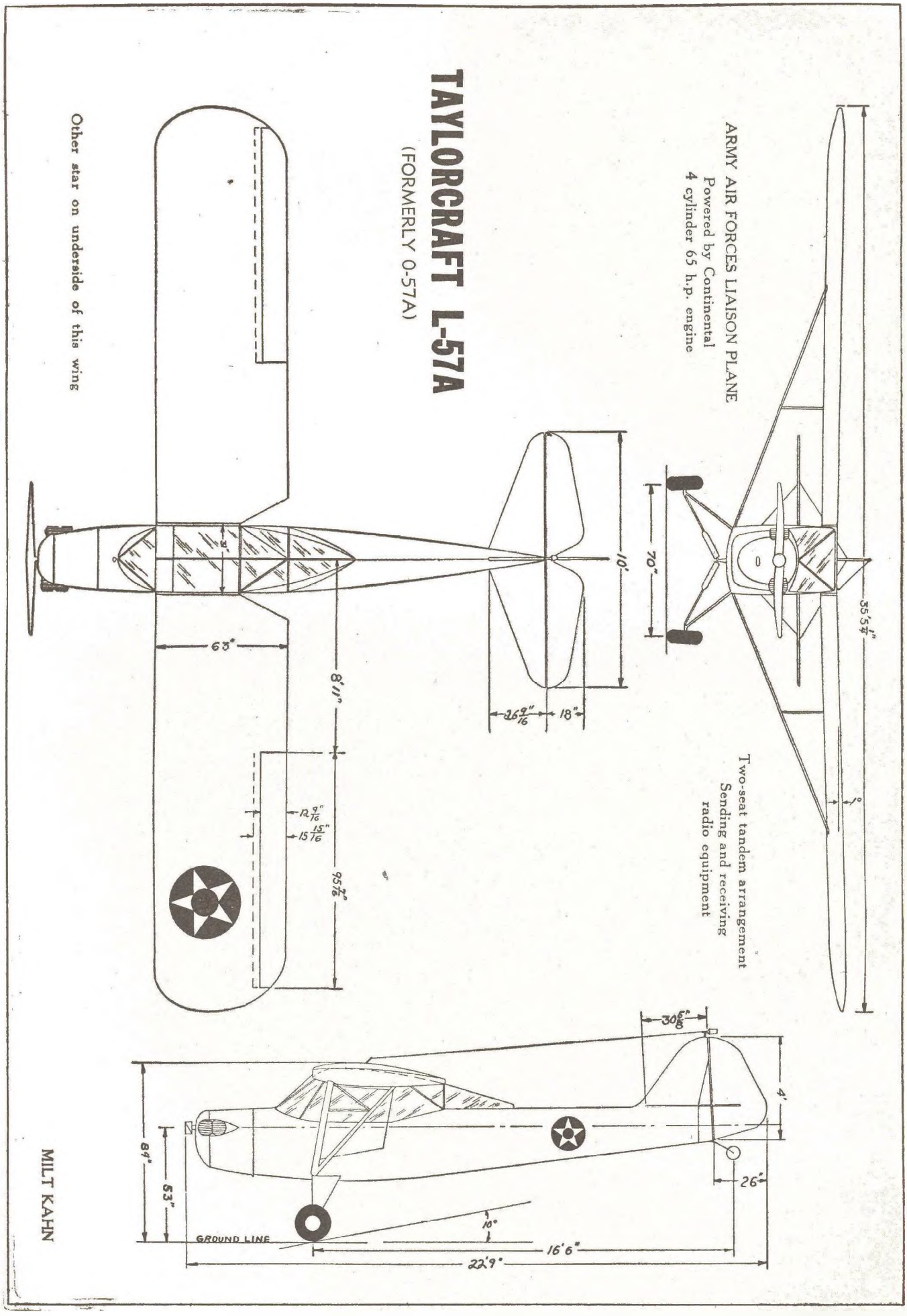
CARVE THE BELL AIRACOBRA P-39—Plate 3



SCOOP THREE-VIEW DRAWING—"FLYING JEEP"



Although the 180 degree turn is a simple maneuver, it must be executed flawlessly—especially when done in the vicinity of Randolph Field, Texas, where there may be more than three-hundred planes in the air at a time. Embryo pilots and instructors find these solid models, counterparts of the types used in basic training, very helpful.

Life at Randolph is rigorous and vigorous and there's no time for stalling—except, aeronautically speaking—in the air. So before roaring upstairs in their sleek 450 h.p. BT-9's the instructor, right, shows them each movement of the plane when they pull its nose up and hold it there until the ship just loses all lift and swooshes down again.

Most spectacular of aerial acrobatics is the loop. Control positions and pressures are explained before going aloft for the "real thing." On left, model plane in instructor's hand dives to gain speed, then stick is eased back to lift nose, full throttle and up into a climb, over on your back, ease up on throttle, into a dive, finally levelling off.

Power diving begins with "peeling off." Next to the loop a plane in a dive is a fascinating thing to watch. Contrary to popular opinion a plane in a dive does not have its engine wide open. If it did the propeller would be turning over so fast it would act as a brake. Engines are cracked slightly and nose down position does the rest.

MODEL MANEUVERS

THE problem of graphically illustrating aerial maneuvers while on the ground always puzzled the flying instructors at Randolph Field, Texas, giant basic flight training school of the Army Air Forces, until a young lieutenant who got tired of wiggling his hands all around to make dodos get the point, pounced on the idea of using models.

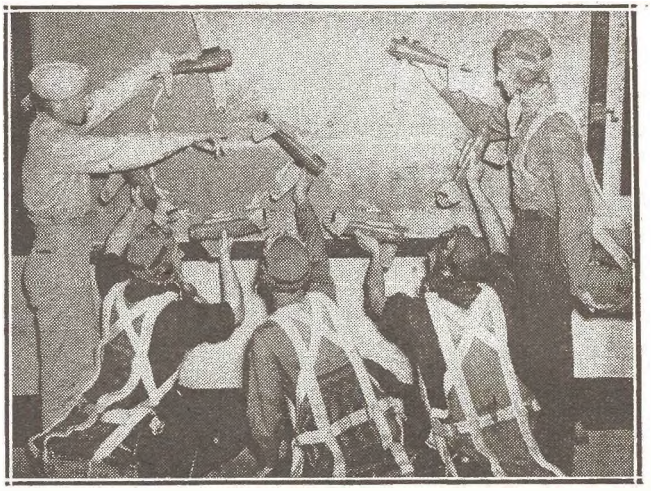
From a model builder's viewpoint, the "objects" used to emphasize a maneuver have little in common with contest type solids.

Instructors find that when primary and basic training students go through the maneuvers with these solids first and understand the "idea" thoroughly, they can go aloft and execute them with more precision than they could ordinarily by just talking about it. THE END

Enframed by the nose, prop, and wing of a BT job, three future pilots of Uncle Sam's aerial forces learn various aspects of flying technique from their flight instructor. Proper gliding angle preparatory to landing is being demonstrated. Who said models are only for kids?

The "pylon eight" is a series of precision banks and turns during which time the fledgling pilot keeps his eye on the point of reference. Strings attached to each model plane represent the sighting line while the chalk figure marks path flown. Instructor is in the center.

It's easy when done with model planes but the chandelle, a variation of a climbing turn requires constantly varying pressures on the stick and rudder. Right to left, chandelle starts from level flight, swoops down in a dive to gain speed, up into a 180 degree climbing turn, until the stalling point is almost reached, then slight rudder and forward stick to get nose down and continue in level flight.



The "lazy eight" maneuver is composed of a series of dives and zooms. Here you see the instructor on the left with his model plane starting into a dive, the first step of this maneuver. Second figure shows the nose of the plane passing through a point on the horizon as the ship races earthward. Then comes the recovery, a steep 180 degree climbing turn to its peak and down again through the point.

You can't pick up a newspaper these days without reading about dive bombing. This precise method of dropping destructive explosives, developed in the U.S. is a familiar art to Yank pilots. Students above hold models in line-up preparatory to hurtling down at an enemy battleship—the white thread marks the line of sighting.

To get the enemy off your tail the pilot resorts to a famous trick used in World War I days which was invented by the German ace, Immelmann. This maneuver also has a dual purpose and that is in getting the enemy off your tail you reverse the situation—you hope, and get on his tail with extra altitude. It's a fine art if you know how.

Cadet breath taker-awayer is the spin. The first spin to a cadet, perhaps more forcefully than any other maneuver, brings home to the embryo pilot that he is indeed a flyer, a thing apart from his benighted brother sworn to more peaceful pursuits. Think you can take it?

After getting visual instruction which saves much gasoline and vocal exercise, students climb into their aerial classrooms and proceed to show their instructor just how well they absorbed their ground lesson. If you have a model at home, why not try some maneuvering?

"Hangar flying" between flights aloft. " . . . So, I pulled the nose up, kicked right rudder and did two turns of a spin," declares a Flying Cadet at Randolph Field, and he proceeds to illustrate the maneuver for the edification of his classmates using a model for emphasis.

FROM R.O.G. TO AT-6

A few months ago this young man was building model planes. Today, a commissioned officer in the Army Air Corps, he is now instructing among others, former modelers in the fine art of flying.

Leon Jerome Friedman, Lieutenant, Air Corps, United States Army.

IT'S A LONG WAY from warping the wings of a stick model to adjusting the trim tabs of a military training plane, but these days anything can happen. Take the case of Leon J. Friedman, a young model builder, of New York City. Just a few short months ago it was impossible for me to walk down a certain street every morning without seeing "Lee" nonchalantly ambling along with some packages under his arm. He was an errand boy and while he did his daily chores conscientiously enough, his heart and mind were up in the clear blue.

I caught up with him one morning and he excitedly told me that he had taken his first flight lesson in a Cub. "It was easy as pie," he said. "Nothing to it. My instructor thinks I've got what it takes."

"Did he find that out all in one lesson?" I asked.

"Guess so," Lee chirped. "Model building does a lot to make a fellow familiar with theory of flight and control movements of a plane, you know." I agreed with the lad, for it had been my experience, too.

When I spoke with Lee again several weeks later he proudly told me he had piled up the high time of three hours and to him landings were just ho-hum.

"I find nothing hard about them," he would tell me. I wondered whether the kid was getting over-confident or whether he really had that stuff they call "instinct."

At one of the local gas model meets I found Lee bent over a stubborn Class "B" engine trying to coax it into life.

"How's the hot pilot coming along?" I asked.

"Had to give it up," he said without even looking up. "Running short of money, I decided to take the Air Corps preparatory exam at an uptown school."

A short time later Lee dropped in on me and modestly told me that he passed the school test with one of the highest ratings and also went through the Air Corps' cadet entrance exams with flying colors. He was now standing by awaiting shipment orders. "Ma was a good sport about it. She signed a waiver because I was a bit too young for the minimum age," he added.

Learning the art of soldiering is among the many other things a flying cadet must know. This photograph of Cadet Friedman was taken at Randolph Field, Texas.

On the day Lee was to board a train out of Penn Station bound for a primary flight training school he looked me up to say so long.

"I wonder whether the few hours flying time I've had will stand me in good stead," he murmured. "I heard they're pretty tough on the primary boys. Washouts come fast and often."

"I dunno, keed," I said, "I have a hunch you'll come through—I hope."

Time passes quickly. The other day a neatly wrapped package arrived in the mail. I opened it and pulled out a photo of a handsome young lad in the uniform of a flying officer.

"Lee!"

There was a letter, too. Listen—

"The thrill of becoming a U.S. Army pilot-officer—a dream I've had ever since I built my first model airplane—at last has become a reality.

"After about 30 weeks of intensive flight and ground training, I recently received the silver wings and gold bars of a second lieutenant in the Air Corps Reserve and am temporarily assigned to Brooks Field, Texas, where I was commissioned.

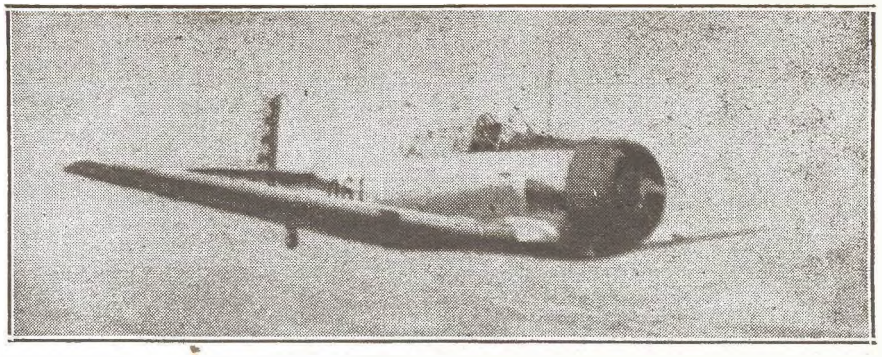
"On completion of the course at the Advanced Flying School here, I was named as one of the pilots to fly student observers on their training missions at this, the nation's only Advanced Observation Flying School. From here, the trained 'Eyes of the Army' are sent to tactical observation squadrons to patrol our coastlines or perform reconnaissance and other missions on the far-flung battle fronts.

"As you know my flight training

Dressed in flying togs, parachute, radio phones, and sun glasses, Pilot-officer Friedman steps into his fast trainer for a X-country flight.

by Jerome Jacobs

began at Pine Bluff, Arkansas, where I received primary training in one of the best training ships in the world, the Fairchild PT-19A. After ten weeks of intensive work, during which time I had that once-in-a-life-time thrill—my first solo—I was sent to Randolph Field—the 'West Point of the Air.' Here the mysteries of formation, instrument, and night flying were unravelled for me. Quite a thrill in itself was flying the North American BT-14—the first high-powered ship I ever flew.



As assistant flying instructor we see Lieut. Leon Friedman (front cockpit) observing the reactions of a cadet to level flying. The ship is an AT-6.

"THE INSTRUCTION I received at Randolph Field laid the groundwork for my training at the Advanced Flying School, and it was here that I received the training most conducive to my future success in the Air Corps.

"Formation flying, as you know is an exact science. Following the signals of our leader, we cadets were taught to execute echelons, V-type, and other formations in almost perfect harmony and unison. Towards the end of our period of training, signals from a leader were dispensed with, and we found that we could follow his ship without losing or breaking formation.

"You have doubtless heard the expression, 'on the beam.' Well, that expression is more than just a phrase to me. It represents many hours of completely blind flying under the hood with an instructor or another student in the other cockpit, and countless times orienting myself, 'bracketing the beam' into the cone of silence, and effecting a let down onto the field. I believe this to be the most valuable training I ever received in the Air Corps, for some day I may be forced to fly blind and depend on the instruments alone in order to make a safe landing at my home base.

(Continued on page 73)

FLIP THE "FLIPSTICK"

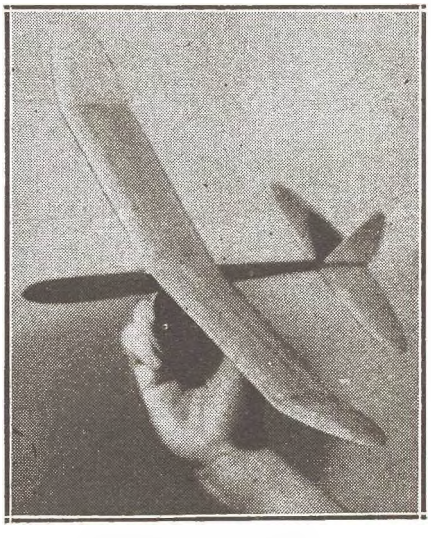
Some glider, we'll say—and so will you!

by Louis Bucalo

THERE isn't much I can say that will fully describe the performance and beauty of the "FLIPSTICK." Use of polyhedral and high wing-low tail give this glider a flat glide and a quick pull-out from bad throws. This ship is solidly built. Do not fear a little extra weight because it is weight plus "oomp" technique that gets the glider up. The design and adjustments keep it there. You can best be convinced by getting to work and proving the efficiency of the "FLIPSTICK" to yourself.

The wing is made from balsa 3/16" by 3". Use a grade ranging between soft and medium. Because the wing has four panels instead of two, it is imperative that very strong cement joints be made. Sand each panel to an accurate rib section, coat the butt end with cement and allow to dry.

After each panel is cemented to the adjacent one, four additional coats of cement are applied with a brush. Silk is then glued over the joints insuring strength as shown in the plans. Brushing the cement on forms a smooth, neat-looking skin. Each coat should extend ½" over each panel and should be permitted to dry before the next is applied. For a slick finish, apply four coats of clear dope, sanding after each is dry, with wet-or-dry sandpaper.



This is the "Flipstick"

Warp in a slight wash-in on the right wing (increase of angle of attack near tip) and slight wash-out on left wing. The right wing is seen in looking forward toward the nose of the ship from the rear.

The fuselage is made either from light 3/16" flat pine or rock-hard ¼" balsa. In the original ship, pine was used. Shape fuselage as shown on the plans and sand to given cross-sections. Remember to enlarge the plans of the fuselage as it is shown half-scale. A "V" cut is put into the top of the body to hold the wing. Sand the fuselage well and repeat the finishing procedure used on the wing.

The stabilizer (shown full size) is cut from ⅛" sheet and finished in the same manner as wing and fuselage.

The rudder is shown half-size so it must be enlarged. Using 3/32" flat follow same procedure as in stazilizer.

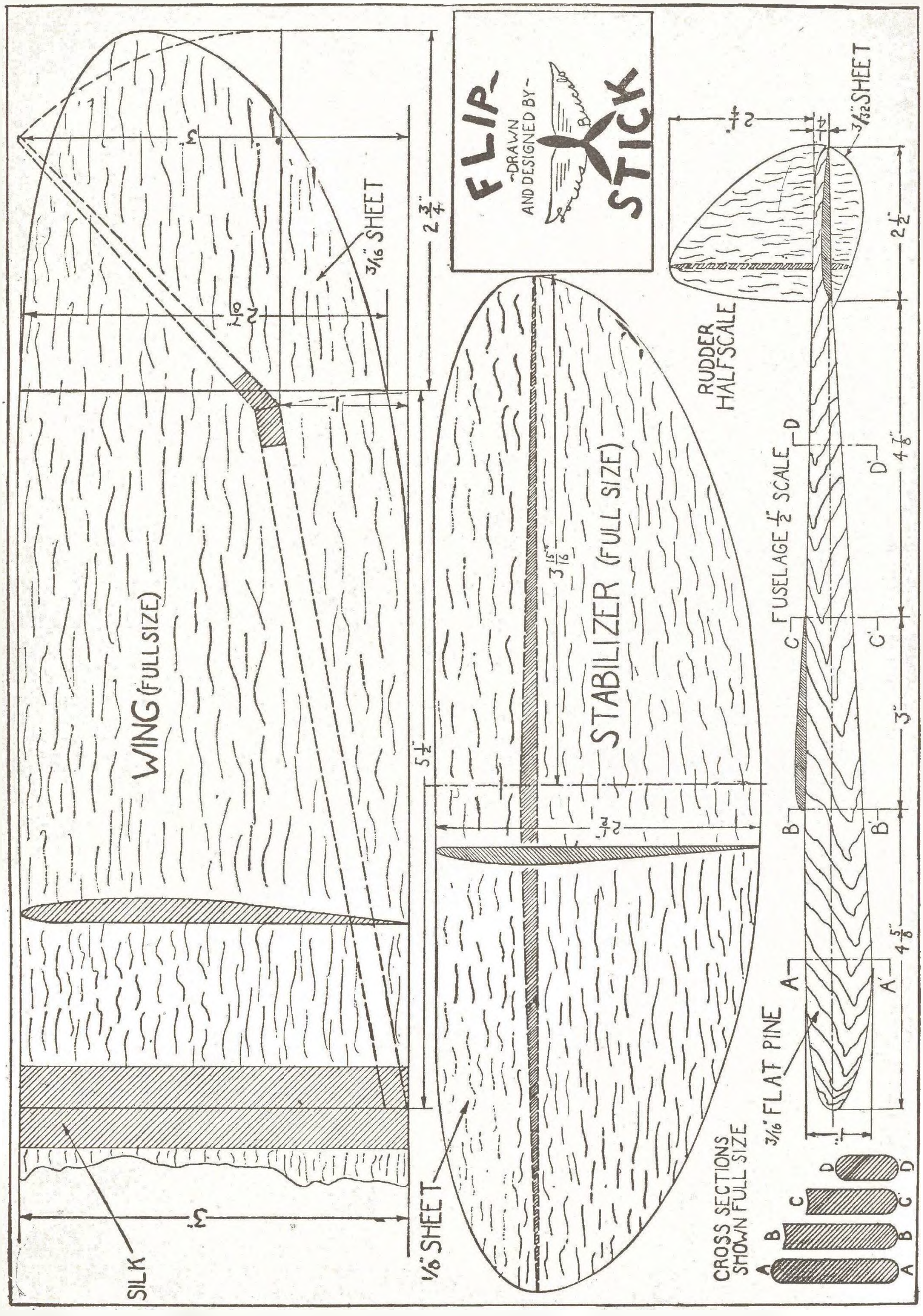
Cement wing and stabilizer to the fuselage as shown on the plans. Check perfect alignment. Cement the rudder in place and set it for a slight right turn. The wash-in of the right wing will prevent the ship from banking too steeply. Apply four coats of cement over the wing-fuselage joint.

The glider is thrown into a slight right bank and glides to the right. Pull-out is automatic, and because both climb and glide are to the right, no altitude is lost. In testing the glider, make four throws, gradually increasing the speed of each.

Better put your name and address on your "FLIPSTICK" and "flip" your model success to its zenith.

THE END

TURN TO NEXT PAGE FOR WORKING DRAWINGS


WING (FULL SIZE)
3/16" SHEET
SILK
1/8" SHEET
STABILIZER (FULL SIZE)
FLIP-STICK
DRAWN AND DESIGNED BY
RUDDER HALFSCALE
3/32" SHEET
FUSELAGE 1/2" SCALE
3/16" FLAT PINE
CROSS SECTIONS SHOWN FULL SIZE

News of the Modelers

All model clubs are urged to send us reports of activities for inclusion in this department—advance dope on contests, club activities, and results of meets. Such news should be sent to us as promptly as possible.

NACA Employment for Girls

Feminine model aircraft makers are wanted by the National Advisory Committee for Aeronautics. The Civil Service Commission has asked the Academy of Model Aeronautics to announce that NACA will hire immediately girls between the ages of 16 and 25 who are experienced model-plane builders and flyers to work at the Government's aviation laboratories at Langley Field, Va. Their work will be vital to the war effort and will consist of specialized duties, including work on aircraft instruments and the balancing and testing of airplane models in the NACA wind tunnels. Starting salary is $1,260 a year with full opportunities for advancement. Applicants who qualify will be hired immediately, pending the establishment of a Civil Service register.

Qualified girl aeromodelers should write to William R. Howell, Special Representative, Civil Service Board, Fort Monroe, Va. Ask for application No. 4-691 which Mr. Howell will send together with any other additional information that is desired.

Aviation Education

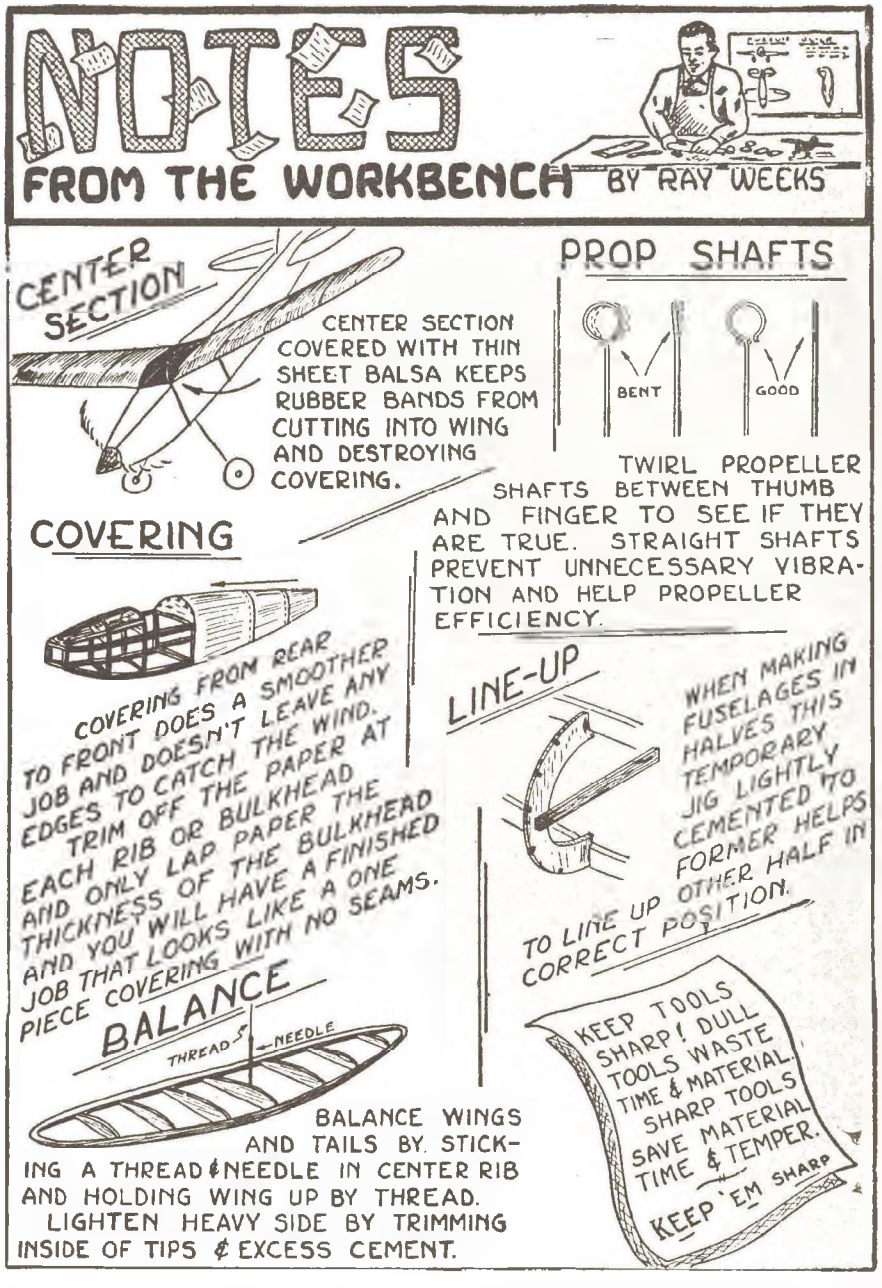
Plans for the immediate installation of junior aviation courses in public and private schools throughout the country was the keynote of the First Air Youth Aviation Education Conference called by NAA in Washington recently. The ground work also was laid for setting up educational courses for NAA's Junior Air Reserve, patterned after ground school work given Army and Navy pilots. An outgrowth of NAA's conference will be a series of meetings between aviation officials and educators in all parts of the country.

Joint Aviation Committee

The U. S. Office of Education and the Civil Aeronautics Administration announced recently that they are joining forces in an all-out drive to "air-condition" American youth by stimulating aviation education in elementary schools and high schools. The CAA has been training pilots in colleges and universities since 1939, and the proposed program is designed to round out this work by carrying aviation to secondary schools.

By turning over to schools responsibility for teaching preliminary units in basic air training, the move is intended to create in school youth a thorough-going knowledge basic to a candidate for pilot training and to increase public interest by instilling a thorough knowledge of aeronautics beginning in the earliest grades.

The Army and Navy, through their respective Assistant Secretaries for Air, Robert Lovett and Artemus L. Gates, will work with the two agencies to form policies and draft plans, it was announced.



VFW to Start Model Program

The Sons of the Veterans of Foreign Wars of the United States, according to their official publication, "The Acorn," are soon to embark on an extensive aeromodeling program. "The Acorn" recently announced that under the provisions of the mandates of the Forty-second National Encampment of the VFW held in Philadelphia, a model airplane building program is soon to be inaugurated.

The VFW's National Department of Americanism is now working on all the details and expects soon to distribute a bulletin containing complete information for the units to be tied in with the NAA Air Youth program. Although the initial announcement was brief, the VFW reports excellent response to the idea.

Model Aviation Has Gone to War

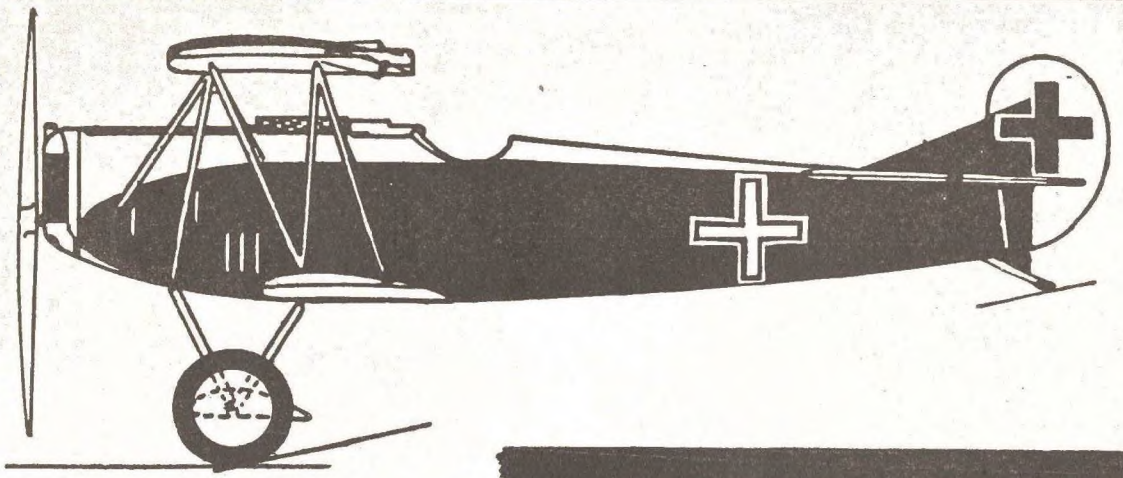
If nothing else, airplane model building has served the useful purpose of educating its followers to the knowledge that air supremacy is necessary to win the war and maintain the peace.

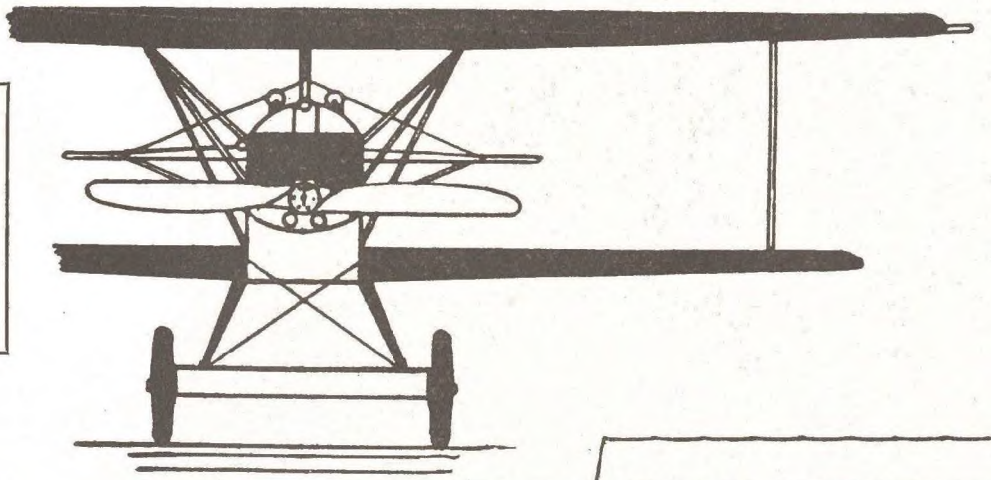
But in addition, aeromodeling is an essential defense activity—for it can pre-train hundreds of thousands of

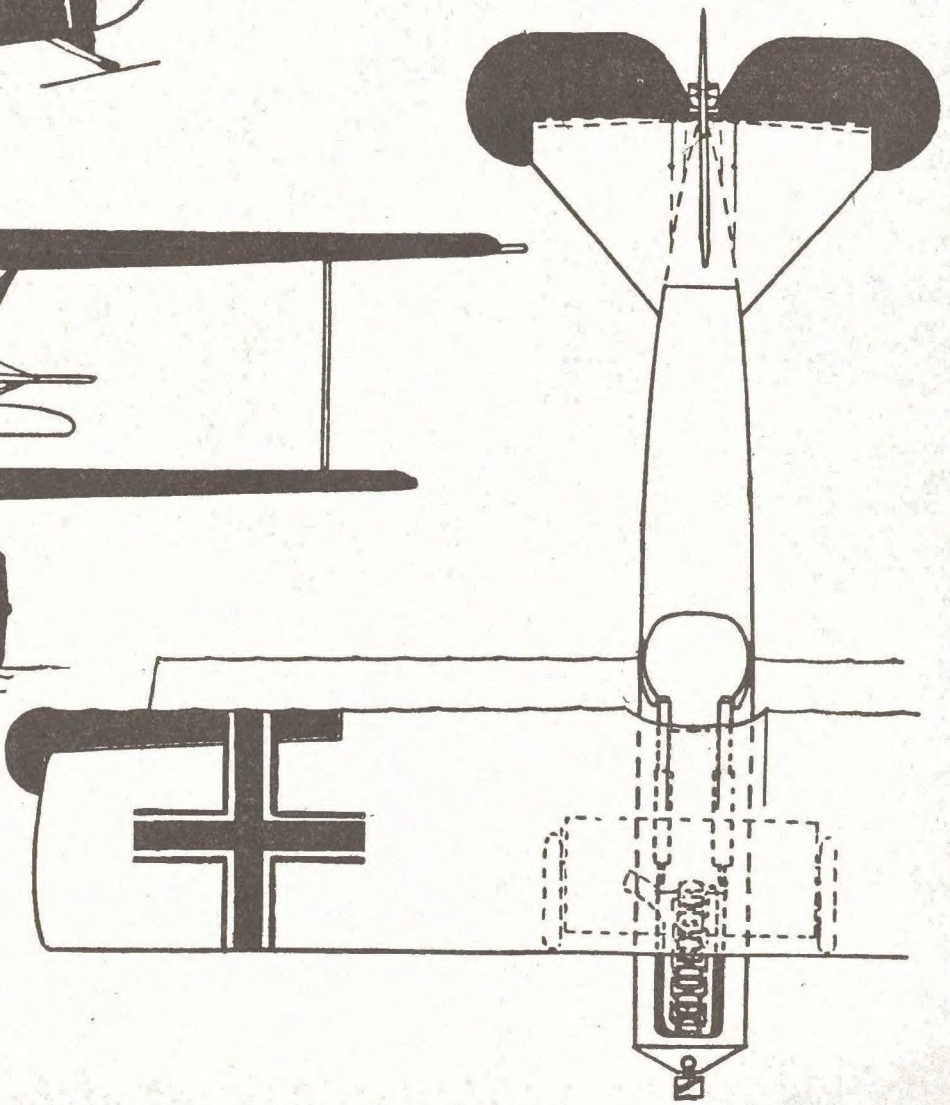
(Continued on page 71)

FOKKER D-VII 1917-1918

Scale ¼" = 1'







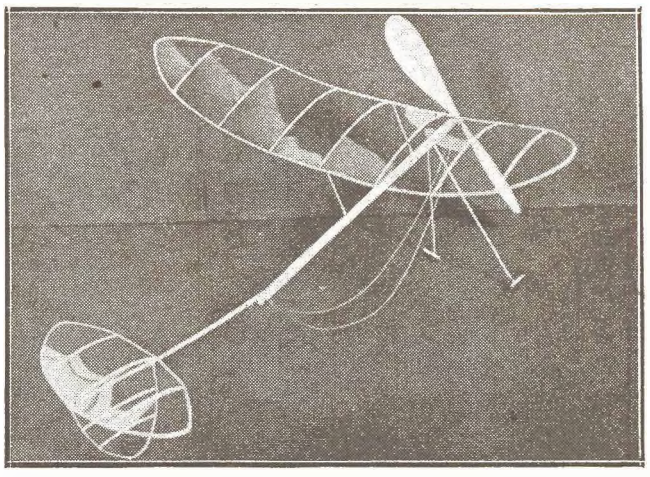
Span, upper wing,	29 ft. 3½ in.
Span, lower wing,	23 ft. 8 in.
Chord, upper wing,	5 ft. 2½ in.
Chord, lower wing,	3 ft. 11¼ in.
Stagger,	1 ft. 11½ in.
Gap,	4 ft. 2 in.
Overall length,	22 ft. 11½ in.
Height	9 ft. 2½ in.
Landing gear tread,	7 ft.

Twin Spandau machine guns
Powered by a six cylinder in-line
Mercedes engine 160 horsepower
High speed approximately 120 m.p.h.

MICROFILM-COVERED R.O.G.

by Leon J. Friedman
and Arthur Ruthlein

Plans for two indoor endurance jobs suitable for a beginners' model program.



The "E-Z" type indoor ship is capable of better than 10 minutes.

HAVE YOU EVER sat home on the day of a contest with your models packed and ready to go and could not because the weather wouldn't permit outdoor flying? In such a case, either of the models presented here will provide a "salve" to the builder's feelings. To steal a phase from the Post Office Dept., "neither rain, nor snow . . ." shall stop the modeler from flying one of these ships as long as he has a fair sized room.

The author has done 2 min. 10 secs., in his parlor, which is very small, with the "E-Z" model. The advanced model is slightly more critical in its adjustments and necessitates flying in a larger circle, and therefore is not perfectly suited for flying in a very small room.

No one can truthfully say he is an expert model builder unless he has tried his hand at building indoor models. The ships presented here are for the purpose of acquainting the builders with a very simple indoor model which is built fundamentally the same as any record job, yet which a builder may make as his first indoor ship. This job we have called the "E-Z". We also present a real contest ship built along the same lines, which we call the "E-X". The "E-X" should be capable of at least 12 mins. 30 secs.

Our "E-Z" ticked off a consistent 10½ minutes every flight. This time in itself is not so remarkable but one must take into consideration it was not built for contest work and the weights were not watched. The economy of construction is really amazing with these models as both of them won't cost you more than thirty cents.

Well let's get down to building it. The "E-Z" is suggested if you have never built an indoor model and the "E-X" if you have built one before, or if you want to built it after finishing the "E-Z" and acquaint yourself with indoor construction.

Propeller, Motorstick, and Wing

FIRST AND MOST IMPORTANT item in an indoor job is the propeller, for the basis of all high time and consistency is a light, well balanced, smooth, efficient prop. If desired, an 8" indoor machine carved prop may be used but these are hard to obtain. The best idea is to carve it from a block of very light balsa 8" by ⅝" by ⅞".

The block is marked out and cut down to an "X" blank. Carve the undercamber first on both blades and then carve the top. The prop is sanded with 6-0 sandpaper and then finished off with 10-0 sandpaper. The shaft is then glued on. Completed it should weigh about .004 oz.

For the "E-Z" model a solid stick ⅛" by 1/16" by 8" of very hard balsa is used. The ends are tapered and sanded and the hook and bearing are cemented on firmly. A hollow motorstick made of 1/64" sheet sanded, 9/16" in width and wrapped around a piece of dowel is used on the "E-X". The ends are capped with 1/64" sheet and the bearing and hooks glued on.

The indoor wing construction is very important and is quite different from outdoor types. The "E-Z" spars are cut from 1/20" sheet and sanded until it tapers from 1/20" at 8" from the front to 1/32" at the end. When you take the ruler to cut the spars you cut so that it tapers the same in the top view. This is the method that all tapering is done on indoor models.

Four spars are made this way for the "E-Z", tapering from 1/20" square at the center to 1/32" square at the tip. There are four spars to be made for the "E-Z" but these are made a little differently A center spar 3½" long is made by the same method, tapering from 3/64" by 1/32" at the center to 1/32" square at the next rib. The wing tip spars are made by sanding 1/32" sheet at the center to 1/64" and tapering to 1/32" at the ends. The cut is made to have a spar 1/64" square at the center and 1/32" square at the tip.

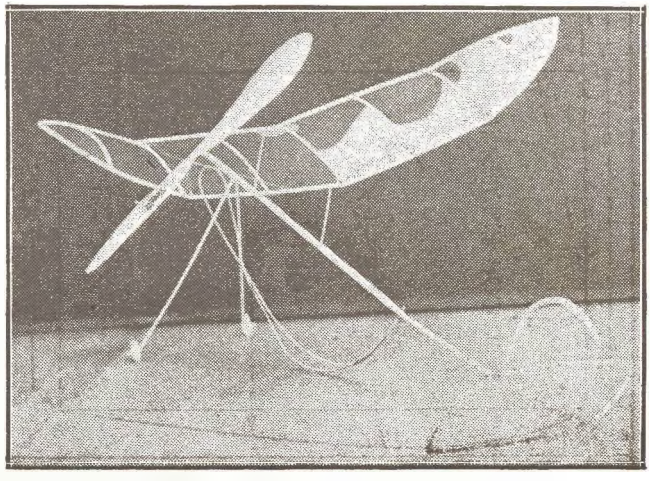
For the "E-X" a template must be made of the wing tip and the spar wrapped around it wet. The "E-Z" may be laid out without bothering with templates. The spars are laid directly on the plans and glued together. Ribs are made by cutting a template of cardboard or aluminum and placing it on a sheet of balsa; the size for the "E-Z" ribs is 1/32", and for the "E-X", 1/64". By moving the template down either 1/32" or 1/64" and cutting along it again, a rib is cut out. The leading edge of the rib is glued to the spar and the trailing edge of the rib is cut to fit and then glued. The wing clips are glued on firmly and you may use wire or aluminum for the "E-Z" and aluminum only for the "E-X" to hold the wing to the motor stick.

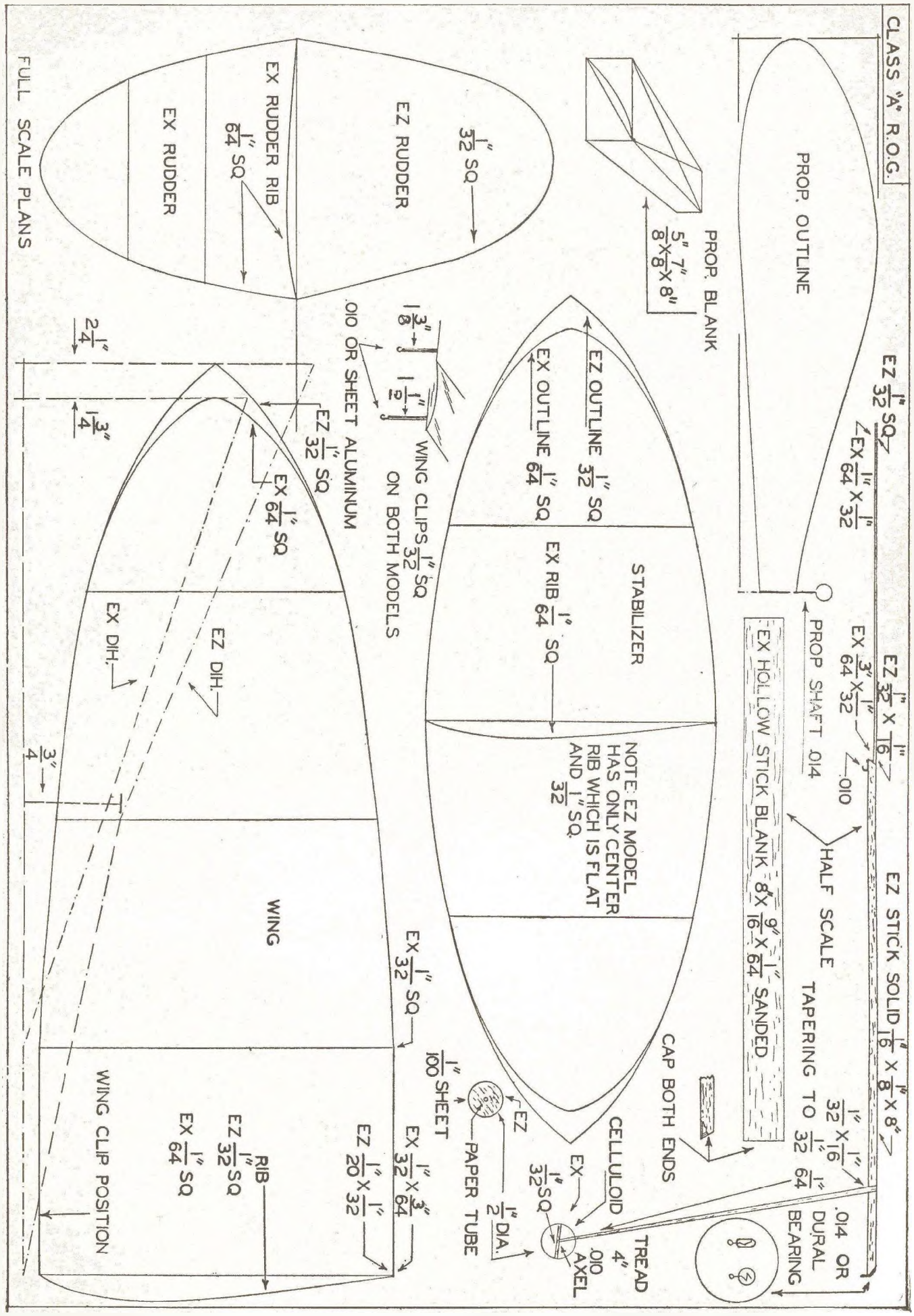
Tail, and Landing Gear

THE CONSTRUCTION of the tail is very simple and for the "E-X" much the same as building the wing, except the spars aren't tapered but are made of 1/64" square which is made by cutting from 1/64" sheet balsa. The "E-Z" is just an outline of 1/32" square. The rudder on the "E-Z" may be made right on the tail boom which is made like the spars of the wing. The rudder is first covered

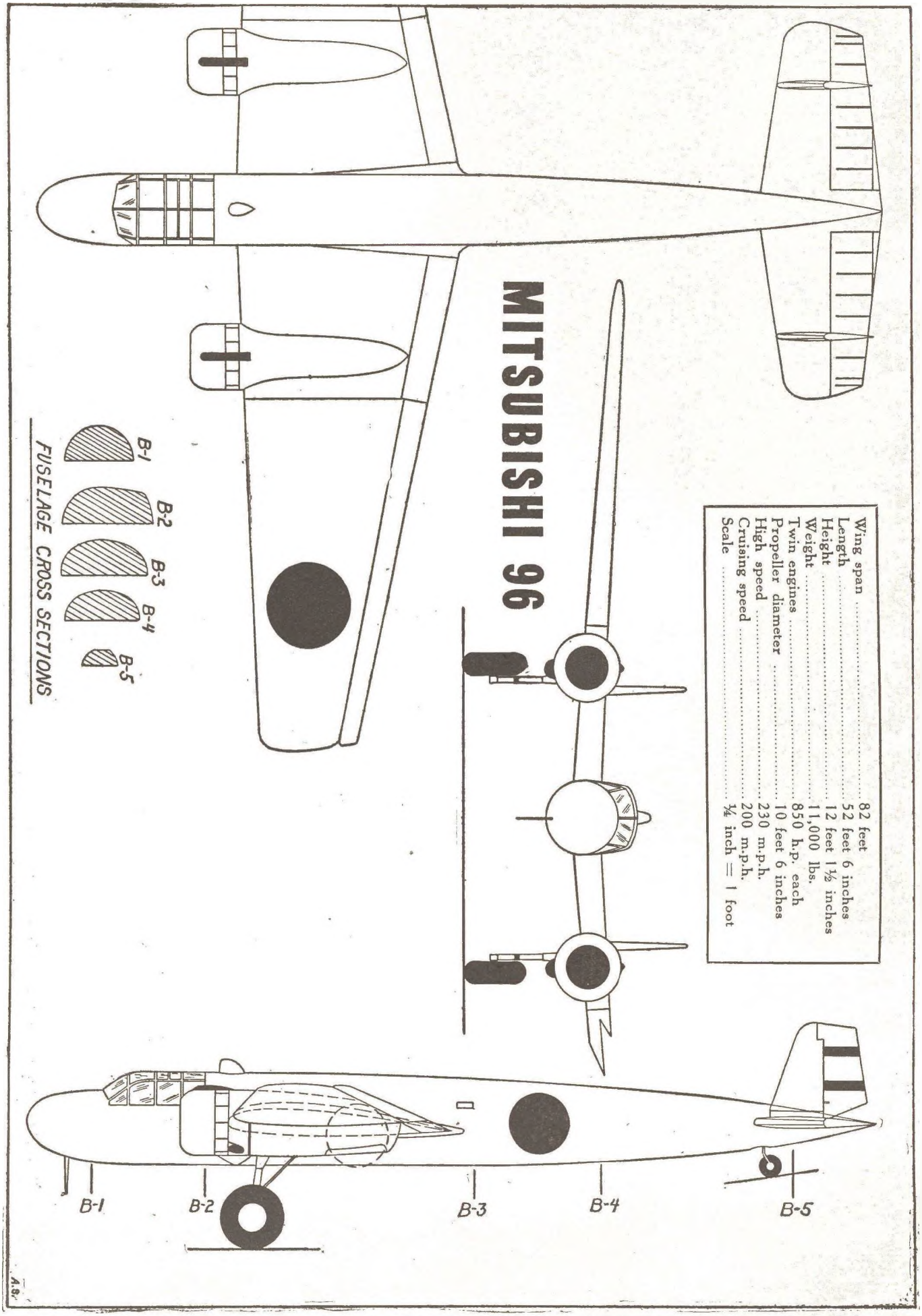
(Continued on page 71)

A larger indoor craft, the "E-X", has flown about for 12 minutes.




CLASS "A" R.O.G.
PROP. OUTLINE
EZ 1/32" SQ
EX 1/64" X 1/32"
PROP. BLANK
5/8" X 7/8" X 8"
EZ OUTLINE 1/32" SQ
EX OUTLINE 1/64" SQ
STABILIZER
EX RIB 1/64" SQ
NOTE: EZ MODEL HAS ONLY CENTER RIB WHICH IS FLAT AND 1/32" SQ.
EZ 1/32" X 1/16"
EX 3/64" X 1/32"
.010
PROP SHAFT .014
HALF SCALE
EX HOLLOW STICK BLANK 8" X 9/16" X 1/64" SANDED
TAPERING TO 1/32" X 1/64"
EZ STICK SOLID 1/16" X 1/8" X 8"
CAP BOTH ENDS
CELLULOID
EX 1/32" SQ
EZ 1/2" DIA. PAPER TUBE
1/100" SHEET
TREAD 4"
.010 AXEL
.014 OR DURAL BEARING
EX 1/32" X 3/64"
EZ 1/20" X 1/32"
RIB EZ 1/32" SQ
EX 1/64" SQ
WING CLIP POSITION
EX 1/32" SQ
WING
EX 1/64" SQ
EZ DIH.
EX DIH.
EZ 1/32" SQ
.010 OR SHEET ALUMINUM
WING CLIPS 1/32" SQ ON BOTH MODELS
3/8"
1/2"
2 1/4"
3/4"
3/4"
1/32" SQ
EZ RUDDER
EX RUDDER RIB 1/64" SQ
EX RUDDER
FULL SCALE PLANS

JAPANESE ARMY AND NAVY LONG-RANGE BOMBER



You Said It!

Here's your corner, buzzards, and it's open to all readers who have a model argument they want to get off their respective chests. Make your comments short and snappy, and we'll try to squeeze 'em in.

Glad—He Said It!

Model Editor, FLYING ACES:

I would like to start the ball rolling in favor of more flying scale models. They're tops!

DICK GLAD,
Sedro-Woolley,
Washington

All in Due Time

Model Editor, FLYING ACES:

How about putting in three views of the Ago flying boat, Roland Caproni, and Bleriot planes in the World War I department?

M. E. DONNELLY, Jr.,
Apponaug, R.I.

Model Editor, FLYING ACES:

That March issue was the best ever! When I saw that swell "Gloster Gauntlet" I fainted dead away. Let's have more of those full-size solid scales by Harry Appel. And as for Jim Loveless, the guy that doesn't like three-views of wartime planes—*!%&"!!

ROBERT NARRATH,
Grand Rapids, Minn.

Great Discovery

Model Editor, FLYING ACES:

I have just discovered a great magazine! The more I read F.A. the better I like it. Here's to more outdoor flying models like "DOC" (March 1941 F.A.).

KENNETH F. HITE,
Earth, Texas

You Mean It?

Model Editor, FLYING ACES:

That March issue was a pip—but a pip! That's the way F.A. ought to dish it out. From now on I'll never let a single issue go by. Yes, I Said It!

ALFRED CRANWELL,
White Plains, N.Y.

Complaint Dept.

Model Editor, FLYING ACES:

I was glad to see the plans of the Sopwith Dolphin in the (January 1942 F.A.). But why did you leave out the cross section views? I'd also like to see the RE-8, FE-2b and the Gotha bomber in the W.W. Three-View section.

I would appreciate it if someone would loan me plans for the Westland Lysander.

JAMES JOLLY,
834 Arthur Ave.,
Fresno, Calif.

New Steady Customer

Model Editor, FLYING ACES:

I just finished the Ercoupe flying scale (December 1941 F.A.) and it cost me just forty cents to build. It's a good flyer, fast, and stable. Have been building models for six years and reading F.A. for half that time. The mag is the best on the market.

The Ercoupe is the first ship made out of F.A. plans and I'm going to build all the rest if they are as good as this one.

STEVE MURTAUGH,
Utica, N. Y.

Stick Around, Earl

Model Editor, FLYING ACES:

I've been buying F.A. since 1936 and I have my likes as well as dislikes about the model section. Take the "Moth" (August 1937 F.A.) for instance. My friend and I built one but they didn't fly. Maybe we're just different.

I do agree, however, with the fellows who want the World War I three views back again. And the lesser

Logging the Motor Market

1942 Marvin Engine

THE LATEST Marvin Class "A" engine embodies qualities of construction which make it one of the outstanding gas engines in its class. Before these engines are shipped out of the plant, they are given a twenty-minute test run and guaranteed against faulty operation.

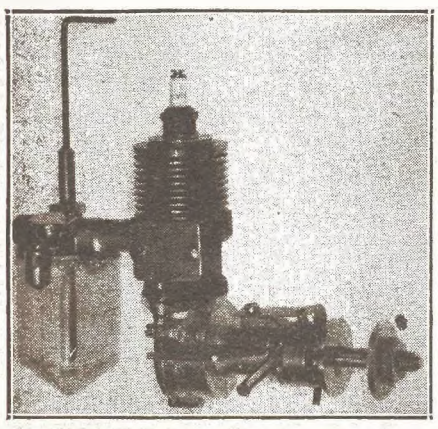
A special iron and steel alloy, recommended and used by all auto manufacturers is used for the cylinder and piston construction. Using the same material in both the aforementioned parts, it is claimed, makes for easier starting whether the engine is hot or cold as the coefficient of expansion of like materials is the same at like temperatures.

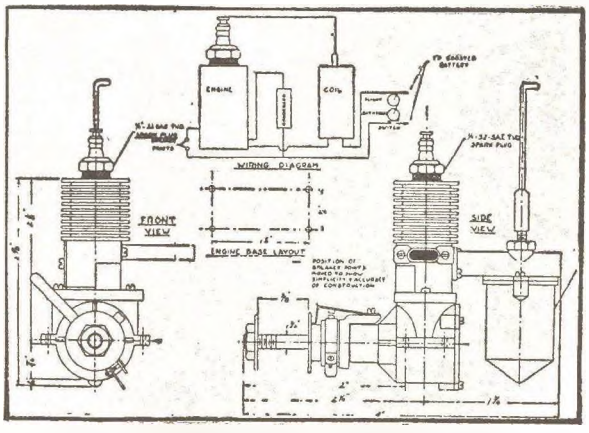
The piston made with mirrorlike finish is lapped in the cylinder which has been diamond bored and honed to give .0001 running clearance. Compression ratio is 7 to 1 to give maximum horse power. The cylinder has ten cooling fins which gives maximum cooling at all temperatures.

The wrist pin is heat-treated tool steel, ground. It is full floating, allowing it to turn in the piston as well as connecting rod, giving it double bearing surface. The connecting rod is cast and machined of a special high tensional strength material. The crank shaft is heat-treated tool steel which is designed to withstand rough treatment. It can be straightened out without breaking if bent in a crash.

The main bearing is ¼" in diameter and 1" long. It is ground to fine surface finish and fitted in Oilite Oil cushioned bronze bearing—which is considered the most outstanding bearing in the industry. The crank pin is made of tool steel. The gas tank is made of transparent plastic which is light in weight. It holds enough fuel for approximately 10 minutes of flight. Crankcase is made of special die-cast alloy designed for strength.

Specifications: Bore, 9/16"; stroke, 9/16"; ports, 3; maximum revs, 10,000; horse power, 1/10; cubic inch displacement, .14; bare weight, 4.502 ounces; fuel ratio, 4 to 1; grade of oil recommended, SAE 70; propeller, 9" long, 3" pitch; price $9.95, subject to change without notice. May be purchased from any engine dealer or direct from manufacturer.—Marvin Manufacturing Co., 642 Vermont St., Royal Oak, Mich.





Left: Marvin Class "A" engine for 1942. Right: Three-view drawings and dimensions.

known jobs the better.

Other things I'd like to see are more stick jobs, outdoor commercials (yum yum), flying models of radical design, and endurance gliders.

EARL CHURCHILL,
Cicero, Ill.

Glider Fan

Model Editor, FLYING ACES:

Although I've read F.A. for several years I've never written to you before. I've built several of your gliders and they're all tops. The smart Aleck who said he had to make so many changes on the "Cue Ball" to get a good performance must have just come out of the funny factory.

As for the World War plans, hash 'em up. But keep 'em coming.

HERBERT WILLIAMS,
Bartow, Fla.

"Moth" Fans, Attention

Model Editor, FLYING ACES:

I figure this note is a penny wasted. But I have about twenty-five copies of the "Moth" plans around and will send a set to anyone, post paid, for 10 cents apiece. Also have plans of the "Kaydet" for the same deal.

MASON BOYATT,
202 Mountain View Ave.,
Maryville, Tenn.

He Likes Us

Model Editor, FLYING ACES:

I think you've got a swell aero mag. I've watched aviation publications come and go for the last ten years, and when I chanced on F. A. a year ago I decided on that one for keeps. Boy, what a mag!

Recently I redesigned the scale "Ercoupe" (December 1941 F.A.) into a gas model. With the exception of a few bugs, the ship is a beaut. You ought to see the landings and take-offs. Saves on props, too.

LAROY MICKELSON,
Los Angeles, Calif.

Likes British Buzzards

Model Editor, FLYING ACES:

Have been reading your mag for the past three years, and a better aero book is yet to come out. The World War I three-views are great, keep 'em coming. I would like to see flying scale models of several English planes such as the Fairey Feroce, Swordfish, Blackburn Shark, Westland Wapiti, Hawker Nimrod, Fury and Demon.

DEAN MAXWELL,
Longmont, Colo.

Line Forms to the Right

Model Editor, FLYING ACES:

I am a collector. By that I mean I collect everything—including F.A.'s. I'd like to get plans of the "Moth" (August 1937 and August 1941 F.A.'s) and the "Hi-Climber" (August 1939 F.A.).

In return I will send any plan. Just name it. In fact, I shall go farther than that. Just tell me what plans you want (one to a customer) but be sure to enclose a self addressed and stamped envelope.

STANLEY ALSWANGER,
2270 Walton Ave.,
Bronx, N. Y.

Oh, Oh!

Model Editor, FLYING ACES:

Your mag's okay, but you don't seem to give Britain's planes much credit. After all they're certainly doing a fine job in this war and your country's aren't so hot.

ROSS CULLEN,
Alberta, Can.

Likes Jiffy Jobs

Model Editor, FLYING ACES:

Your mag is swell, keep it up. But I'd like to see more models that can be made in a jiffy. Most of the young fellows in my community aren't interested in models.

I'd like to get a set of plans of the Douglas DC-3.

JOE COLLINS,
R.F.D. No. 1,
Newburgh, Ind.

THE END

Workbench Tips

Glossier Finishes

Private plane manufacturers always apply a coat of silver dope over the first clear dope and then follow with the colored dope. Model builders should follow their example.

The silver reflects the sun's rays, thus it prevents: (1) Scorching and weakening of the fabric; (2) Drying out and making the balsa brittle; (3) Light from passing through the model showing all brush marks and thin spots in the colored dope. Silver dope made by mixing silver powder and thinner gives better results.

Apply a coat of clear lacquer over the final coat of colored dope and your model will have a polish and lustre similar to a new automobile.

LLOYD COOPER,
Collinsville, Ill.

Solid Soldering

Frequently, when two pieces of music wire are joined together, it is necessary that the joint be soldered. This is true in the case of landing gears, complicated rubber tensioner arrangements and free-wheeling devices. In these instances soldering is the best policy, but it is wise to remember that when you are working with music wire, soldering alone will not suffice.

Carefully bind the joint with fine iron or copper wire *before* soldering, and you can rest assured that if you have used plenty of heat the connection is permanent. Incidentally, be sure to use acid core solder for this type of job, for though it is unsuitable for electrical connections, on steel wire it will really dig in and hold.

WALTER HICKS,
Goldsboro, N. C.

THE END

"The Air Corps turned me down—they discovered I had a dormant sense of equilibrium."

ON HAUNTED WINGS

(Continued from page 19)

completely covered by a black hood. It had been pulled sidewise, twisting upward so that the goggle lenses sewed into it showed the man's forehead. On his neck, above the Luftwaffe uniform collar, was a scratch from the opened buckle of the strap which secured the hood.

Trent bent over, removed the hood. The German's head rolled back, his blue eyes staring glassily into the sky. His face was a mottled, unnatural color, and Trent saw a broad red band on his throat, where the strap had been pulled tight. There was no trace of a mortal wound, but he knew, even before he listened for a heartbeat, that the man was dead.

"Looks like he was strangled," Crabb said huskily. "But why was he wearing that hood in the first place?"

Trent shook his head. "It reminds me of a hangman's hood, the kind the Germans used back in the sixteenth century." He stopped, bent for another look at the dead man. "Mort, do you know who this is? It's Wilhelm Grussen—the Nazi ace!"

"First von Zenden, and now Grussen! Eric, this thing's getting hot."

"Help me put him in the car," said Trent. "We'll take him back to the airport and search him."

He unbuckled the parachute harness, and Crabb helped carry the body back to the car. Trent unlocked the luggage compartment and they shoved the corpse inside, doubled up. Something made a metallic thud. He opened the German's flight jacket, saw a pistol in a shoulder harness. It was the same make as the silenced gun in his coat pocket.

Trent started to close the top of the compartment. Suddenly there was a scuffing sound behind him, and Crabb gave a startled exclamation. Trent made a lightning movement.

"Look out, Eric!" moaned Mortimer Crabb. Trent turned, bumped his hat against the raised lid of the luggage compartment. Crabb's hands were in the air. Twenty feet away stood Hermann, the dimly reflected glow of the searchlights gleaming from a tommy-gun.

CHAPTER II

"FOR MURDER AND TREASON!"

"DON'T MOVE!" rasped the German. He sidestepped to cover them better. Back in the shadows Trent saw the dark shape of another car which had crept up silently. A uniformed figure circled around behind Crabb, and Trent recognized von Zenden, still made up as his double.

"Put up your hands, Commander," ordered von Zenden. As he spoke, he quickly ran his hands over Crabb in search of a weapon. Finding none, he strode over to Trent.

"The left-hand coat pocket," Trent said pleasantly.

The impersonator felt on that side, then with a scowl took his silenced gun from the right-hand pocket.

"So! Still trying your tricks, *Herr* Trent. Another like that and—" he drew in his breath sharply as he saw the corpse. He took out a pencil flashlight, cupped his hand around the end and hastily inspected the dead ace.

"*Lieber Gott!* He wasn't shot, Hermann. The hood must have—" von Zenden bit off the words, straightened up. "We must act quickly. Some one else may have seen the parachute."

"Why not have them move the body to our car?" said Hermann gruffly.

"No. We'll use their machine and save time. The police may have the number of the other car, also." Von Zenden opened the door of the coupé. "Commander, you and this sour-faced *Leutnant* will put the body on the rear seat. Then you will climb into the luggage compartment—both of you."

"Why not shoot us now?" Mortimer Crabb said gloomily. "That's what you're aiming at, anyway."

"Speak for yourself, Mort," said Trent. "Personally, I'll string along with *Herr* von Zenden. We might make a deal."

Von Zenden smiled sardonically. "A deal? Perhaps so. Now, the body—*mach Schnell.*"

Trent pivoted, hands still raised to the level of his hat. Suddenly he flipped it aside and snatched out Grussen's pistol, which he had concealed underneath it. Flame jetted from the muzzle and Hermann tottered back, dropped the tommy-gun. Von Zenden leaped into the coupé, pumped a wild shot at Trent from his silenced pistol. Trent hurtled against Crabb, knocking him flat. Crouching back of the raised compartment-lid, he sent two bullets through the coupé's rear window. The engine started with a roar and the car plunged crookedly along the top of the dyke.

Crabb jumped up, lifted the tommy-gun. Its tracers blazed close to the fleeing car, but before he could correct his aim von Zenden drove the coupé off the dyke and went racing down onto a runway. Trent flung a look at Hermann. The Nazi was crawling off, groaning, one arm dangling.

"Come on, Mort!" Trent sprinted to the spies' car and Crabb tumbled in after him. The airport searchlight whipped back from the Potomac, spotted the two cars. Trent sent the spy machine bouncing over the side of the dyke, with von Zenden now a hundred yards ahead.

The impersonator was making for the Curtiss SB2C-1. He stopped, his tires screeching, car and plane silhouetted in the glare. Trent pounded the horn button, but his attempted warning was drowned as the scout-bomber's engine started. Von Zenden stumbled toward the rear pit, Grussen's body slung over his shoulder. He dumped it in, sprang up into the front cockpit. The Curtiss lurched ahead, its wing tip knocking a mechanic flat.

"That dirty Hun!" bawled Crabb. He sent a burst from the tommy-gun after the fast-moving Curtiss. But the ship did not swerve. Trent brought the car to a violent halt beside the Brewster. Crabb jumped out and seized the inertia-starter crank, and the engine, still warm, caught at Trent's first try. Two Army sentries were running toward the Brewster, an airline pilot behind them.

"Pile in, Mort!" Trent said swiftly. "No time to explain now."

A rifle bullet drilled the hatch-cover as he taxied out. He kicked around, into the wind, and the Brewster thundered away, with rifles blazing behind them.

The Curtiss was a hundred feet in the air, climbing fast. Trent took-off, zoomed the instant he had speed. A quick blast over the Curtiss brought it around in a furious turn. Four tracer streams shot back at the Brewster. Trent crouched as the Plexiglas shattered overhead. His own guns were pounding again. He lifted his tracers, saw them gouge near the tail and jerk forward.

Von Zenden started to roll out of the burst. Grussen's body lurched, his arms hanging down from the rear pit. The spy hastily chandelled, to keep the corpse from falling out. Trent was almost in line for another attack when a Bolling Field searchlight flashed across the Brewster.

By the time he could see again, the Curtiss had disappeared. He swung across the Potomac, banked to turn back from the pursuing searchlights. The tip of the Washington Monument showed through the misty sky ahead. He twisted to pass south of it.

"Watch out!" bellowed Crabb. "There's another Stuka!"

The Nazi ship came riding in with a searchlight at its back. Trent pulled up in a half-roll, barely in time. The Brewster quivered from the impact of bullets near the tail. Crabb cut loose with the rear guns, and the Stuka hurriedly renversed. Trent saw the pilot in the shifting light beams. The Nazi's head was covered with a black hood, just as Grusson's had been.

CRABB'S TRACERS abruptly shifted, and Trent saw the Curtiss reappear on his left. He whipped into a tight bank, tripped the forward guns at the Stuka while Crabb drove off the Curtiss. The hooded pilot gave an agonized jump, then Trent's blazing tracers stabbed on past and into the Stuka's cowl. Flame puffed out and the Stuka nosed down, streaking groundward like a huge torch hurled from the sky.

Trent turned sharply, but the Cur-

tiss was only a blur, swiftly vanishing. He circled for a minute or two, waiting to see if there were any more Stukas. Then he turned back toward the airport. The burning plane had struck in the upper end of Potomac Park, and its lurid glow lit up the low-drifting clouds.

"What do you make of it, Eric?" Crabb said, as Trent cut the throttle to land. "That hangman's hood business, I mean."

"Your guess is as good as mine, old bean. Too bad we couldn't hang onto Grussen's body. Might have told us a lot."

Trent flashed his recognition signal with the Brewster's running-lights, got an answer from the tower. He landed, taxied in on an approach runway. An Army sentry was talking with a civilian at the spot where the Brewster had been parked. The sentry started out as Trent stopped the ship, but the civilian motioned him back. Trent swung the Brewster around, pivoting on one wheel.

"You stay here, Mort, and leave the engine running. That looks like our old F.B.I. friend, Red McBride. He might have some cockeyed idea—"

"Here we go again," Crabb said unhappily.

Trent chuckled, opened bullet-torn greenhouse, and swung down. McBride waited, the sentry a few yards behind him. The light from the burning Stuka gleamed from the sentry's fixed bayonet. The F.B.I. man stood with his hands in the pockets of his raincoat, a limp felt hat cocked over one ear, revealing a thatch of bristling red hair. McBride was above medium height and a trifle on the thin side. He had dark-brown, unblinking eyes, and a dead-pan face.

"I want to see you, Trent," he said curtly.

"Delighted, Red, old top," replied Trent.

"Don't call me Red," growled the F.B.I. man. "Come on inside."

"I'm quite comfortable here." Trent idly reached out, produced a lighted cigarette seemingly from behind McBride's ear. "Thanks, don't mind if I do. Would you care for one?"

"Lay off that magician stuff," McBride said tartly, while the sentry gaped at the cigarette. "I want to know what's going on out here."

"Well, of course, you know planes go in and out. That's the first thing. Then there's the de luxe dinner in the main restaurant, short orders in the coffee shop."

"Cut the comedy," said McBride. "Just exactly where were you at ten o'clock—"

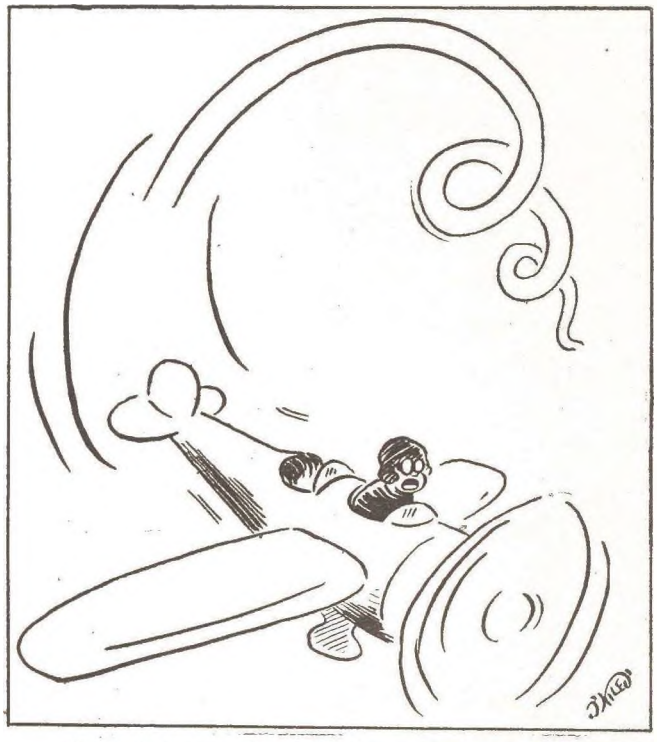
"On the night of January twenty-eighth? I know that one; I always have an alibi for that night. Very lovely one, too. Remind me to introduce you some time."

"Look here, Commander," McBride said coldly, "I'm the senior agent covering airports around Washington. So don't try pulling rank on me."

"My dear fellow, I'm completely at your service." Trent took out the three little steel balls, began to juggle them. "You don't mind if I practice a bit while you give me the third-degree?"

McBride scowled. "A guard was shot out here tonight. Know anything about it?"

"Certainly." Trent juggled for a moment. "I was in the crowd when they brought him in—poor fellow,"



"How's that new safety belt of yours working, Butch?"

McBride said something under his breath. "All right, let that go for a minute. When I got here somebody said you dragged a stiff into your ship and beat it."

"I think Mort would resent that." Trent grinned. "Though I'll admit there's a touch of rigor mortis about him at times—somewhat the same expression you have, now that I think of it."

McBride lost his dead-pan look. "Say, are you trying to make a monkey out of me?"

"I never compete with Nature," Trent said amiably. "She always does a better job."

"I don't like you, Trent," the F.B.I. man said grimly.

TRENT sighed, juggled the balls around behind his back. "I was beginning to suspect that. I guess I just don't know how to win friends and influence people."

"According to the evidence," McBride said doggedly, "you heaved a stiff into your ship and then ran down an Army mechanic. Right after you hopped off a German plane came along to help you—"

"Oh, so that's what it was doing," Trent cut in.

"Uh—beg pardon, sir," the sentry said to McBride. "But it was the Curtiss, not this ship. That's what the sergeant told me."

"They told me the pilot was a Navy three-striper with a black mustache," McBride asserted flatly. "If that isn't Trent here, who is it?"

"Sure, I changed ships in mid-air," said Trent. "And there's the stolen corpse—or is it just a reasonable facsimile?"

McBride strode toward the Brewster. Mortimer Crabb looked mournfully over the side at him, and the F.B.I. man swore.

"All right, Trent, somebody got mixed and saw you in this ship. Then you were chasing that other plane. Why—and what about the stiff? And who was the pilot?"

Trent kept the balls moving, but his glance shifted for a second. A hatless airport attendant was running toward McBride, with what looked like a message in his hand

"It's a Naval Intelligence job, but I'll let you in on it," he told the F.B.I. agent. He put the balls in his pocket, motioned McBride closer. But the messenger broke in: "Mr. Groves said to see that you got this right away. That guard came to, and he recognized—"

McBride snatched the envelope, ripped it open. Trent tried to get a glimpse at the scrawled message, but the light was too dim. McBride held it close to his eyes and his face went dead-pan again. He slowly folded the paper, reached inside his raincoat as though to put it in his pocket. Trent suddenly caught the upturned collar with both hands. A swift yank, and the coat was down pinioning McBride's arms to his sides.

"Sorry, old top!" Trent whirled, raced for the Brewster.

"Stop! You're under arrest!" shouted McBride. "You fools, get this coat loose!"

A pistol made a faint report as Trent shoved open the Brewster's throttle. Mortimer Crabb ducked, and Trent saw his lips working soundlessly. The ship slued around, onto a cross-wind runway. Trent brought the Brewster up to flying speed and sent it hurtling out over the misty Potomac.

"You lunatic!" moaned Crabb. "Now we are in a mess."

Trent slid the hatch closed. "Why, Mort," he said reproachfully, "I couldn't let McBride lock us up and leave that juicy mystery about von

Zenden unsolved could I, old man?"

He reached for his head-set, slid the phones over his ears.

"What are you going to do?" Crabb demanded through the interphone.

"I want to give McBride a bum steer. I'll call Naval Air at Anacostia and tell them we're landing there. Then we'll shoot for our old field."

Trent switched on the set. Before he could cut in the transmitter, words crackled into his phones:

"P-39 Patrol, Bolling. Force down Navy Brewster just taking off from Washington Airport . . . Men in it wanted for murder and treason . . . If unable to force down, use your guns."

"Eric—the Airacobra!" shouted Crabb. "We're finished!"

The nearest P-39 flipped into a vertical bank to follow the Brewster. Trent zoomed and the Airacobra pilot sent a burst past his wing tip.

As though submitting, Trent nosed down. Then with a lightning renversement he dived under the P-39 and instantly climbed at full gun. The Airacobra hastily followed through, but another P-39 was charging in to force the Brewster down. Both fighters veered out to avoid collision, and Trent lifted the two-seater up into the shrouding mists.

The Bolling Field operator was still calling the P-39 Patrol, repeating the order. Trent got a radio bearing, glanced at the compass. Easing down to three hundred feet, he closed the throttle and began a shallow glide.

"Are you crazy?" howled Crabb. "We'll crack into Arlington radio towers."

"We'll sit down right in the middle of our private field," Trent said, unperturbed. "I've offset the Bolling Field station, and we're practically on a beam."

THE BREWSTER settled through the murk. Trent waited, ready to open the throttle. Something brushed past the right wing tip. He flattened out, held it, and the Brewster hit, bounced, and rolled to a quick-braked stop. Trent switched off the engine.

"We just missed a tree by a hair," Crabb said gloomily as they got out. "Not that it would make any difference. We're doomed men—thanks to you."

"Have I ever let you down?" Trent countered.

"Only about a hundred times," grated Crabb.

Trent laughed. "You're still able to put away three square meals a day, I notice. I got us out of von Zenden's little trap tonight, and I'll get us out of this."

"You and your magician tricks! Where'd you get that gun, anyway?"

"A variation of the rabbit-in-the-hat trick, my dear Mort. That was Grussen's pistol. I put it on top of my head for emergency use when I heard our friends arrive."

"Not bad," Crabb admitted grudgingly. "At least you finally found some use for that thick skull of yours."

"You're just trying to be nice." Trent grinned. "Come on. We'd better get over to the house. If I can reach Captain Blaine I'll explain everything and he'll head off the F.B.I."

"A fat chance." Crabb morosely trudged after him. "That Army operator said 'murder and treason.' The guard must have died, after implicating you. Unless you can find von Zenden and make him confess, it's going to be bad."

Trent pushed through a turnstile in the fence. "You're clear, old man, anyhow. The phone girl can testify you were in there when the shooting happened."

"I don't know," Crabb said dismally. "She might not remember me."

"One look at that distinctive countenance and nobody could ever forget you," said Trent.

"Never mind about my face," snorted Crabb. "Open the gate, if you can remember the combination."

The stone wall of the old Harrington estate loomed up darkly as they crossed the road. Trent and Crabb had leased the mansion and the adjoining meadow some months before Pearl Harbor. Crabb had fitted up the basement as a laboratory, where he developed his inventions for the Army and Navy. The meadow had proved usable as a landing field, even for the military planes which were sometimes loaned to Trent for semi-official missions before he signed up with the Navy. To safeguard his inventions, Crabb had installed special electric-charged barbed wire on top of the high wall. Inside the massive iron-studded gates were electric locks operated by secret buttons or from a radio-relay under the instrument board of Trent's coupé.

Trent peered up and down the road, to be certain no one was approaching. He removed a small stone from the right-hand portal, felt for the two buttons recessed there. He pressed the left one twice, the other one four times, and the heavy gates began to grind open. Floodlights under the eaves of the mansion came on automatically. Trent replaced the stone, followed Crabb inside.

"Better disconnect those lights, Mort, or we'll have an air raid warden on our necks."

"They'll cut off when the gates shut," said Crabb. "I'll attend to that later."

Trent glanced toward the gloomy old mansion. In the walled yard to the left he saw "Leaping Lena," the autogyro which had come into their possession during a brush with Axis spies. Then the gates clicked shut and the lights went out.

They went on up the winding drive, to the porte-cochere entrance. Crabb produced the key, and they went into the dark hall. Heavy velvet drapes shut out all light, and for a few seconds there was pitch blackness, until Trent switched on the chandelier.

"I'll phone Blaine," he told Crabb. He went into the drawing-room, dialed the Intelligence chief's private number. In a moment he heard Blaine's dry, precise voice say, "Hello."

"Captain, this is Eric Trent. I'd like to report—"

"Where the devil are you?" rapped Blaine. "I've just had a cockeyed telephone call from the F.B.I. about Crabb and you."

"I'll explain everything, Captain. But first, you'd better get a warning out about Kurt—"

There was a sharp click. Trent rattled the cradle, then slowly replaced the phone.

"What's the matter?" asked Crabb.

"The line's gone dead," said Trent.

CHAPTER III

THE MAN OF A THOUSAND FACES

"YOU MEAN somebody's cut the wire?" Crabb said, alarmed.

"Sounded like it. Blaine would hardly have hung up."

"That means the F.B.I. is already headed this way," Crabb said hopelessly. "Our phone and light cables run underground and nobody could cut the wires. The G-men must've been tapped in at some exchange, and they cut you off."

Trent grinned. "Don't let it get you down, Mort. We've still got our transmitter downstairs. I'll contact Blaine through Navy radio, and I'll use code so F.B.I. won't get it."

The basement stairs opened off the rear hall, opposite from a large study which Trent had converted into a repository for his magician's paraphernalia. Magic cabinets, trick tables, illusion mirrors, and scores of special effects all but filled the room.

Trent started on past, then he stopped abruptly. Only a dim light shone in from the hall, but his trained eye caught something unfamiliar in the shadows. Taking out Grussen's pistol, he motioned Crabb to keep back while he reached for a light switch.

The lights flashed on. Mortimer Crabb let out a croaking gasp, and Trent looked down in astonishment.

He was gazing on the mottled, ghastly face of Wilhelm Grussen!

"Lord help us," Crabb said hoarsely. "How did this body get in there?"

"Von Zenden must have carried him here; that's the only answer." Trent took a quick glance into the hall. A muffled sound came from somewhere behind him, and he wheeled with the gun poised. Crabb pointed at a tall red-and-gold illusion cabinet.

"Somebody's in there, Eric!" he whispered.

"Get over to the side," Trent said in an undertone. He touched a recessed catch, and the front of the cabinet came open.

Crabb's eyes bulged as the half-dressed body of a man toppled out on the floor. "Another corpse! I'm getting out of here, Eric!"

"Hold on," muttered Trent. "Let's see who it is."

He bent down, gingerly rolled the dead man over. Then something went up his spine like the touch of an icy

finger on an August afternoon.

"*Grussen!*" He spun around, with a sudden understanding.

"Drop it, *Herr* Trent," said the man in the chair. He sat up with an ironic smile, the muzzle of his silenced gun pointed straight at Trent's heart.

Trent looked into the black hole at the end of the silencer. Then he slowly laid his pistol down on a table.

"Very neat, von Zenden." He gazed from the dead ace back to the impersonator. "Considering the lack of time, an amazingly good job."

"And why not?" the Prussian said sardonically. "I was not called 'The Man of a Thousand Faces' for nothing. Move back!"

Trent stepped back from the table. "So you inherited your father's trade name, along with the spy business, eh?"

Von Zenden's made-up eyes narrowed. "Be careful, *mein Freund*. My father was the finest impersonator who ever lived—and the greatest agent of the Corps d'Elite. If I can but approach his deeds, in serving our *Fuehrer*—"

"Never mind the 'heil Hitler,'" Trent cut him off. "If it will make you feel any better, I'll admit the von Zendens seemed to be fairly bright boys."

"Very kind of you, *Herr* Trent," the spy said mockingly. "The German mind is always superior to low Yankee cunning—such as that trick with the gun in your hat."

"That was pretty crude, wasn't it?" Trent said apologetically. "I'm afraid it can't compare with this—" he stopped and picked up a small clockwork device which had fallen out of the cabinet with Grussen's body. It was one of the timers used to set off various delayed-action magic apparatus. Von Zenden had evidently set it to release the trip against the side of the cabinet, making the noise which Crabb and he had heard.

"The mechanical effect was of small importance," von Zenden said disdainfully. "But only a master could have made up to pass for Grussen."

"True Prussian modesty," said Trent. He set the timer beside a cuckoo clock, motioned to Crabb. "Might as well sit down and be comfortable, Mort. This hymn of praise may go on all night."

VON ZENDEN'S lips tightened. "You will not be listening to anything much longer, either of you. When my aides arrive, it will be my privilege to even the *Fuehrer's* score against you."

"Well, Eric, I hope you're satisfied," Crabb said mournfully. "At least the F.B.I. would have given us a fair trial."

Trent looked down at the dead Nazi ace. "Sorry, Mort. But, anyway, we've wrecked their plans, whatever they were up to."

"You think so?" sneered von Zenden. "You fool, by tomorrow morning Washington will . . . *Ach!* So you think you'll get me to betray the se-

Aero Book Reviews

Any volume described in this department may be obtained, at the price quoted, direct from the publisher named and at the address given. When writing for a book, kindly mention that you saw it reviewed in FLYING ACES.

Air Transportation, by Claude E. Puffer, The Blakiston Company, Philadelphia, Pa., $3.75.

This volume gives a complete and detailed analysis of the economic and legal characteristics of the air transportation industry, together with a full account of the activities and decisions of the Civil Aeronautics Authority, Civil Aeronautics Board, Interstate Commerce Commission, and other governmental agencies affecting the industry. Last but not least, the book contains an analysis of the economic principles applicable to the regulation of discriminatory rates. A valuable reference for persons connected in the aviation business.

The History of Combat Airplanes, by Charles G. Grey, Norwich University, Northfield, Vt., $1.00.

The James Jackson Cabot Professorship of Air Traffic Regulation and Air Transportation of Norwich University was endowed in 1935 by Dr. Godfrey Lowell Cabot, of Boston, Mass., and named in memory of his son, James Jackson Cabot, an officer in the U. S. Flying Service during World War I.

Following its custom of producing and distributing publications treating of aviation developments and trends, the James Jackson Cabot Professorship wrote Mr. Grey, inviting him to prepare a history of combat airplanes.

Space does not allow us to go into detail concerning the contents of this book, but from its title one can gather that, if Mr. Grey has written it, it *must* be authoritative in every respect. For more than twenty-eight years Mr. Grey was editor of *The Aeroplane* and recognized as one of the most informed men on aviation developments the world over.

This book is the seventh in a series of aviation publications and sells for $1.00. If you are a rabid aero enthusiast, by all means make it a point to obtain this copy. As a reference it is invaluable and very interesting to the end.

Other titles and prices are as follows: No. 1—*International Aeronautic Organization and the Control of Air Navigation,* by John Jay Ide, $.50; No. 2—*The Early History of Air Transportation,* by Edward P. Warner, $.50; No. 3—*Technical Development and Its Effect on Air Transportation,* by Edward P. Warner, $.50; No. 4—*Safety in the Operation of Air Transportation,* by Jerome Lederer, $.50; No. 5—*European Air Transport on the Eve of War—1939,* by Parker Van Zandt, $.25; No. 6—*The Measure of America's World War Aeronautical Effort,* by Edgar S. Gorrel, $.50.

Other publications on various aero subjects are in preparation. When available readers of this magazine will be notified through these columns. However, for a well-rounded reference library, it is recommended that a copy of each title be purchased.

ABC of Aviation, by Lieut.-Col. Victor W. Page, Norman W. Henley Publishing Co., 17 West 45th St., New York City, $2.50.

The 1942 edition of this book contains a simplified explanation of all types of aircraft with condensed instructions on their basic principles of construction and operation. It also describes important recent developments in airplanes, and engines, airliners, inspection, trouble-shooting, care and maintenance of instruments, etc. This book is excellent for an aero enthusiast who desires to secure a good basic knowledge. Fully illustrated.

Technidata Hand Book, by Edward L. Page, Norman W. Henley Publishing Co., 17 West 45th St., New York City, Spiral Binding, $1.00, Cloth Binding, $1.50.

As a student, the author found himself carrying around too many books and spending too much time looking through them for information which often proved to be scattered elsewhere. He compiled for his own use the data contained in this book which in its compactness contains nearly all the essential information needed on these subjects.

This unique book has been written for all who use their knowledge of mathematics, physics, chemistry, mechanics, or engineering. It contains the essentials of books on geometry, algebra, trigonometry, calculus, physics, chemistry, and mechanical engineering, and is presented in a relatively few well-organized pages.

Facts, figures, theory, definitions, laws, formulas, simple calculations, diagrams and tables are all utilized. Formulas with short explanations of terms have the units and common constants given. Unnecessary data and long explanations have been omitted. The information is basic and fundamental and will not go out of date. This book is undoubtedly valuable to the student aero engineer.

(Also see pages 67, 74, and 78 for other reviews)

cret and then somehow escape to warn them."

"That was the general idea." Trent smiled indolently, as he eyed himself in one of the full-length mirrors. "You know, Kurt, now that modesty's the keynote, I think I cut a better figure than you did when you were Commander Trent. At least, I don't have to put lifts in my shoes."

The spy's hand tightened on his gun. "Keep a civil tongue in your head, or I'll finish you here and now! My impersonation was perfect. In three weeks, no one has suspected—not even your contacts in G-2 who have been so obliging."

"So that's it. You've not only been making this place your headquarters, but also doing a termite act over in town."

"Precisely," von Zenden smirked. "I planned the whole thing even before you left Washington. My agents watched this place every night for two weeks, until they learned about the hidden buttons at the gate. We tried the various mathematical combinations until we hit the right setting."

"Damned burglars!" grated Crabb. "Eric, you realize what that means? They've had access to the radio, our Naval Intelligence teletype, all my confidential files!"

"Cuckoo!" The front of a small clock suddenly opened and a little yellow bird popped out. There was a bright flash, a puff of acrid smoke, and both clock and cuckoo vanished.

Trent had been waiting for the flash. He jumped back through the smoke, in front of the illusion mirrors. Six other Eric Trents instantly became visible.

"Halt!" shouted von Zenden. He jerked the trigger and a slug crashed through the glass. Trent laughed.

"Try again, Nazi!" He sprang toward the center panel, shoved. The mirror revolved, and he was through in a twinkling. Another bullet shattered glass back of him. He ducked, snatched up a nickel-plated prop revolver.

"Keep back, Crabb!" he heard von Zenden cry tautly. The Prussian's voice came from the middle of the room. Trent pressed at the back of the cabinet where Grussen's body had been hidden. The rear section swung in on silent hinges. Trent leaped through into the room, fired the prop pistol at the back of von Zenden's head.

The Prussian gave a wild leap as the revolver roared. Dropping his gun, he staggered sidewise, clasping both hands behind his head.

"I'm shot!" he groaned. "I'm dying!"

Trent picked up Grussen's automatic from the table where he had laid it. Mortimer Crabb had dived for von Zenden's silenced pistol.

"Well, I guess you saved me the job," Crabb said sepulchrally.

"Much as I hate to disappoint you two," said Trent, "that was only a blank."

VON ZENDEN turned around, ashen through the already corpse-like make-up. His shaking fingers removed the blank-cartridge wadding from the back of his neck.

"Schweinhund!" he said thickly, "I'll kill you for that."

"Take it easy," advised Trent, "or the Master Mind's superior brain may spring a sudden leak. This one has real bullets."

"Let's get him out of here," Crabb urged. "He said he had his gang coming."

"Calm down, old bean," said Trent. "I fancy we can handle a few Nazi muscle-men. While we're waiting, go through his pockets—also that Navy uniform he discarded behind the cabinet."

He covered von Zenden while Crabb searched. The inventor laid a wallet and a folded paper on the nearest table.

"Watch it," said Trent. "That'll fall through the cuckoo-clock trap."

"That thing scared the liver out of me," grumbled Crabb. "I never knew it was a trick clock."

"My dear chap, if I explained all my effects I'd never have any surprises left. Think how dull life would be for you and our friend Kurt."

Von Zenden's eyes watched intently as Trent unfolded the paper. It was a map of the Washington area, including a section of Virginia. An easterly course-line had been drawn from their estate to a point beyond the capital suburbs. There it ended in a circle with "1,000 meters" written beside it.

"H-m-m," mused Trent. "This begins to clear up. You're using our short-wave transmitter as a beam to guide the Stukas. Take a look at this, Mort. What does that circle and the '1,000 meters' suggest?"

Crabb eyed the map while Trent covered von Zenden. "My guess is they've made a radio marker-beacon out there, intersecting this beam, and when the Stukas hear the signal they're supposed to start a set glide from 1,000 meters."

"Sounds likely." Trent glanced at the spy's grim-set face. "Feel like talking? It might make it easier for you on that murder charge."

Von Zenden laughed harshly. "You're the one they accused. I heard them radio the Airacobra pilots."

Trent looked amused. "My dear Kurt, you Nazis are so naïve. Haven't you ever heard of a frame-up?"

"What do you mean?" snapped the impersonator.

"Very simple. First, Mort knocks you cold while I keep you covered. Then we dress you in that three-striper uniform again. After that, I take off your make-up, replace the black mustache, and put the silenced gun in your hand—after wiping off Mort's prints. A little smear of grease-paint and cold cream on your face—and the stage is set."

"It won't work!" snarled von Zenden.

"When we call in the F.B.I. and Naval Intelligence, I'm afraid you'll have a rude shock. That make-up kit you left behind the screen will be hard to explain. In a pinch, I might even do your face over in a passable imitation of your making-up as myself. I'm not entirely a stranger to grease-paints."

Von Zenden glared at him, then a crafty light came into his eyes. "Very well, *Herr* Trent. What do you want to know?"

"What killed Grussen?"

"The hood must have strangled him," replied the Prussian. "It probably caught on something when he jumped."

"Most unfortunate. And why was he wearing that hood?"

"Because he was in disgrace," von Zenden said rapidly. "He and other pilots were to be executed, but they were given a last chance—"

"You really should study the fine art of lying," observed Trent. "Suppose I tell *you*. Grussen was poisoned. He was given that hood to keep from inhaling gas or poison dust. It probably had an oxygen tube leading into it so he could breathe. But he either left it off until the last moment or it wasn't tight enough. He bailed out to save himself and tried to get the hood off, but it stuck and he died. His throat swelled up and the strap made the red mark on it."

"Eric, you really think they were going to gas Washington?" Crabb said, appalled.

"No. They couldn't gas a whole city. But they might gas some vital spot. Maybe we can figure it out. Their target must be on this course-line—"

OUT IN THE hall a buzzer-signal sounded and Trent heard the more distant grind of the gate-motors; he saw a gleam come into von Zenden's eyes.

"How many bullets left in that gun?" he asked swiftly.

"Three," said Crabb, after a hasty inspection of the magazine.

"Good. Get our friend Kurt behind that Chinese screen . . . on the floor, face down. Hold a gun at his head. If he tries to warn them, shoot. Nobody's likely to hear it, so don't hesitate."

"I won't," grated Crabb. He shoved von Zenden behind the screen and Trent hurriedly shifted the illusion mirrors, leaving only one shattered frame in sight to explain the broken pieces. He closed the trick cabinet, tossed Grussen's Luftwaffe jacket over the dead ace's body, and put the prop revolver away.

In a few moments he heard the front door open. He picked up the impersonator's make-up kit, snapped it open. Small cakes of special greaseless paints were arranged on one side, like blocks of water-colors. Tufts of crepe hair, prepared mustaches, lining pencils, and adhesive tape were on the other side. Small scissors, powder puffs, special overlay teeth, and other make-up accessories were clipped in between, and in the lid was a mirror.

Trent laid down his gun, quickly smudged a bit of flesh color along one cheek. Muttered voices became audible and he heard footsteps coming nearer. He took the pistol and stepped to the doorway.

"Wo ist es?" he rapped out, imitating von Zenden's voice.

"Von Zenden—*Gott sie Dank!*" came the mumbled answer. Trent hid a start as he saw Hermann's brutal features. The Nazi's coat sleeve was ripped open and a red-stained bandage showed on his forearm. Behind him were two men; both wore dark suits, although it was late Spring. They slid guns to their inside armpit holsters when they saw Trent's face. The first was a young man, with a big, hulking body. He had a low forehead and thick, protruding lips. The other was about thirty-two, small but wiry. He had little darting black eyes, so dark that the pupils were all but invisible.

"*Excellenz,* we thought you were killed," said the little Nazi. "Ludwig said the Curtiss was shot down in flames."

"I said it looked like it," the hulking youth said, sullenly. "Don't always try to blame me—"

"There's no time to waste in arguing," snapped Trent. "Are you sure you weren't followed here?"

Hermann shook his head. "The blackout's still on. It was all I could do to find Max and Ludwig. We drove without lights." His heavy features took on a resentful expression as he eyed Trent's immaculate uniform. "You saved your hide without a scratch, I see. For all of you, I might have been killed back there."

"Don't be a fool," Trent said sharply. "I had to get Grussen's body away, didn't I? The cause is more important than anyone's life!"

"You had better get out of that make-up," Hermann said in a gruff voice. "They're sending a description by radio to all Intelligence and police offices. We caught it on the short-wave in the car."

"Did you learn anything else?" demanded Trent, stepping back into the doorway.

"We caught the U-boat flotilla's signal, *Herr* von Zenden," Max said eagerly. "The rest of the Stukas will take off to reach the marker-intersection point at exactly twelve o'clock!"

CHAPTER IV

DOUBLE FOR DEATH

HERMANN NODDED. "This time there will be no mistake. Washington will be a mausoleum in twenty-four hours."

Trent felt a prickling at his scalp, but he managed a gloating smile. "*Gut,* but the time is short. You know what to do, while I change?"

"Then you landed the Curtiss here?" returned Hermann. "The transmitter in the gyro is still not working, May says."

"The Curtiss is across the road," answered Trent. "I brought Grussen's

Aero Book Reviews

Any volume described in this department may be obtained, at the price quoted, direct from the publisher named and at the address given. When writing for a book kindly mention that you saw it reviewed in FLYING ACES.

Victory Through Air Power, by Major Alexander P. de Seversky, Simon and Schuster Publishing Co., 1230 Sixth Ave., New York City, $2.50.

Long an exponent of air power, Major Seversky in this book smashes to smithereens all the theories and concepts of "so-called analysts." Seversky shows how America can win the war through proper application of our growing air arm. His assertions are not mere ideas, though, because they have been given plenty of thought and are the materialisms of a militaristic mind, for Major Seversky is not only a recognized aeronautical authority but also previously manufactured warplanes and farther back was himself a war pilot. He has seen air power grow from its conception, and he knows the military advantages—and disadvantages—of aviation as well as any other person.

Victory Through Air Power is hitting the book world like a bombshell, for it is a bombshell itself—a book that literally explodes all previous concepts of air power. In written word, Major Seversky has shown how the war can be won and how lives can be saved in its winning. Now, it's up to the military to recognize that victory can best be won through air power and that *Victory Through Air Power* gives the answers to the questions of strategy and tactics, This is one of the most important books of the war and *demands* a place in your library.

Adventure Was the Compass, by Alma Heflin, Atlantic-Little, Brown Publishing Co., 60 E. 42nd St., New York City, $2.75.

If there was ever a bundle of energy Alma Heflin is it, for during her career in aviation she has actually covered almost every phase of the game—and now she is the only woman test pilot in America, and the second in the world.

In this book, which is one of the best straight commercial aviation adventure pieces we have seen, Miss Heflin explains an aerial jaunt to Alaska via Piper Cub. She ran into adventure galore, and Miss Heflin put it all down in a perfectly enjoyable style. She has captured all the eccentricities and mannerisms of the various people she met, and has cunningly set down all the minor thrills of aviation which seem commonplace to most pilots; the way these various happenings are explained, a reader can picture, more vividly than an actual passenger in a plane might, the difficulties encountered. Too, Miss Heflin's humor is really top-flight.

The book is made even better by Martha Powell Setchell's excellent line drawings depicting various scenes.

Air Pilot Training, by Bert A. Shields, Whittlesey House, McGraw-Hill Book Co., 330 W. 42nd St., New York City, $4.00.

From beginning to end, this book is absolutely swell. According to the publisher, it is the only book on the market that covers all the essential material required for private and commercial pilots' licenses and, at the same time, presents this material in a manner conforming to the courses set up by the Civilian Pilot Training Programs.

Written in a non-technical style, with plenty of clear-cut photographs for illustration, *Air Pilot Training* is just the book for students studying at home in preparation for CAA written examinations. Moreover, it is also valuable for licensed pilots who wish to increase their general knowledge or just check on particular points with which they are not thoroughly familiar.

Sea Power in the Pacific, by Hector C. Bywater, Houghton Mifflin Publishing Co., Boston, Mass., $3.50.

Although this book is neither new nor aviation, it should be in the library of all interested in military tactics as a whole. Published in 1921, *Sea Power in the Pacific* is still regarded as an authoritative book—probably *the* authoritative book—on Japanese sea power. It explains the formation and phenomenal growth of Jap naval forces and how those forces could be employed in a battle against America. Too, the author goes into quite some detail on tactics and strategy which would probably be employed during such a war.

For military students, one of the most interesting features of the book is the table of types. Names of vessels, years they were completed, displacement, armament, and other pertinent data are given. It is really difficult to understand how the author was able to compile much of the information, because of Japanese secrecy.

(Also see pages 65, 74, *and* 78 *for other reviews)*

body in it. A doctor's examination might have given everything away."

Max and Ludwig stared at the dead ace.

"I still don't understand how he got poisoned," Ludwig said stupidly. "Hermann said the only danger was if they got in each other's slipstream. They couldn't have been releasing the dust, because the radio wasn't on to guide them."

"One of the Airacobras must have punctured the tank, or maybe Grussen opened the dump valve trying to gas the pilots," offered Max. "That's my guess. Grussen probably had to make a sudden turn and he flew into the stuff before he could get his hood tight. Then he took to his chute, hoping to get into clear air—"

"*Ja*, only it was too late," Hermann said stolidly. "Well, he was a fool. Anyone knows cyanide dust is not a child's toy."

"Maybe it killed some Americans down in the city," Ludwig said hopefully.

"No such luck," replied Max. "By the time it floated down it would be too much dispersed."

"*Himmel!*" Ludwig said suddenly. "What happened here?"

He pointed at the shattered glass across the room.

"I ran into a mirror in the dark," said Trent. He rubbed the paint spot on his cheek. "Forget about that—go down and turn on the transmitter."

Max and Ludwig started out. Hermann stared at a piece of mirror-glass on the floor, then with another glance at Grussen's body he followed the two Nazis. Trent waited until he heard them descend the basement stairs, then he quickly closed the door. As he turned back his eyes fell on the glass fragment Hermann had noticed.

A shadowy face was reflected there. In dismay, he realized it was a double reflection from one of the standing mirrors to von Zenden's made-up face, back of the screen. Before he could seize the gun he had put down to allay suspicion, the hall door burst open. Hermann charged in, pistol leveled, Max and Ludwig behind him with their guns ready.

"Get back!" Hermann rammed his gun against Trent's ribs. "Max, pull that screen away!"

IN ANOTHER SECOND the light shone down on von Zenden and Mortimer Crabb. The impersonator threw himself back, one hand knocking Crabb's gun toward the ceiling. Max and Ludwig leaped in, tore the weapon from Crabb's grasp.

"Why didn't you shoot when you had the chance?" said Trent, as Crabb was dragged to his feet.

"What good would it do?" croaked the inventor. "They'd have finished you; I could see they had you covered."

"At least, you'd have knocked off von Zenden. Now they'll kill us anyway."

Von Zenden gave him a savage look. "Right, my smart Yankee. Hermann, that was good work."

"I almost gave it away, when I saw the glass," said Hermann. "Then when Max said the telephone fuses were pulled out, I knew it wasn't just some funny angle with the mirrors."

"I took out the fuses." Von Zenden explained in brief words how he had been captured. "I had to catch them off guard; that's why I made up as Grussen when I heard them open the gates. But this *Teufel*, Trent, with his infernal magician tricks—"

"But how did they get here, Excellenz?" exclaimed Max.

"They must have landed in that Brewster. Fortunately it was too dark for them to see the Curtiss unless they almost ran into it. Hermann, go over and set the radio in the Curtiss to the Stukas' wave-length. Ludwig, plug in those fuses, so I can telephone while Max starts the transmitter downstairs. I want to make sure our men are ready to take over at—"

"What about weather reports?" interrupted Hermann.

"I got the latest Navy report an hour ago," said von Zenden. "We'll fly out on the beam from here and circle down low at the 'marker' location. It won't be as easy as landing there in the gyro would have been, but it will be enough to guide the Stukas."

"All this could have been avoided if the U-boat operators had kept tuned in for any changes," complained Hermann. "I called them for an hour after Max found the gyro transmitter wasn't working. By one o'clock we could have had it going, and there would have still been time—"

"Lucky they sent off only two Stukas before they caught our warning," von Zenden said brusquely. "But it's too late to wait for the gyro now. Go ahead with the Curtiss. Max, you wait here a minute—we have a little work to do."

Hermann went out and Trent heard the front door open. Ludwig had already gone down to put in the fuses. There was a moment's silence, while von Zenden smiled mirthlessly at Trent. He had picked up Grussen's pistol, and Max had his gun carefully trained on Mortimer Crabb.

"I should thank you for coming here, Commander," the impersonator said silkily. "Your Government—what there is left of it—after tonight will be looking for what you call the 'Master Mind.' Your unexpected return from Australia proves fortuitous, after all."

"So you're going to pin it on me?" said Trent.

"On you and your Gloomy Gus comrade. Or they may think you fooled *Herr* Crabb and he tried to stop you at the last moment. Yes, that would be better. Murder and suicide . . . and I'll leave this little map to show how you planned—"

The buzzer in the hall sounded as the gates started to open. Trent heard three pistol shots in rapid succession, then a man cried out hoarsely.

"Watch those two!" von Zenden flung at Max. He ran toward the front door. Trent saw Ludwig out in the hall, his face taut with sudden panic. There was a thud as though some one had fallen inside the vestibule. Then he heard Hermann's labored voice.

"Von Zenden . . . it's the F.B.I. . . they got me!"

"The basement—over the wall!" shouted von Zenden. Ludwig dashed by the door of the magic room, the Prussian close behind. Von Zenden cast a hasty look at the prisoners.

"Shoot them, you *Dumpkoff!*" he snarled at Max, and raced on by. Max jumped back toward the doorway, raised the gun.

"If you do, you'll get the chair!" said Trent.

A CLAMOR of voices sounded outside the mansion. Max, deathly white, jerked a frantic glance up the hall. Trent dived behind Grussen's body, with a yell at Mortimer Crabb. Max whirled, fired twice. The bullets hit the corpse as Trent held it up before him. With an oath, Max swerved the gun toward Crabb. Trent dropped Grussen's body, seized the leg of a small magic table.

He hurled the table at Max's shins, and the Nazi fell on one knee with a howl. Both Trent and Crabb lit on him at once. The pistol went off, searing Trent's sleeve. Mortimer Crabb snatched the gun out of his hand, brought it down hard behind the German's ear.

"Well, I guess that'll hold him a while," Crabb grated. "What happened to von Zenden?"

"He must have escaped through the basement," said Trent. He ran into the hall.

"Stop where you are!" bawled a familiar voice. Trent wheeled. McBride strode in through the vestibule, three F.B.I. agents behind him.

"Get some men around back," clipped Trent. "Two Nazis just went down through the basement."

"It's no use, Trent, I've got you cold," barked McBride. "Take his gun, Williams."

A blond young G-Man obeyed. McBride stared into the magic room, where Mortimer Crabb sat astride Max's unconscious figure.

"What in Pete's name—" he blurted out. "So that's the stiff!"

"No, he's merely *hors du combat*," said Trent. "Your long-lost corpse is over in the corner. I had to use him as a barrier, but you can ignore the bullet holes."

Out in the walled garden an engine sputtered, went dead. Two of McBride's agents streaked outside, and in a few seconds Trent heard a muffled command, "Halt!" A pistol shot followed like a punctuation point. One of the agents came back panting.

"Big fellow; tried to get over the wall with an insulated ladder when he couldn't get the gyro started."

"Well?" snapped McBride.

"Sorry, but I had to shoot. He was about to drill Peterson."

"That," said Trent, "would be *Herr* Ludwig, one of the muscle-men. I suppose it wouldn't interest you that the leader is probably outside the wall and making a clean getaway."

McBride looked uncertainly at Max, then at Grussen's body. "Williams, scout outside the wall. With those floodlights on maybe you can spot him —if there *is* any leader," he added tartly, turning back to Trent.

"Suppose you listen for a minute," Trent said calmly. "It might also interest you to know there's a plot to use gas against Washington—tonight."

McBride started. "Gas? Talk—and talk fast!"

Trent crisply gave him the salient points. McBride sent an uneasy glance at Grussen's mottled face, then went behind the magic cabinet and brought out the Navy uniform von Zenden had worn.

"For Heaven's sake, man, make up your mind!" snorted Crabb. "Those devils are planning to strike within forty minutes! At least warn the Interceptor Command."

"There's only one way to be sure they don't reach their target—whatever it is," cut in Trent. "Leave the transmitter going downstairs, so they can ride in on the carrier beam. Have the Airacobras out there, waiting at that intersection point on the map."

McBride hesitated, staring at the map. "All right, where's the phone?"

Trent led the way into the hall. "It's in the drawing-room, through that arched doorway. Wait until I see if Ludwig put the fuses back."

"And to save time," Crabb said morosely, "you'd better let me try that transmitter, to be sure it's set on the right bearing."

"Williams, go down with them," ordered McBride. "Watch what goes on. I still wouldn't bet on that guy Trent, even if Captain Blaine did say . . ." The rest was a mumble as McBride went on into the drawing-room.

THE BASEMENT was brightly lighted, the outside doorway wide open. Trent saw a ladder leaning against the wall, Ludwig's body at the bottom, doubled up.

"Anybody guarding those ships across the road?" he asked Williams. The young agent nodded.

"McBride left a man over there. He spotted the planes when the floodlights went on."

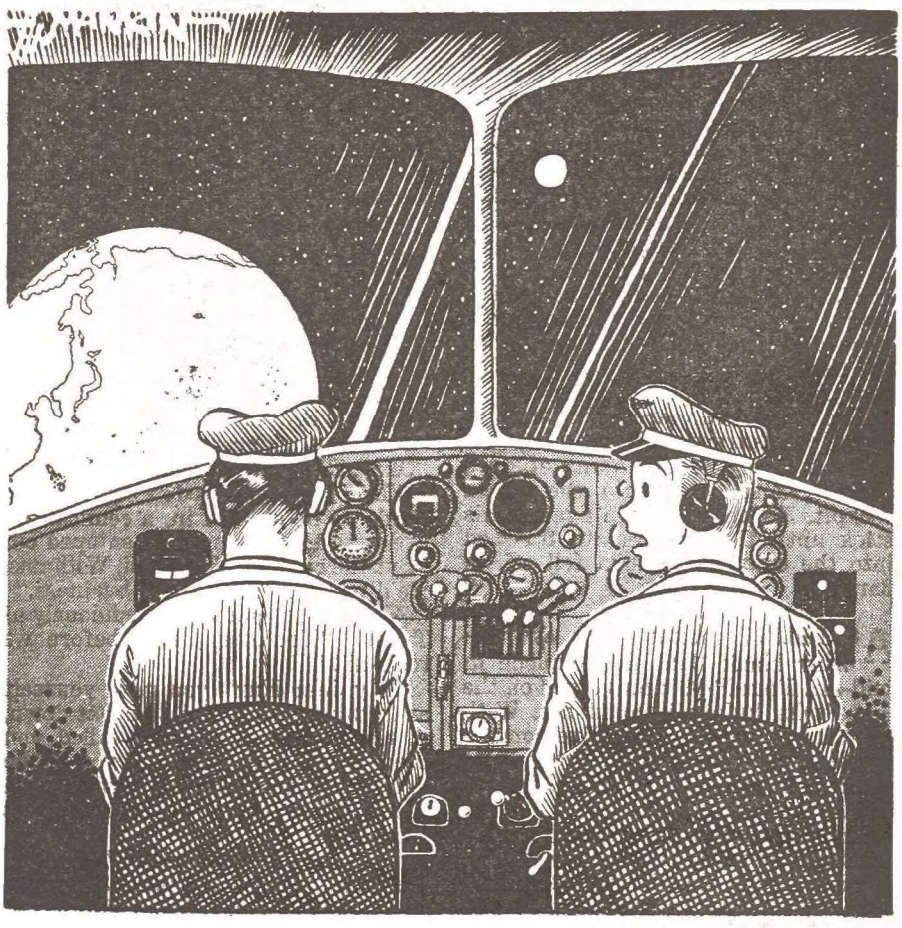
Crabb finished checking the beam angle, and in a few seconds McBride hurried down the steps. "All right, Trent. They'll have the interceptors there. But I'm going with you—just in case you've got some trick up your sleeve."

"It's a pleasure, Red, old top," said Trent. "Of course, it's usually the chap in the rear seat who gets shot first."

McBride pulled his hat down with both hands, in a defiant gesture. "You can't scare me. Get going."

"I was only thinking of your weak stomach," Trent said maliciously. "You see, Red, Lieutenant Shafer told me about that bumpy trip you had with him last Fall."

McBride gave a sickly smile. "Don't worry about my stomach. Come on—I've got the map."



"Pardon me, sir, but aren't we going a bit too high for our bombing?"

"Just a second." Trent crossed the lab to Crabb's desk. He scribbled a note, came back. "Mort, give this to Captain Blaine when you see him," he said.

"Let me see that," snapped McBride. He read the words. "So! 'Ignore all charges by that fathead McBride!' We'll see about that, Commander—when I get back!"

"You shouldn't read private notes," chuckled Trent. He patted Crabb on the shoulder. "So long, Mort, in case my guardian angel slips up."

"I'll help you get started," Crabb said gruffly.

Later, with McBride ensconced in the rear cockpit, Trent sent the Curtiss roaring up into the night. The floodlights, still on despite the blackout, enabled him to miss the trees, and he quickly swung onto the course the Nazis had mapped. He ran his eyes again over his instruments, cartridge-belt indicators, on down to the Pyrene fire-extinguisher and his flare releases.

"Turn on the radio!" McBride shouted, his voice barely audible over the engine. "How do you know we're heading right?"

Trent switched on the receiver. "Give me the map, while you check the beam."

McBride shoved it over into the front cockpit, put on the rear-pit headset. Trent swiftly inspected the course-line, which he had already traced through downtown Washington. Oddly, it touched no important buildings. Then he saw it, an all but invisible dot on the line at the edge of the main reservoir.

The reservoir—Washington's water supply! It hit him like a blow. Cyanide powder dumped into the reservoir . . . von Zenden's hint of men taking over some point—undoubtedly the water testing-station—to prevent any warning . . . and in the morning, unsuspecting thousands drinking—and dying!

"Trent, we're off the beam!" McBride's shout broke in on Trent's tense thoughts. "You circled too far before you set your course."

Trent put on his headset, banked into a climbing turn until he had maximum volume. He straightened out, holding an altitude of four-thousand feet. The low clouds were thinner on top and he could see occasional stars.

"Switch on your transmitter," roared McBride. "Hurry up!"

Bending over, Trent flicked the switch. The Curtiss skidded as he lifted his foot from the left rudder pedal. He heard McBride yell for him to swing back and start the circle, at the marker-intersection point. But before he could start his turn, the red and green lights of a plane appeared, ahead and about five-hundred feet below. Trent jerked open the front cockpit enclosure, fired a red rocket into the sky.

"What are you doing?" screamed McBride.

A brilliant light burst overhead, and against the blinding glare Trent could dimly see the diving planes.

"It's a trap!" McBride cried wild-

ly. He whirled the rearpit guns up at the leading ship. Trent snatched the Pyrene loose from its clamps, slammed it at the other man's head. It caught McBride behind the ear, and he slumped down in the seat.

The diving ships materialized, under the flare, as Army P-39's. Trent whipped aside, to clear their path. Below, three black Stukas were zooming wildly to get out from under the light. A faint, smoky haze, like a mirage, suddenly appeared behind the leading Stuka, as the black ship flicked its tail toward a plunging P-39. Trent stood the Curtiss on its nose, cut loose his four forward guns.

The Airacobra veered off hastily, to miss Trent's tracers. Before the Stuka could swerve, Trent's guns stabbed their blazing death into the pilot's cockpit. He held the trip against his stick until the tracers ate forward into the cowl. The Stuka fell off, in flames.

AS TRENT chandelled he saw another black Nazi ship explode in mid-air. Four P-39's converged on the last Stuka before it could flee. With its tail cut off, the Nazi dive-bomber started a headlong plunge. Trent dived after it, holding his breath. If Mort had not understood . . .

The first flamer had burned its way through the mist, and he saw, as the last one struck, that it was open country. With a long breath of relief, he leveled out and headed back toward the Potomac.

The floodlights were still on at the old mansion, and he landed without difficulty. Mortimer Crabb and the young agent, Williams, came to the side of the ship.

"Eric! We just got word about the Stukas!" exolaimed Crabb.

"They hardly knew what hit them," said Trent. "But I had a casualty. Our friend here didn't like the way I was handling things, and I had to bop him. Help me lug him inside."

It took the three of them to carry the senior agent into the mansion. He began to stir as they laid him on a sofa in the drawing room. One of the other F.B.I. men brought some ammonia from Crabb's medicine chest.

"He's coming out of it all right," said Trent. "But I'm afraid he's going to be a little peevish."

Their patient sat up, gasping and sputtering. He put up one hand and felt the bump on his head, just under the brim of his hat.

"Sorry I had to lay you out, old chap," Trent said amiably.

The other man staggered to his feet. "You—you traitor! You're under arrest. Take him out of here, Williams."

"What charge?" said Williams. "He led the Interceptor Patrol to those German planes and helped wipe them out."

"He's lying! He signaled the Nazis . . . he tried to kill me. I know now he was one of von Zenden's spies. Trent let the Nazi escape!"

"That's right," said Trent. He smiled as the other man gaped at him. "But you see—I brought him back."

He reached out, suddenly jerked off the agent's felt hat. A mass of red hair, glued inside the band, came off with it, revealing the man's natural blond hair, plastered close to his skull. A strip of white skin, devoid of make-up, showed at the hairline, where the tight-drawn hat had concealed it.

"Gentlemen," said Eric Trent, "permit me to present the Man of a Thousand Faces. This is known as Face Number 13, by courtesy of McBride."

For an instant von Zenden stood as though turned to stone. Then he made a fierce lunge at Trent.

"You fiend! I'll kill you for this."

The F.B.I. men hauled him back, and Trent glanced toward the hall. "Okay, Red, you can come in now."

"Don't call me Red!" snarled McBride as he stalked in, a comical figure with half of his hair snipped off. "Put the cuffs on that Nazi, Williams. He'll pay for this night's business."

Von Zenden stared incredulously at Trent. "You knew, even before we took-off?"

"My dear Kurt, you gave yourself away when you pulled that hat down, in the basement. When I called you 'Red' it evidently reminded you of the hair you had so hurriedly fastened in there after — er — borrowing it from—"

"Never mind about that," snapped McBride. "And don't think I let him do it. He got me in the dark when I went to phone. Next thing I knew, I was trussed up and gagged in that closet where Crabb found me. If you knew it then, why didn't you grab him and look for me?"

"I wasn't sure what else he'd done. I made positive it wasn't you, by inventing a bumpy ride with a non-existent mutual friend. Then I wrote two notes, one for him to see; the other I slipped to Mort telling him it was von Zenden and to look for you, warn the Interceptor Command, and bend the beam so the Stukas wouldn't get over Washington. I knew if I took von Zenden along he'd make sure we contacted the Stukas. Otherwise, they might drop the stuff before the P-39's could get them."

McBride glowered at the impersonator. "I traced that call you *did* make, my fine Nazi. We've rounded up the mob that seized the Bryant pumping station and the testing lab, and that gave the show away. We've enough to burn the lot of you."

"I shall never sit in the electric chair," von Zenden said haughtily. "*Der Fuehrer* will see to that."

"Damn if I'm going to have my own face talking back to me!" roared McBride. "Trent, can you get that stuff off?"

"Sure, but I'd leave it on until you photograph him over at the Bureau. Then at least you'll have him for impersonating an officer."

"Thanks," growled McBride. He slammed the felt hat over his cropped hair. "Take him out of here, Williams, before I make another egg grow by that one Trent gave him."

THE END

SLIPSTREAM

(Continued from page 24)

also is *Al Hunter*, one of the famous brothers who set that 23-day refueling-flight endurance record in Chicago in '30. He fell from the roof of a building.

Tailwind Tips

First tests have now been made on one of those new French flying boats we were telling you about. Known as the P-161, it's a 43-tonner. . . . New York's bridges are to get camouflage paint. . . . Lockheed's got bikes for its employees, and so has Douglas in efforts to ease worker transportation. . . . Tests show that men between the ages of 18 and 24 stand high altitude flying best. . . . And eight hours of war flying a week is about all a flyer can put in and still retain top efficiency, according to Wright Field studies. . . . Douglas workers have been selecting names for their company's A-24, A-20, B-23, B-18, and other jobs, in a contest which pays out in War Bonds. . . . The RAF dropped two and a half times the weight of bombs on the Renault factory in France as compared with the load the Nazis loosed on Coventry. . . . That hat-in-the-ring cocarde used by Rickenbacker's 94th Squadron in the last war is again being sported by our current 94th. . . . Capt. Bob Northcutt flew in so low in one of his B-17 raids on the Japs in Java that fragments of his own bombs damaged his plane.

THE END

GAS BLITZ

(Continued from page 6)

how such materials might be used against our forces and how protection might be provided.

Without detailing the principal weapons of the Service—consisting of chemical mortars, Livens projectors, and portable chemical cylinders, which provide more than a passive defense against any enemy who may choose to perpetrate this kind of combat—let the reader be assured that neither we nor our British nor Soviet allies will be caught unawares.

Our War Department, in its own words, "is convinced that the best insurance against employment of chemical munitions by a potential enemy is the knowledge that our Army is fully prepared to defend itself against the use of all types of chemical agents."

Thus, our troops in the field may well anticipate such visitations. But what of our civilians in the continental United States?

Well, air raids are always a possibility. As likely as not, the enemy

may employ on these occasions poison gases as well as explosives and incendiaries. He is not likely to be rewarded with spectacular triumphs if our civilian and military defenses are on the alert. Many of the steps normally taken to protect ourselves against the more conventional air raids will work admirably, in addition to the special anti-chemical measures.

But from what directions could such possible attacks come? Japan's prospects are most unpromising in any present consideration of this subject because of the vast distances separating our West Coast from her bases. Germany is nearer across the Atlantic and also has aircraft of longer range than the Imperial Air Force. If the Luftwaffe attempts this operation, it will be taking a great risk which at best may be compensated by only slight damage. For it is generally believed by the experts that the main accomplishment of the operation may be demoralization of civilian centers. Needing all her airplanes on various far-flung fronts, facing on the Eastern Front what is undoubtedly the gravest crisis ever to confront a great modern air force, can the Luftwaffe afford frequent enough excursions to America merely on the chance that some people along our Atlantic seaboard may be depressed?

Just the same, let us not overlook anything in this struggle to the finish. In case the Nazis are in the mood, what type of aircraft are our spotters to look for as a carrier of chemical gifts?

I think that one of the likeliest visitors to operate directly from Europe is the new Heinkel He.177, which has a range of 7,040 miles at 180 m.p.h. In production at the Rostock plant of the firm, the craft is still believed to be suffering "teething troubles." However, the Ernst Heinkel *Flugzeugwerke* engineers were rather prompt in ironing out the kinks in their earlier types, and they undoubtedly will get the He.177 in production form in short order. This up-to-date craft has a top speed of 280 m.p.h. and a rate of climb of 840 feet per minute.

Another Heinkel type that comes to mind is the He.116. This ship has a top speed of 233 m.p.h., a cruising speed of 198 m.p.h., a service ceiling of 21,650 feet, and a rate of climb of 820 feet per minute.

There is always a probability of either side in the war springing surprise weapons, especially if a deadlock is attained at the front. The Allies can afford to "sit out" any deadlock because they have superior resources for the war of attrition. The Axis powers favor the blitz way not always necessarily because it is the best way but because any appreciable prolongation of hostilities offers a fatal threat to them in the form of a drain on their none-too-plentiful aviation fuel and other vital supplies.

It was this drastic state of affairs in the last war that led the Germans to the use of chemical implements, rather a surprise weapon for a while. In this war they are probably seeking—they may have already found—some novel way of dealing death and destruction through chemistry. Whatever their chemical surprises may turn out to be, however, it is a safe bet that when they materialize they will be in an intimate alliance with aviation.

THE END

MICROFILM JOB

(Continued from page 57)

and glued to the tail boom and then both are glued to the side.

The landing gear struts are also made the same way as the wing spars from tapered sheet balsa. The wheels for the "E-Z" are made of 1/64" sheet sanded to 1/100". A small piece of .010 wire is glued to the struts and a piece of tissue is wrapped around a pin, glued and cut in half and used as a tube through the center of the wheel.

Another type of wheel is made of a thin strip of celluloid about 1/32" wide glued in a circle with a center brace of 3/64" by 1/32". The paper tube may also be used here as an axle if desired. The landing gear is glued to the body about 1½" from the front and about a 4" tread.

MAKING MICROFILM AND COVERING

IF you have never tried making microfilm don't be frightened at the thinness of the stuff as microfilm is really easier to cover with than tissue. If desired a sort of makeshift microfilm can be made from either dope or lacquer; made flexible with a few drops of castor oil. The amount of castor oil is determined by experiment; that is, add a few drops of castor oil to some dope or lacquer and pour on water. If the stuff spreads out nicely and after awhile starts to crinkle around the edges, you will have to add more castor oil. If you add too much oil you will find either you can't pick the film up with a hoop of wire or that it becomes too tacky and sticks to everything it touches.

There are many commercial formulas for "mike" which will save all this bother. A hoop of wire is needed. It may be an old clothes hanger bent to shape or 1/16" galvanized iron wire which can be obtained anywhere, or ⅛" aluminum wire which is the best. About 3 inches of water should be run into either a bathtub, tank or wash basin top. For the beginner, it is best to use cold water as this produces heavy "mike" which is much easier to handle. The solution is poured on the water, and after about three to five minutes of drying, a hoop is placed over the "mike", the "mike" pushed to the edges of the hoop and lifted in a semi-circular motion away from you. A knack of lifting will be acquired with a little experience.

Probably the best way to cover is to lay the uncovered parts on an enameled surface and draw a wet finger around them, leaving them completely encircled by water. Then wet the frames with saliva and place back in position. If the hoop of "mike" is then placed over the parts it will stick to the wet enameled surface and to the structure.

Another way is to rest the hoop on four bottles and place the frames wet, right on it. The mike is trimmed with either a hot wire or a brush with acetone or thinner. Dihedral is then put in the wing and to get the wrinkles out a hot wire is passed beneath it.

If the ship is made to fly in a small room, it is advisable to glue the boom on at an angle to give the model left turn. Assemble the ship and put in about a 10" to 12" loop of 1/32" flat brown rubber. Place the wing in position so that it glides flat. Put in about 500 turns and launch very gently. All adjustments should be made with the tail. The "E-Z" should be able to fly in a very tight circle but the "E-X" may be a little more difficult to fly in a small place. Make sure the windows are closed.

THE END

MODEL NEWS

(Continued from page 55)

youngsters in aviation, youngsters who may soon be called upon to fly America's dive bombers and service its fighting aircraft.

Educators, aviation leaders, and aeromodelers know that the building and flying of model airplanes provide basic training in aerodynamics, aircraft construction, and flight instruction. Knowing this, the officers of the Academy of Model Aeronautics and those who head up NAA's Air Youth division are doing their utmost to make model aviation available to an ever-increasing army of enthusiasts —now 3,000,000 strong, according to CAA spokesmen.

Those who direct the headquarters activity of AMA and Air Youth have been working longer hours than ever before in an effort to provide modelplane building aids and aviation education materials for the young enthusiast. No overtime pay do they expect or receive. Even the stenographic help pitches in. Business is not pretty much as usual at headquarters these days. Model aviation has gone to war. And as the clearing house for aeromodeling in America, your organization is working day and night to do the job. But

headquarters merely coordinates the work of leaders and members throughout the country. *The real task is in your hands.*

It has been apparent that some who are recognized as aeromodeling leaders have progressed backwards in their thinking, instead of staying abreast of aeronautical trends. These chaps decry some of the suggested wartime regulations for model flying which the AMA Contest Board and particularly its chairman, Everett N. Angus, have labored over so diligently. The rules represent not the Board's ideas alone, but the thoughts of modelers everywhere whose suggestions have been sampled in meetings, conferences, and surveys. Also consulted were aviation leaders who did not want to see aeromodeling shut down for the "duration."

To cite an example, take the proposal to eliminate fuselage cross-section requirements for gas models. Some leaders were horrified. They don't seem to realize that military craft *without* fuselages are already on the drawing boards and in the air.

The proposal to permit optional launching for gas models met general approval. But a few couldn't see this at all. For their edification we mention here that the London *Daily Mail* has reported the Nazis utilizing rockets to assist their heavy bombers to get off the ground with an additional 1½ tons of bombs.

Miller and Robbins Appointed

The Academy of Model Aeronautics announces the appointment of Edward Miller of New York to its Education Committee. Mr. Miller has long been active in AMA activities and is currently drawing up a program of conservation and curtailment of essential materials for the airplane model industries. Mr. Miller replaces Mr. Russell Nichols, who is now associated with Headquarters and as such has resigned from the Education Committee.

The Air Youth Division of NAA announces the appointment of Richard Robbins of New York as Projects Consultant. Mr. Robbins is well known in the field of Hobby Activities, having organized the first Wisconsin Hobby Show.

National Headquarters also announces the appointment of E. F. Bergdorf of Houston, Texas, as Air Youth's first Field Representative. Mr. Bergdorf has been recently elected President of the Southwestern Gas Model Airplane Association. He has been long active in aeromodeling activities in the Lone Star State.

Modelers in Civil Defense

In recent discussions with officials of the Office of Civilian Defense, the Academy of Model Aeronautics has been informed that volunteers over sixteen years of age are still needed in most areas as observers.

The Academy pointed out to OCD officials that, because of their general knowledge of aircraft, the ranks of our American model builders offer one of the best sources of personnel for this vital defense service. OCD officials have informed the Academy that model builders who volunteer and are accepted can fulfill a twofold service: first, by giving their own time and service, and second, by releasing other volunteers whose time may be of value in connection with other activities related to National Defense.

Aeromodeling in War

What effect America's entry into the second World War will have on model aviation is difficult to predict at this time, and it would certainly be unwise to attempt to do so.

This much we know. Model builders, hundreds of thousands strong, through their understanding of aviation and ability to turn out craft products, offer a reservoir of aviation personnel and stand ready to be of tremendous value in the home defense activity. At this very moment the National Aeronautic Association and its Academy of Model Aeronautics are working together to have model aviation recognized as an essential defense activity.

Modelers Must Aid Program

No one will deny that recreation and sport keep up the morale of the country. But aeromodeling already has passed beyond the casual competitive and sporting stage to the point where it is developing air-mindedness in the youth of the nation and pre-training devotees for a place in aviation.

Are you aware of the change?

Is your modelplane club still building and flying model airplanes as a hobby?

How about helping America's war effort? The building and flying of model airplanes in definite educational sequence to impart a thorough knowledge of aeronautics is an essential defense activity. This must be encouraged. You and your club must do the job.

Here's how you can start: Arrange a meeting with your superintendent of schools. Find out what phases of aviation (if any) are now being taught in the classrooms of your community. Convince the school leaders that aeronautics starting with airplane model building should be as much a part of the school program as English, physics, or algebra. Start junior aviation clubs and training classes in conjunction with local youth organizations. Ask for community sponsorship. Don't hide your efforts. The more publicity you can focus on aviation, the more important your work will be in America's "Air-conditioning" program.

Above all, act now!

AMA Credentials Returned

Pfc. Daniel DeForest, 48 Q M Regt. Co. B Apo. 402, Ft. Wayne, Mich.; George DeBlock, 30 Broadway, Jersey City, N. J.; R. W. Field, 1340½ Hewton Ave., Columbus, Ohio; Charles Lewis, 445 18th St., Columbus, Ohio; Henry Lilyquist, 3006 Rhode Island Ave., St. Paul, Minn.; Edward Nye, R.F.D. No. 3, Lawton, Okla.; Harold Osborn, 414 W. 121 St., New York City; Alfred Paternoster, 927 Forest Ave., New York City; George Pedder, Woodland Ave., Esmont, R. I.; Horace Poston, Jr., 508 Oakland Ave., Austin, Tex.; Ed Spaulding, 819 Monroe Ave., Chicago, Ill.; Colin Simpson, Los Angeles, Calif.; Homer Drye, Concord, N. C.; Jack Fedell, Frontenac, Mo.; Wallace Boyd, Houston, Texas.

If you can help headquarters locate any of these individuals by supplying their correct address, please drop a post card to the AMA Headquarters, 717 Jackson Place, Washington, D.C.

THE END

AIRACOBRA!

(Continued from page 45)

strip) is painted on, or may be a piece of sandpaper touched up with black india ink and pasted on.

Attach the wing with plenty of cement inside the scooped out portion of the body and on the upper part of the wing itself. Press firmly and insert model pins deep into the wing so that they stick right into the body. Fill holes with filler material and sand smooth.

The landing gear legs are made of white pine dowels carved to the required shape. Rubber tire wheels or hard wood wheels may be used. The outer portions of the landing gear are shaped from pieces of sheet balsa and cemented to the landing gear arrangement as shown in views on Plate 1 and 3. Main landing gear strut should be inserted up into the wing for added strength. Sheet balsa is used to simulate the metal pieces used to form the flush surface for the nose wheel when it retracts. The landing gear as shown in the drawings is not made to retract so wheel wells have been omitted from the underside of the wings. In the event the model builder wishes to have his model without landing gear, the entire arrangement should be eliminated.

THE END

AXIS PLANES

(Continued from page 33)

These 12 squadrons probably constitute the largest concentration of military airpower that any country in the world has gathered around a capital city. Of course, the territory from Tokyo south of Kanya is the most important in the Empire, since it is the most densely populated and the most productive. In addition to the original 64, other army squadrons, which are not used for combat duties, are located at Tokorozawa, Akeno, Shimoshizu, Inagemachi, Kumagi, Hamamatsu, and Murayamamura. The duties of these are, respec-

tively, flight training, aerial fighting, tactics and reconnaissance, air defense, air pilotage, bombing, and boys' training.

An additional 40 to 50 squadrons are under the command of the navy; some of these are land-based and some are stationed aboard aircraft carriers. The known carriers at the beginning of the war were the *Kaga* (60 aircraft), *Akagi* (50 aircraft), *Soryu*, *Hiryu* and *Koryu* (each of which carry 28 aircraft), *Hosko* (26 aircraft), and *Ryujo* (24 aircraft). Also, Japan had six specialized seaplane carriers of about 10,000 tons each and 14 battleships, each of which carried two or three catapults and up to five or six seaplanes. All of these battleships have been modernized since 1929 or 1930 and can therefore be classed as almost new ships. Further, all but five of Japan's 43 cruisers carry from one to two catapults.

Very little is known about the productive capacity of Japanese aircraft factories or the number of military machines of which their air force is composed, so any figures given are necessarily hypothetical However, Alfred Downs, on December 17, 1941, published a very interesting account of the Japanese air force in the London *Daily Mail*:

"Last year it was estimated that Japan had about 5,000 first-line airplanes and was turning out, annually, about 8,000 of all types. The goal for 1942 was 30,000 annually, but it is believed that Japan will never reach that figure because of shortage of materials, especially tools and aluminum. Japan's capacity this year is estimated by American engineers at 10,000 airplanes."

This 10,000 figure sounds very small to the 60,000 aircraft which are to be built in the United States during 1942 and the 125,000 projected for 1943—but it must be remembered that mere quantity in an air force means absolutely nothing. It's just like trying to get on a bus with a ten-dollar bill, when it is a rule that conductors are not obliged to change bills of larger denominations than two dollars. Not only can Japan use her aircraft in the Pacific area; she can also route replacements without undue difficulty. On both of these scores, the United Nations are sorely hampered. Therefore, Japan's 10,000 rate is better than any production rate, no matter how much higher, which cannot be put to effective use.

It seems that the weakest link in Japan's entire scheme of airpower is in the matter of personnel replacements. It is estimated that no more than 700 finished military pilots are commissioned by the army annually, after they have passed through an instruction period of two years. Further, it is said that Japan has a larger accident rate than any other air force in the world during the instruction period.

From all reliable reports, the Nipponese are poor aeronautical engineers and have patterned many of their service types after machines in use with foreign air forces. On this point it is interesting to quote again from Mr. Downs' *Daily Mail* article:

"A Douglas engineer told me that they were informed that the Japanese cracked up the giant (Douglas) DC-4 transport airplane which the country purchased two years ago as a model for a heavy bomber superior to the American (Boeing B-17E) Flying Fortress. Efforts to reproduce the DC-4 failed, although the Douglas Company provided blueprints as well as the airplane itself."

Originally, the air arm of the army was influenced strongly by the French and Germans, and that early influence is still plainly noticeable in Japanese plane construction. Only in recent years has the American influence made itself felt to any marked degree.

("War Planes of the Axis" is published by the Robert M. McBride Publishing Company, 116 E. 16 St., New York City, and sells for $2.75. All copies ordered from the publisher by F.A. readers will be autographed by the author.)

THE END

R. O. G. TO AT-6

(Continued from page 53)

"I have flown over so much of the state of Texas on extensive cross-country flights, both day and night, that I often think of the state as my own backyard. Another thing about this training I'll never forget is the flight I made up to eighteen thousand feet—the flight which called for the use of my oxygen mask—an experience entirely new to me.

"Formation flying, cross country hops, instrument flying, an oxygen flight—that about sums up the flight training I received at Brooks. The latter part of my work here consists of flying AT-6's and BC-1's, both high-powered ships with retractable landing gears, controllable pitch props, and landing flaps. Recently I was made an assistant instructor and spend much of my time flying the Curtiss O-52's.

"Being a flying officer in the Air Corps is about the most enjoyable and interesting job a fellow could hope for. With a definite goal ahead, I hope to be able to do my share in the large task that lies ahead of us."

While undergoing flight training Lee has had his share of "experiences," too. The story as we heard it is that Lee was on a practice flight in the vicinity of Randolph and around 5,000 feet up. Coming out of some fancy maneuvers he leveled off to try some more. He moved the control stick forward—at least he tried. It wouldn't budge! He tried to haul it back, still no soap. Left and right pressure on the stick brought no response either. If he bailed out right there and then he would have done the right thing. He tried adjusting the trim tabs of the stabilizer. It

Aero Book Reviews

Any volume described in this department may be obtained, at the price quoted, direct from the publisher named and at the address given. When writing for a book, kindly mention that you saw it reviewed in FLYING ACES.

Hitler Cannot Conquer Russia, by Maurice Hindus, Doubleday, Doran, 14 West 49th St., New York City, $2.00.

"He may sweep over the Ukraine, up central and northern Russia. He may seize Kieve, Kharkov, Rostov, Leningrad, Moscow. He may push eastwards to the Urals. But he will not win the war because he cannot hold the Russian earth and the Russian humanity."

The purpose of this book is to depict to American readers the cause for which the Russians are fighting, how they are fighting, and of the forces within them that make it impossible for the Hitler legions to subjugate them.

Model Aircraft Handbook, by William Winter, Thomas Y. Crowell Company, 423 Fourth Ave., New York City, $2.00.

William Winter, long an expert model builder and designer, has placed at the disposal of the novice modeler the benefit of his many years' experience in this field. His new book, profusely illustrated with drawings, covers every point of the modeling art, and he tells all the whys and wherefores on each subject. There's lots of excellent dope in this volume.

All Out on the Road to Smolensk, by Erskine Caldwell, Duell, Sloan & Pearce, Inc., 270 Madison Ave., New York City, $2.50.

This book, written by the famed author of *Tobacco Road,* and who as an impartial observer of the Soviet experiment gives a picture which reveals what Russia at war is really like. It is a close-up of the Soviet Union today . . . of Moscow blackouts, the people's army, the fighting pilots of the Red Air Force. One of the best accounts of those months when the armored Nazi legions moved onwards to Moscow.

Convoy, by Quentin Reynolds, Random House, Inc., 20 East 57th St., New York, $2.00.

If you like tales of adventure told by a real story teller, make it a point to read Quentin Reynolds' *Convoy.* This book was written while Reynolds was on his way to England just prior to his trip to Russia. He went over on a slow freighter, part of one of the largest convoys that ever crossed the Atlantic Ocean.

Impatiently pacing the decks of the lumbering ship, Reynolds reviewed in his mind some of the most exciting assignments of his hectic newspaper career. Finally he decided to collect some and put them into book form.

Attack in the Desert, by Michael Home, William Morrow & Co., 386 Fourth Ave., New York, $2.50.

The time of the story is 1940. Its scene, the great Libyan desert. Its minor characters, the solitary men and small bands whose daring exploits in the war seldom find their way into the front page dispatches, are told in an absorbingly interesting account. Good fiction stuff, about an RAF pilot.

Mathematics for the Aviation Trades, by James Naidich, McGraw-Hill Book Co., 330 West 42nd St., New York, $1.80.

This book has been written for students in trade and technical schools who intend to become aviation mechanics. The text has been planned to satisfy the demand on the part of the instructors and employers that mechanics engaged in precision work have a thorough knowledge of the fundamentals of arithmetic applied to their trade.

Each new topic is presented as a job, thus stressing the practical aspect of the text. Numerous photographs and drawings make this volume interesting for the student-mechanic.

Science Year Book of 1942, by John D. Ratcliff, Doubleday, Doran & Co., Garden City, N. Y., $2.50.

It is easy to take for granted the immense strides being made in all branches of science that few people realize how rapid our rate of progress is proving. This book, dealing with science's rapid progress, is more than just a record of achievement in one year. It contains stories of wonder which have all the fascinating interests that a Jules Verne novel held for readers a generation ago. It is certain to thrill and excite as well as instruct; it offers entertainment and knowledge in equal proportions.

Corporal Cat, by Martin Flavin, Harper & Brothers, 49 East 33rd St., New York, $2.50.

Quite simply, this is a story of a Nazi parachute soldier who came down in Germany under the mistaken impression that he was in enemy territory. This adventure story is packed with excitement and at the same time is as deeply moving.

(Also see pages 65, 67, and 78 for other reviews)

worked enough to give him a little longitudinal control.

He kept cruising around trying to work out things for himself and then decided to call Randolph's control tower. The Operations Officer ordered him to maintain his altitude while they'd send up one of the pilots to see what could be done.

Within a few minutes another BT job cruised up alongside the stricken ship and by means of sign language Lee followed instructions and then expertly guided his ship down to a perfect landing. Upon inspection it was found that some mechanical failure had developed which prevented the full use of the control stick. Lee, hero of the day, was congratulated by all his buddies as well as the Field Commandant himself who was at the controls of the other ship.

THE END

DOUBLE-CROSS

(Continued from page 29)

you are poison. Scram you!"

In his hut, Phineas took helmet and goggles from his trunk; it was the scalp he had recently bagged from one of Heinzhund's Halb pushers. The night was going to be balmy and he would not need a big coat. He wrapped some of his cherished personal possessions in a chunk of tarpaulin and tied them up securely. While he worked, he heard the squadron jallopy heading out of the drome. Garrity and seven of his brood were going over to Commercy to see a show put on by Elsie Janis and Company. With the Old Man away, the tension on the tarmac would ease up a bit and efficiency would drop a few points. Captain Howell was the officer in command until Garrity returned.

An hour or two later, a Spad began to turn over and Howell sauntered over and questioned the flight sergeant.

"It is Pinkham's crate," Casey said. "Lieutenant Gillis says he wants to know if it is okay, as he intends to fight von Heinzhund with it. He wants to be sure there is no buzzers, time-bombs, or scorpions in it. He is goin' to fly it tomorrow."

"All right, Casey," Howell said. "Keep your eyes peeled, though. If something happens while the Old Man is gone, I get the blame, see?"

"Y-yeah," Casey gulped.

The coast was clear. Captain Howell would be in the farmhouse, feeling important, Phineas figured. Maybe he would be at the C.O.'s desk getting the feel of that, too. The Boonetown miracle man walked briskly across the tarmac for several yards, then accelerated.

Phineas jumped into the Spad's office. A grease monkey got hold of one of his legs and held on. Casey hit the mech and then asked Phineas to hit him.

Five minutes later, Sergeant Casey

was being helped to his feet and Captain Howell was roaring in his ear.

"The mug didn't have to hit me so hard," Casey said. "I'll knock his brains out! He double-crossed me with them dice. Oh, hello, Captain. He seemed to come right out of the ground and then the ground up and slapped me one."

"That big stiff!" Howell yelped. "He is so lowdown he would have to reach up to touch bottom. Look what he's got me into! Now I'll get the works because he got away from me. Who the devil ever enlisted him in this air corps? Oh, cripes! Where did he get shoes and helmet?"

"Come to think of it," Casey gulped. "Just before he crocked me, I saw his eyes an' they was square. The goggles, I mean. I bet he's got a Kraut helmet on."

"Well, he's gone," Howell said. "I'm goin' over and take two bars off my shoulders."

"Sorry, Cap," Casey said to himself. "You git busted and you're still a looey. I do and I never will git to be one. Around Pinkham it is every man for himself, and every man needs two helpers."

MAJOR RUFUS GARRITY came back from Commercy in a nasty mood. It seemed that the actors had taken some cracks at aviators of the sector and hinted that the Baron von Heinzhund was a bogey man who frightened Spad pushers in their beds. The Old Man heard of the Pinkham hegira and went into a terrible tantrum. He promised Captain Howell and Flight Sergeant Casey that they would be getting a change of scenery as soon as he could enter charges against them on the Ninth Pursuit police blotter. Garrity locked himself in his quarters and did not come out until one o'clock in the morning when a shocking bit of news came from the front.

Pilots who were still up wondered if the C.O. had swallowed a beetle when he groped his way out of the Operations office and came into the mess.

"Got a report from Divisional P.C. near Framerville," the Old Man said. "A Spad made a forced landing between two Yank trenches while a shelling was going on. Seems a shell hit the Spad dead center about ten seconds after it landed and blew it from here to the Pyrenees. No chance for the pilot to get out. Only one Spad out, gentlemen. Well, has anyone anything to say? Good idea to break out a bottle or two."

"Yeah," Howell choked out. "Save the U.S. traveling expenses for a Judge-Advocate, huh? Hope everybody is satisfied, now we are rid of Phineas. A swindler, wasn't he?"

"We misunderstood him," Bump Gillis said and poked at a wet eye with his index finger. "He was just playful, was all. Why do majors, when they git to be majors, lose a sense of humor. Nobody should live long enough in an air corps to get to be a C.O."

"Oh, so I sent him to his death, ha?" the Old Man roared. "I take the rap, as usual. You have got me hysterical, and I hope you're satisfied. Look at me shake. The stuff in my eyes is not belladonna. I got to keep discipline, don't I? Awright, I'm a ghoul, a martinet! Who wants my job? Speak up, and the first one who wants it can have it—even Goomer."

"Oh, let's all pull ourselves together," Howell said. "We are upset."

While the verbal wake was going on near Bar-Le-Duc, a mud bespattered figure, clad in a Kraut officer's greatcoat and a coal-scuttle helmet, crawled along the Alsatian countryside. Phineas had made a forced landing all right, but the Spad had shaken him loose before the Krupp capsule had made the bull's-eye. Phineas had skidded into a shell crater where four defunct Heinies were huddled together. They had been there for several days and the place did not smell very healthy.

"I don't git it," Phineas choked out as he continued to emulate a worm. "My eyes went bad on me and it was moonlight. I could have sworn I wasn't within a mile of that pill box when I nudged it. Well, here I am with the enemy, and I got to do somethin' or perish. If they catch me in a Heinie suit—"

Phineas arrived at a deserted Alsatian farm about two o'clock in the morning. He got into the farmhouse through a hole gouged out by a shell and foraged for anything that could be digested or worn. He found none of the former but he had success with the latter. He ressurected an old pair of trousers, a long black coat, and a battered wide-brimmed slouch hat. He peeled off the Boche officer's coat and tossed the tin skypiece away. In the bundle of stuff he had taken out of his hut was a pair of smoked glasses, and he took them out and fitted them over his nose. Again an idea rolled up its sleeves, spit on its hands, and whacked him one.

Phineas donned a wig, pasted little pieces of gummed black paper over three of his front teeth and blacked them out. He was glad he had not shaved in three days. He adjusted his pack in place and put on the old peasant's coat. The pants and hat followed, and he wished he had a mirror. He was pretty sure his own mother would not have recognized him at the moment. He was an old hunchbacked and blind war victim. He nearly forgot something and quickly corrected the slip of the mind. Two little concave objects he had purchased several months ago. They fit over the eye-balls and in the center of each one was a little round hole. He sat down and wondered which way he should go to find the city of Metz.

"A" FLIGHT went over the lines at dawn. The Baron von Heinzhund's Halbs happened to be at work in the same sector, and Howell and his men, their hearts not altogether

in their work, were chased all the way back to the tarmac and given a going over right up to the second they hit the dirt with the Spads. The Halbs strafed the drome again and nearly got the Old Man before he dived into a dugout.

"It is a wonder they didn't land and refuel," Garrity complained when he crawled back to the farmhouse. "You guys could beat anybody in a race. Where's Lieutenant Gillis?"

Bump landed ten minutes later and the mechs counted 32 holes in his Spad. There was a little trench in the back of his flying coat and phosphorous was sizzling in his pocket.

"I dropped a note to the Krauts, and I hope they find it and send it to the Baron," Bump said, wiping dither dew from his face. "I am going to make things right for my pal. I will paint his insignia on my Spad and go out tomorrer and fight von Heinzhund. He will not rest in his grave if I don't."

"You mean Phineas?" the C.O. snapped. "I'd like to see any grave keep him horizontal! Excuse me, as I am not myself. It is suicide, Gillis! I forbid you—"

"If he don't, somebody else will," Howell said. "It is for Phineas. You can't stop us. We will hold you down while one of us gits aboard a crate tomorrow an'—"

"It is mutiny!" Garrity yelled.

"It will be murder if you don't look out, sir," Bump said.

"Go ahead, if you feel like that," the Old Man said in a voice as small as a cherub's.

The Homberg Hellions were in the little town of Snuzheim and were absorbing morale and moxy through the mediums of schnapps and laughing Frauleins. The Baron was deep in his cups and telling the world what he would do to Leutnant Pinkham on the morrow, if the upstart dared to appear at the appointed time. When the binge was over, the Halb hearties crowded into a Mercedes boiler and rolled out of town. On the outskirts, a black cat sped across their line of flight and the Baron ordered the Mercedes to halt. He got out and picked up some dirt and threw it over his shoulder.

"Now," the Baron said, "der bad luck ist *kaput*. Drife on, Otto."

The moon was as high as the Krauts when the brakes of the Mercedes squealed again. They were two miles from the drome when they overtook the ragged figure plodding along the highway. He carried an old cane that was no more than a cast-off tree limb. There was an ugly hump on his back. His face was smeared with dust, and when he grinned at the Junkers his teeth revealed three ugly gaps.

"*Ach!*" the Baron said when he got out of the car. "Der hump-back, *mein freunds*. *Himmel*, to rub der hump giffs good luck, *hein*? Where ist you from, *mein Herr?*"

"Notre Dame," Phineas said. "When the bombs hit it, I had to go. How far is it to Vienna. I bet it is a long wait, *hein?*"

"As if I liff and breathe," the Baron chuckled. "Quasimodo come to life, *mein* brave chentlemen. Ho ho, make room for der bummer!"

"*Ja*. We make him what ist called der mascot off der Cirgus, *Herr* Baron."

"*Ja*. Drife on Otto."

The Mercedes brushed against the branches of the trees that lined the narrow road leading to the camouflaged Halb hangout. The dried leaves made significant sounds that Phineas' astute brain absorbed. He hoped the Krauts were mulled enough so as not to hear the hammering of his pump.

Phineas' stomach fell when the Baron ordered the car up a hillside to an old peasant's cottage. They were not going to take him to the drome, he mused sourly. A few minutes later, the Baron introduced Quasimodo to a buxom old house *frau* and gave her orders in Kraut. The old dame argued for a while but finally gave in. The Baron and his Junkers departed, after each had passed his palm over the hump on Phineas' back.

"Rubbing the Pinkham bag of tricks," Phineas told himself. "Boys, if they only knew!"

"*Parley vous Francais?*" the old girl tossed at Phineas.

"*Oui. Un per. J'avais* not much of ze *ecole. Jay le povre homme* et did not see ze *troisieme* grade," Phineas sputtered and sat down in a chair. He made out enough from the *frau-lein's* broken French to tell him that the Baron and his Junkers had put him up there for good luck. He was not to go within a mile of the Heinie drome or he would get punished.

"*Oui. Vous allez* too close to the airdrome et it giffs der hump sawed off der back. *Comprennez?*"

"*Oui*. I mean no harm," Phineas said. "Any way, what could a poor blind man do?"

PHINEAS was up at dawn. The roar of Halbs filled the sky. He saw them come out from under the canopies that hid the runways from the prying eyes of Yank observation crates. The drome was about half a mile away from the hut. Phineas counted twelve Halbs, then yawned and looked about him. There were books in the room and he guessed the old doll's spouse was a book worm before he went away to the wars. The day promised to be another scorcher and the branches of the trees outside made dry, eerie sounds against the roof of the hut, like the shaking of a skeleton's fingers.

Phineas picked up a book and scanned the pages. He came to a chapter having to do with a big-brained old scientist named Archimedes. There was a rough diagram

on one page showing how the ancient Einstein had burned the Roman fleet off Syracuse (not New York). He had done it with mirrors. Phineas tore out a page of the book and let his brain rev. He looked over the furniture in the room. There was a mirror on the wall. He found another one in the drawer of an old commode. Quickly he made his plans.

Phineas heard the Halbs return, wondered how many Allied crates had been smeared. Two hours later the Baron came to see Phineas.

"*Gott!* You are der *manna* from *Himmel.* Let me rub vunce der hump again, *mein freund.* I shoodt down three enemy planes already and *der tag* is still young, *hein?* This afternoon, Quasimodo *kamerad,* I fight der gross Pingham. He accepted der challenge to meet me ofer Triaucourt. Twice I rub der hump on der back. Undt here ist 50 marks, *mein freund.*"

Phineas choked off a surprised flow of verbiage. How could he accept the Baron's dare? He knew it was impossible. Here he was in sort of durance vile and he had been gone from Bar-Le-Duc—something was rotten and he was still a long ways from Denmark. Bump Gillis, Phineas thought. Or Howell. They thought he was scattered all over the landscape and they were going to uphold the honor of the Ninth Pursuit. Oh, cripes!

"I come to see you before I fly to meet das Pingham!" Heinzhund said. "Just to make sure. Dey feed you good, *ja?*"

"No sprekken der Doitch," Phineas said and shook his apparently hoary head. "Gut luck, *mein froind.*"

The Baron left. Phineas hurried back to his mirrors. He set them up so that a ray of sun would carom off one of them and hit the other. Down at the foot of the hillside where the foliage was the rustiest, a gob of light struck and began to heat up.

"Boys, I hope the Heinzhound comes and sees me and does not forget." Phineas let the sun do the work and he took helmet and goggles from his pocket. He put them on and then uttered a surprised ejaculation. He nodded and grinned widely.

"It is like I thought," Phineas said. "I cracked up in the trenches because—" He scribbled a little note on a piece of paper and inserted it inside the lining of the hostile leather casque. Then he put it back in his pocket.

The day waxed on. The sun got hotter. At four in the afternoon, the Baron visited his animated luck charm. He rubbed the hump on Phineas' back before he went out to fight whom he thought was going to be the Boonetown wonder. He gave Phineas 25 more marks. He wore his flying coat and his helmet was in his pocket. Phineas asked could he have the helmet so he could give it the blessing of Notre Dame.

"*Ja.* Now how can I lose, *hein?*" the Baron said exultantly. "Tonight I be der hero of Berlin. *Aufwiedersehn, Herr* Quasimodo."

"Bong voyage, Baron, *mein froind,*" Phineas said. He wondered if he had directed the sun's ray at a spot of evergreen. And he wondered if Archimedes was as big a fraud as the fortune teller who had sold the C.O. a tuft of horsehair. Phineas even prayed a little.

BUMP GILLIS left the drome at 5:15. Major Garrity and a group of Yank birdmen stood in a tight group and watched him go. They chewed their fingernails and argued as to which one of them would write to the Gillis family.

The Baron von Heinzhund got off with a bang and his eyes bored into the blue.

"*Ach,* nefer was *mein* eyes so sharp," the Baron chuckled. "Almost I can see der gates of St. Peter undt hear *Die Walkure* singing der songs. It is *der tag!*"

Bump Gillis trembled in the pit as if he had been flying over the North Pole in a sun suit. He had the urge to turn back and let Phineas toss about in his chains. Nobody could lick the Baron, not even Richthofen if he had been around. A guy can get too steamed up over a thing. He should have sat tight like any Scotchman and let somebody else stick their neck out. He decided to turn tail when it was too late. Up there was a Halb and he didn't have to guess who was in it.

The Baron grinned and went to work. The Spad loomed up in his sights as big as the proverbial barn and he started emptying his Spandaus. Why, he could have hit it with a slingshot! But nothing happened. The Spad stayed up and started getting tough. Again the Baron got it dead center and fed the lead.

"*Himmel,* I couldn't miss. *Gott!*" the von howled, and then he was the underdog and Vicker's lead punched through his wings. The Spad drove straight at his prop. Ten feet away, that was all. He had to pull up fast and he yanked the stick back into his stomach so hard he gave himself a cramp.

A Halberstadt can stand only so much. The desperate maneuvre ripped struts loose and the top wing wobbled. Heinzhund tried to show his enemy what an acrobat in his circus could do, but the Halb failed to respond. It got sluggish as if it needed a spring tonic, and it started down the bannisters.

Bump Gillis could hardly believe his eyes. He let the Baron have a sweet wallop that took away another strut, and the Halb went into a fit and a couple of tantrums and then quit trying. The Baron von Heinzhund skimmed over the Meuse, one wing tip kissing a pontoon bridge. He ended up in a heap near some Yank foxholes between Vaubecourt and Lerouville, and Bump Gillis, singing "The Campbells Are Coming," went down to stake his claim.

Back at the peasant's cottage in Alsace, Phineas waited. The ooze of

Aero Book Reviews

Any volume described in this department may be obtained, at the price quoted, direct from the publisher named and at the address given. When writing for a book kindly mention that you saw it reviewed in FLYING ACES.

Aircraft Spotter, by Lester Ott, Harcourt, Brace & Co., 383 Madison Ave., New York City, $1.00.

Produced in photo-offset, this book runs 64 pages and is magazine style. It includes photographs and silhouette drawings of many American, German, Italian, Japanese, and British planes, with photographs of Russian machines. Recognition points of various ships are detailed.

It is recommended for all aircraft spotters, air raid wardens, and others connected with civilian defense, as well as the average aviation fan.

The Lost Diary, by Sandham Graves, 170 Bushby St., Victoria, B.C., Canada. Price quoted upon request.

The Lost Diary is the personal narrative of a Canadian flyer of World War I, and an excellent story he has to tell, too. As a pilot officer in the R.A.F. he stood on the dock at Alexandria, Egypt, watching the loading of a vessel that was to take him back to England. Unable to prevent its happening, he watched a box with his own initials inscribed upon it slip from the loading-hammock and fall into the water, sinking beneath the waves. In this box were his log books, many photographs and notes of his experiences.

After twenty-three years, he set himself to the task of recapturing from memory some of the items in the lost diary—not in any vain glory, not to record military history, but simply and humbly in the belief that the younger generation in Canada should know a little about the human circumstances under which Canada's magnificent tradition of arms was won and maintained.

The narrative is written as impersonal as possible, from the standpoint of one who shared with many others the privilege of seeing Canada's airmen play their most heroic role in the war of 1914-1917. Good reading that you'll surely enjoy.

Pocket Reference

Aid To Pilots, by C. Earle Steele, 2227 West Washington Blvd., Los Angeles, Calif., $1.00.

Aid To Pilots was compiled to give the essentials of the Civil Air Regulations to the many students and pilots who have voiced a desire for a simple, easily understood version.

The contents of this little pocket manual are not confidential in any sense of the word, as the information in it is compiled from the latest available CAA regulations. It has been necessary to re-word and consolidate other paragraphs to eliminate cross-reference and non-essentials.

It covers every chapter of the CAA regulations as applied to all classes of pilot certificates, and includes the latest Amendments and changes. This little reference guide is rapidly becoming the accepted authority by thousands of airmen everywhere.

Metal Airplane Structures, by Major Flavius Earl Loudy, Norman W. Henley Publishing Company, 17 West 45th St., New York City, $5.00.

Prepared by an expert designer of aircraft and airship structures, this book makes a practical and authoritative treatise on the design and construction of the major component parts of various airplanes. In its eleven chapters is a digest of types and designs by many experts in metal airplane construction. Chapters on materials, welded and riveted joints, stressed skin design, metal wings and beams, fuselage hull and float design are all discussed and illustrated by photos and drawings. Replete with useful tables, formula and engineering drawings for the student designer and engineer.

Remember Pearl Harbor, by Blake Clark, Modern Age Publishing Co., 245 Fifth Ave., New York City, $1.25.

The author was in Pearl Harbor the day the Japanese attacked. He jumped in a car and set out to help evacuate women and children. From that moment on, he tirelessly went about collecting material for this book—the story he believed all Americans should know.

The New Alphabet of Aviation, by Edward Shenton, Macrae-Smith Co., 1712 Ludlow St., Philadelphia, Pa., $1.75.

By the author of that grand book, *Couriers of the Clouds,* this is essentially a juvenile book; it is also excellent reference material for older readers. From Airport to Yankee Clipper, *The New Alphabet of Aviation* explains various objects associated with aviation in, as might be supposed, alphabetical order. There are many color drawings depicting the various objects explained.

Buy this as a present for your younger brother or friend.

(Also see pages 65, 67, *and* 74 *for other reviews)*

strain ran off his made-up countenance in drops as big as bantam eggs. He held the Baron's helmet in his hand while he watched that gob of sunlight at the foot of the slope. He guessed Archimedes had used mirrors as big as the show windows in the Bon Ton department store back in Boonetown, Iowa.

It happened fast. Smoke curled up and there was a puff of flame that ate at dried branches and spread faster than a rumor started at a sewing circle. Krauts began to scream. Three Halbs came in from a sortie over the front and landed in a field near the cottage. Phineas Pinkham knew that all the fire departments in Alsace could never stem that blaze. The Halbs were doomed as sure as there were horns on billy-goats. The Yank miracle man went out of the cottage, groping his way with his cane.

"Donnervetter! Sacre Bleu!" Phineas heard the Alsatian femme yelp. "Der fire burns!"

Krauts left their Halbs and rushed to aid in the putting out of the fire.

Three minutes later, the buxom citizen of Alsace yelled for the Heinies to come back. The hunchback was taking off his disguise, was getting into a Halberstadt. "Catch der spy! He ist nodt blind! Look, der hump is only the knapsack!" the frau screeched.

The woman ran back into the cottage and up to the room where Quasimodo the Second had been ensconced. She found the page Phineas had torn out of a book, the arrangement of mirrors. On the plaster wall was a scrawled message. It said: Archimedes B.C. and Pinkham A.D. Haw-w-w!

LIEUTENANT BUMP GILLIS was hailed as one of the heroes of the great war. Brass hats came to see him and to shake his hand. Phineas Pinkham was forgotten until he telephoned in from Revigny. His Halb had run out of gas and the A.E.F. had thrown him into a hoosegow.

"Oh, I am not dead," Phineas said to the Old Man, who was scared out of his shorts. "And I said to always look in the box-score when something big was done. You said Bump got Heinzhund, huh? He's got his helmet for a souvenir? Well, tell him to rip out the lining, as I left a note in it. Send somebody to git me. I am blind and am humpbacked now. Haw-w-w-w-w!"

Major Rufus Garrity stumbled out of the Operations Office and he asked for the Baron's casque. Bump handed it to him and he fumbled with it until he discovered the Pinkham message. He opened his mouth four times and closed it again before he really became articulate.

"It says—er—gentlemen, 'In case anybody shoots down the Baron by proxy, I, Phineas Pinkham claim half of him. This is not his helmet but one belongin' to a Kraut I shot down who tried to knock over balloons one

day. Examine the lenses in the trick goggles as they are a caution!'"

Phineas arrived at sundown and doffed his Kraut helmet. Inside the thing was the name of Baron von Heinzhund.

"That should prove my case," Phineas grinned. "Superstition is somethin', huh? Haw-w-w-w-w-w! It makes a C.O. pay 80 francs for a chunk of a horse's tail and lures a big von to the cleaners. By the way, the Halb drome is burnin' up worse than the Baron right now."

"Even when he ain't in the war," Bump gulped, "he helps win it. He sits in a cottage in Alsace and helps bring down Heinzhund over Triaucourt. Excuse me as I must go and—"

"Awright," Phineas grinned. "The box-score again. Heinzhund bites at a bad one and hits right at Bump Gillis. So credit Bump with the put-out and Pinkham with an assist—and an error by Casey. Haw-w-w-w-w!"

"I'll—er—I am goin' to the showers," the C.O. of the Ninth muttered and staggered away. "I got a good mind to retire. I was born with two strikes on me."

"Haw-w-w-w," Phineas told the gallery. "When the Baron thought Bump's Spad was close up, it was nearly a half a mile away. Why is it that Junker vons have trouble with their peepers, huh? They study too hard in Heidleberg, I bet, and ruin their eyes—so they have to build them special goggles. That pair nearly washed me up as that pillbox looked— Is there an eye doctor in the house?"

"The Baron was still silly when I left him," Bump said. "He talked about meeting Quasimodo, the hunchback of Notre Dame."

"He was not out of his dome," Phineas said. "But didn't he mention Archimedes? It is funny, but history repeats itself like a yodel in the Alps. Oh, cripes, what day is it?"

"Friday," Bump said.

"Oh, I will catch it," Phineas yelped. "I got to git to Barley Duck. It is Babette's birthday. I knew I was forgettin' the most important thing of all. Somebody lend me some francs."

"If anybody ever ruins him," a brass hat grinned. "It will be a woman, not the Heinies. *Cherchez le femme*, what? Remember Samson and Napoleon?"

THE END

CLUB NEWS

(Continued from page 39)

Anyway, Fred writes us quite frequently and tells us of what he is doing. We'll let you in on it.

As a ferry pilot, Fred's job is to pick up ships as they emerge from the factory. Whether they be giant Wellingtons, Halifax, Sterlings, Flying Fortresses, or speedy Spitfires, Airacobras or any of the slew of ships seeing action, he ferries them to whatever destination given him. Whether pilots in this organization have ever flown the ships or not is of no concern. They just lift them off and bring them down in one piece. So when Fred gets back after the show is over he'll have lots to tell the readers of this mag.

Those ribbons and decorations Fred wears under his wings were awarded him during the last war and since. Among the decorations are the Distinguished Flying Cross, Distinguished Service Medal (not ours), Croix de Guerre, Military Cross, and some others we just can't identify. Fred, as some of you readers know, shot down 26 jerries in the last war (really, he's next to Eddie Rickenbacker in amount of victories, but he was with the Royal Air Force and not with the U.S. Air Service) and another 13 in Spain. Some batch, eh?

Well, Clubsters, that's all for this trip. See you all next issue.

THE END

THINGS TO COME

(Continued from page 44)

which they are embodied. In their eyes, the airplane is simply the solution of a problem in mechanics. It represents a series of forces which are or are not in equilibrium. The engineer must know the point along a certain path upon which those forces are to act. The form evolves from this knowledge. As one of the officers of the Unit nonchalantly expressed it, "To the impartial physicist, a propeller on the tail is no more odd than a propeller on the nose."

Certain proved forms, however, can be counted upon for definite results, and when radical changes in these forms are made, it is at best a venture into the unknown which may or may not prove successful.

The farther the known and tried forms are departed from, the greater will be the manufacturing and maintenance problems later encountered. Obviously these factors are of tremendous importance. Even with production procedures solved, the airplane will still not be as effective if grounded for long periods because of maintenance difficulties as a much inferior type of craft which can be depended upon to be in the air when needed.

AFTER CONFERENCES on the new design are completed, work on the design itself is begun. If a bombardment airplane, it will probably be among the largest heavy load-carrying models in existence; if a pursuit type, it will be small but endowed with tremendous fire-power. These types represent two extremes of a tremendous field of coverage, and require each its specialized field of knowledge.

As drawings and data on the new design are completed, they are sent to the Chief of the Experimental Engineering Section, who is charged with the purchase of experimental

equipment, first, to insure that no current technical advances have been overlooked, and, second, to acquaint the project officers of that particular type of airplane with what is considered the latest possibility in advanced design. If well considered by that group, the plans are then submitted to the Air Corps Board, responsible for the directive.

Even if considered favorably by the Board, it will still probably be several years before the design reaches public knowledge, by which time at least part of the strangeness will have been eliminated by predecessors which have prepared the way for it.

Now and then the Design Development engineers discuss a planned model with manufacturers. This is not routine procedure, however. When it occurs, the manufacturer understands that the engineer is not intruding his ideas, but is making a suggestion upon which the industry is expected to improve.

Several years ago the Design Development Unit conceived a high-speed, high-powered pursuit plane possessed of large fire power with an enclosed integral transparent cockpit. Previously pilots had largely flown unprotected from weather in these small ships, their operating efficiency in handling armament and the airplane in maneuvers definitely lowered because of the physical effects of extreme cold. Yet because of the restricted vision and the uncertain means of emergency exit afforded by the few enclosed cockpits then in service, the great majority of pilots was more than willing to suffer the relatively unimportant hazard of fatigue due to wind and cold.

This was the initial attempt to make the pursuit airplane as comfortable as an automobile without impairing the military advantages of the earlier cockpit types. A mock-up fuselage having a transparent cockpit cover was constructed and for many months pilots of various sizes and builds were somersaulted about in it, belted to the seat, in order to obtain information regarding favorable clearance and aerodynamic shapes for the cover which turned the cockpit into a tiny cabin.

ONE DAY the idea was discussed with a leading aircraft manufacturer who seized upon it eagerly and in record time had designed and produced an experimental model. So experimental was the tiny plane that it was shipped into Wright Field and assembled there for its first flights, instead of being flown in, which is the usual method of Air Corps delivery. With its nose wheel, its small highly streamlined, bullet-like fuselage terminating in a sharp "liquid-cooled" nose, its enclosed cockpit, its appearance in 1937 was almost as startling as some of the strange models at present on the drawing boards. A reporter on the Field happening to see it stopped dead in his tracks, exclaiming "What on earth is that!"

Today you know this ship as the Bell P-39, which is now one of the standard pursuits of the Air Corps. It is being produced for combat use in large quantities. The enclosed cockpit feature has also become standard for all pursuit planes since produced.

It is a fascinating privilege to be permitted to peer into this airplane future as embodied in the advance designs of the DESIGN DEVELOPMENT UNIT. Many pusher propeller types are noticeable. Pushers offer benefits in speed of climb. Likewise the pusher propeller does not have the limiting effect upon the speed of the airplane in the approach to the speed of sound possessed by the tractors.

There are swelled wings and very thin wings. There are bombers mounting eight engines, obviously for long range, whose gas tanks are virtually invisible. They are six- and four-engine types with combinations of pusher and tractor propellers. A tailless (Pterodactyl) fighter has wing tip rudders, and pilot and gunner seated back to back.

Fish, swallow, and bat may be suggested in some of the shapes of things to come. But it should be recalled that man has far excelled nature in the speed, range, height, and efficiency of flight. Man has often demonstrated this superiority in the past. The work of the DESIGN DEVELOPMENT UNIT may well be looked upon as most important for insuring our national superiority in flight for the future.

THE END

WAR CAMERA

(Continued from page 15)

The stopwatch device was added after it was found that gun camera dogfights resulted in disputes between pilots over who fired the first vital shot. The cameras contained a simulation of the gunsight, on a glass plate in the camera barrel, marking off each frame of film into quarters and indicating the variation of the target from the center of the sight. The plate was also marked with concentric circles, indicating the variation of the target from the center of the sight. Lighting for the stopwatch pictures was provided by a system of mirrors, reflecting natural light into the watch chamber. By checking the time on the frame which showed the first vital shot on each of the opponent's films, the priority of claim would easily be established.

Since this basic type gun camera was established, there have been numerous changes and developments. By changing the mount, American armament technicians soon developed a gun camera for both flexible and fixed gun positions. For fixed forward-firing models the control was operated by a button on the control stick, the same system used for actual weapons. The camera was sighted with the regular gun sights.

THE END

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