

# AIR TRAILS



SEPT. '39

A STREET & SMITH PUBLICATION

## THE WORLD'S TRANSPORT RACE

by Col. Charles Wayne Kerwood

## CARRIER PILOTS ARE CRAZY

by William Herbert Randall

FRANK TINSLEY - WILLIAM R. ENYART

MANLEY MILLS - BEN SHERESHAU

SEPTEMBER 1939 **15c**



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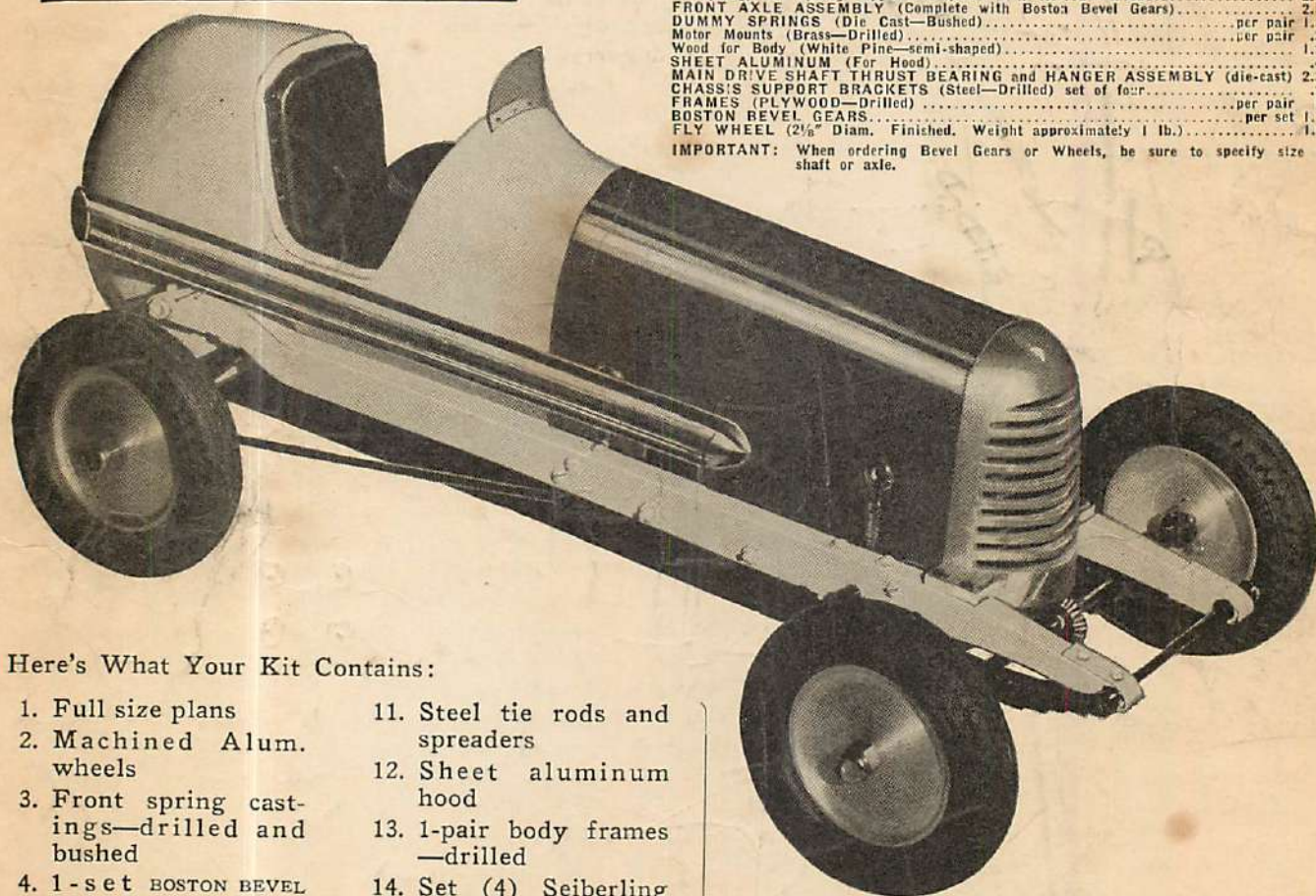
Length O.A. ....	19 1/2"
Height O.A. ....	7 1/2"
Weight (less motor) .....	6 lb.
Wheel Base .....	13"
Tread .....	8"
Wheel Diam. ....	4"
Gear Ratio .....	2 to 1

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| 4. 1-set BOSTON BEVEL GEARS                 | 14. Set (4) Seiberling Tires      |
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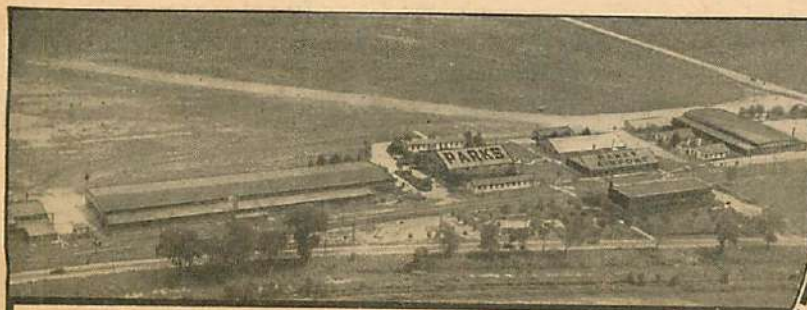
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# IT'S STILL A NEW GAME

By **COL. CHARLES WAYNE  
KERWOOD, Guest Editor**



Col. Kerwood knows all the world's air lines.

**N**O one, I venture to say, is more certain about the future of aviation than we who have had the privilege and the pleasure of being connected with it for these many years. It is no more fantastic today to assert that within the span of an average lifetime we will see airplanes as common as automobiles are now, than it would have been in 1914 to assert that wars would be decided in the air.

From an engineering standpoint the ultimate in airplanes is the limit of man's ability to handle them. To the criticism that it is impossible for a man to travel through the air at a speed of five hundred miles per hour, and function, we have the ready answer that we'll seal the planes and air-condition them so that, regardless of speed or height, the pilots and passengers will experience approximate atmospheric conditions found at the earth's surface.

It is not impossible to conceive that even the pilots may be discarded in favor of robots controlled from a master station—robots that will fly better and more surely because they lack that human element which is the most unpredictable thing in aviation today.

So what?—you say. After all, it's a matter of viewpoint and interest. An engineering theory of today may be the accepted fact of tomorrow. Remember when they offered fifty thousand dollars for the first man to fly across the English Channel, and later when the prize was only half that for the first man to fly the Atlantic, or from America to Honolulu? Now there are regular passenger routes across both these stretches, and beyond.

One air raid in China kills more people than the Germans did in all their War raids on London, and all the raids conducted in Spain during the late rebellion only went to prove that you cannot bomb a people into submission. All of which is no criterion that five years from now there will not be bombs of such destructive power that one bomb will be able to kill every individual in a city the size of New York City.

By which I mean you can't prove anything in aviation by past performances. It's still a new game and an in-

teresting one. Speed and more speed is piled up every day, and long-distance flights are made with the casualness of a Corrigan.

Old-time pilots have told me they learned more about actual flight from flights in gliders and sailplanes than they ever did from flying motor-powered planes. The flight of a model plane may bring out some secret of stability or control or principle of construction that today is only a dream.

War is good for aviation because it means a subsidized concentration of effort. We here in the United States have fallen behind, mainly in quantity, certain other nations, due to the fact that the aviation development of these others has been subsidized. We have not felt the need of such steps so far, as our great efforts have been directed along the lines of commercial aviation, and no country in the world is in a better position commercially than we. What another major war would develop in the way of destructiveness from the air is still mostly a matter of conjecture, but under any condition, it will be horrible.

Aviation has caused the world to shrink in relative distances. It has stimulated the development of new metals, of new and better plastics, a higher refinement of fuel. Outstanding contributions to radio can be attributed directly to the demands of aviation for better communication, and in aviation medical science great strides have been made in knowledge of man's reactions.

These examples are just a few of the many things that have been developed or improved upon through the interest in aeronautics, and the crying need is for more and more inventions and refinements in motors, airplane design and instruments. Nowhere are people better equipped to do this research than right here in our own United States, where a man is free to ask questions, to gain an education and apply it for his own pleasure or gain.

For many years I have kept my fingers on the pulse of aviation, watched its steady growth and investigated some of its major catastrophies, and never for a minute have I ever lost faith, and never more than at this time have I thought the future so bright for (Turn to page 82)



# AIR TRAILS

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# C. A. V. U.

It certainly was a pleasure to hear that Glenn Martin had been awarded a degree of Doctor of Engineering by the University of Maryland in honor of his various aeronautical accomplishments. This grand personality has been connected with aviation for so long and so intimately that the two are almost synonymous. We are all anxiously awaiting the debut of his next product, a navy bomber said to dwarf even the DC-4 by plenty of wingspread and tonnage.

★ ★ ★

Of interest to communities that have water frontage along a shore or lake is the new C. A. A. Seaplane Facility Plan. This consists of working plans for ramps, dollies, and landing floats for the establishment of seaplane bases. The National Youth Administration has agreed, through its various branches, to build these bases for communities. All the communities have to do is to act as sponsors to the extent of one hundred dollars, which is little enough for the fine work and facilities that will result. Of course, the bases may be rented out to private operators, so that the fee put up by the community for the original plans is soon paid back. It seems to us that this is a splendid way for the small communities along any sort of water frontage to provide for the local seaplane operators, and at the same time make money for themselves. For further information, write to the Civil Aeronautics Authority in Washington.

★ ★ ★

At the time of going to press we have just had a verified report come in to the effect that the government has let three contracts totaling \$25,000,000 worth of engines. This, the largest peace-time order for airplane engines ever awarded, is a move to supply the 6,000 planes ordered by the government. One of the contracts was to the Allison Engineering Co., makers of the famous Allison liquid-cooled engines so adaptable for stream-

lining. The Wright Aeronautical Corp. came in for another nice slice of this huge pie to the tune of \$8,976,317, while the third chunk went to an unnamed company. This is the kind of news we like to print, for it means not only that we are

★ ★ ★

right up front in the so-called race for air supremacy, but are giving work to thousands of people in many branches of the industry. It has been very gratifying to us to see the way the Solo Club has taken hold. We started this club some issues back for those students and fliers who have actually flown solo in aircraft, feeling that the once-in-a-lifetime sensation of a pilot's first trip alone should be recognized in some way. Open only to those who could furnish proof satisfactory to the membership committee that they had actually soloed, the club caught on from the first, and at present we have well over a hundred records on file of members who have passed the requirements. It is becoming often that you see these neat little silver lapel pins about the airports of the country. If you have not obtained your pin and life-membership card, fill out the Solo Club coupon elsewhere in the book and let's add your name and number to the rolls.

★ ★ ★

Pennsylvania-Central Airlines takes the initiative and breaks precedent by appointing some air hostesses who are not registered nurses. We have always wondered just why air lines felt that they *had* to have registered nurses for hostesses. If one is airsick, a few simple remedies can be administered by anyone, even the patient; and for what other purpose, practically speaking, is a nurse required in air travel? Personally, we have felt that advertising the fact that the hostesses were all nurses was bad business, for the very mention of a nurse conjures visions of sickness, hospitals, ether, and other things not in keeping with the also-plugged beauty and restfulness of flight. We'll bet traffic on the railroads would suffer suddenly if they began to advertise that every conductor was a registered pharmacist or physician ready for any emergency.

More power to Penn-Central and their no-nurse policy.

★ ★ ★

Orrin J. Whitney has left for his annual trip to South America. Mr. Whitney, head of the famous O. J. Whitney, Inc., outfit, believes that to sell planes one must go where the markets are ripe. His agency for Beechcrafts covers Latin America, and he takes a twin-motored job right along with him as both transportation and sample merchandise. One of his ships has just gone to Netherlands East Indies for use by the missionaries there in their work in the interior.

★ ★ ★

During the recent first-flight of passengers across the ocean in the Dixie Clipper, a novel log of the ship's flight was kept. The passengers took turns at an Ediphone vocally registering their sensations and thrills as they experienced them. Many years from now little Betty can regale her guests with the voice of Great Aunt Gussie, airsick over the Azores—provided anyone ever does get airsick on a Clipper.

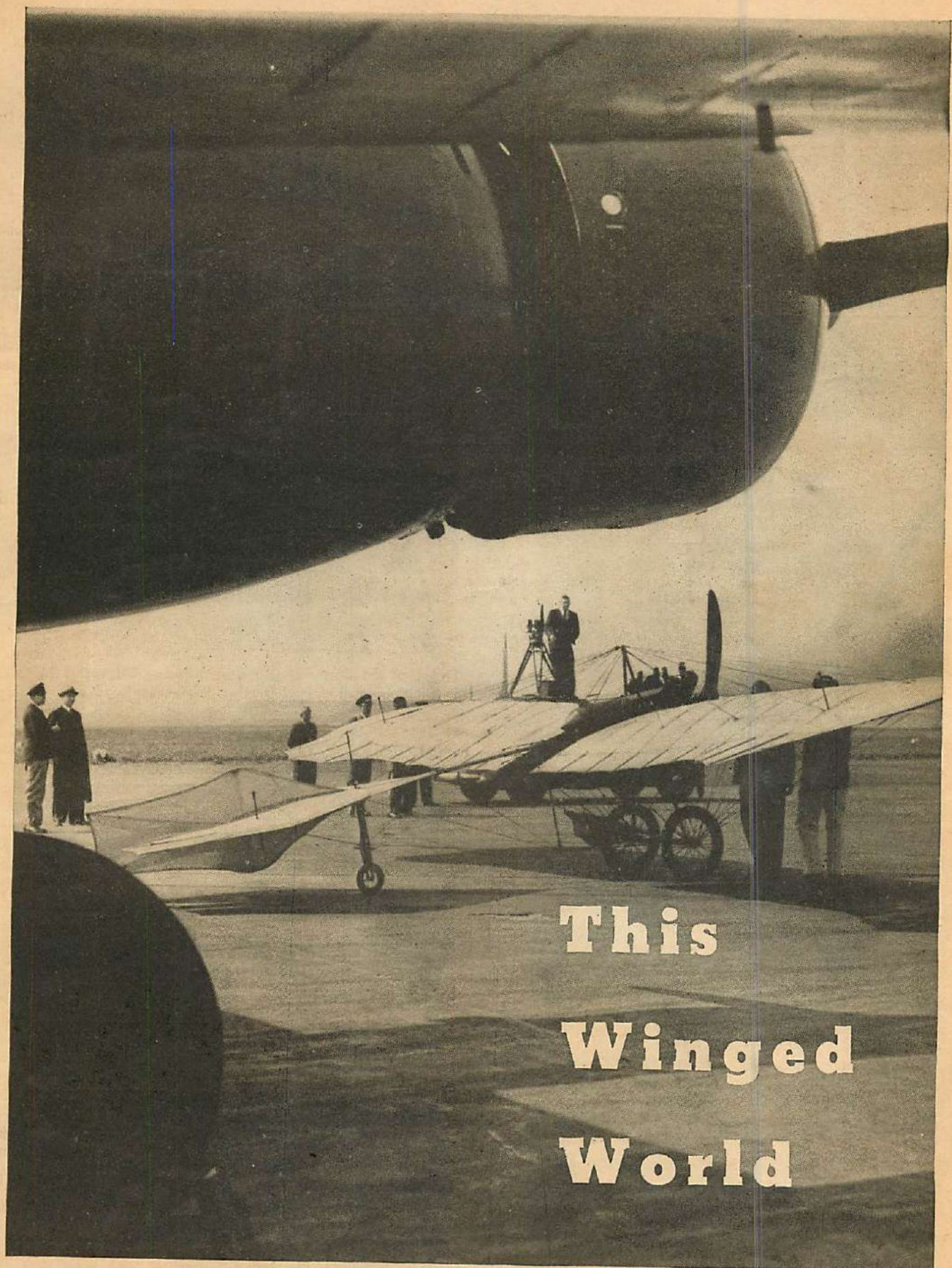
★ ★ ★

Who says there's no adventure in flying a light plane? Clayton Smith, who flies a Taylorcraft and flies it mighty well, ran into an adventure the other day not on the program. He was off on a gold-hunting vacation out Death Valley way. His forty-horsepower ship was loaded with a few tools, supplies, and extra gas for the six-hundred-mile trip out and back from his home in California. Nearing his destination, and flying low, he noticed two burros and a bewhiskered old man on the desert below him. The old man waved frantically and motioned for him to land. Smith set her down on the sand and strolled over. The old prospector was leaning on a burro, one of his pants legs rolled up and displaying a terribly swollen ankle. Nearby were the remains of a huge rattler, which had bitten him over an hour ago. Having no antidote, Smith dumped out his equipment, tumbled the old gent into the cabin in spite of the latter's fear of flying, and rushed back to Mojave to a doctor. There he found that a few minutes later would have been too late indeed, because of the time since the snake bite had been acquired. Smith never went back for his tools, but we believe his realization of having played the part of a mighty good Samaritan with wings will always make up for the loss.

★ ★ ★

The new Boeing B-17B bomber, first of a fleet of new super bombers patterned after the famous B-17s, is undergoing very strenuous (Turn to page 81)





# This Winged World

Under the wing of a giant Focke-Wulf Condor stands this early plane of 1909, a pictorial history of the progress of aviation's growth.

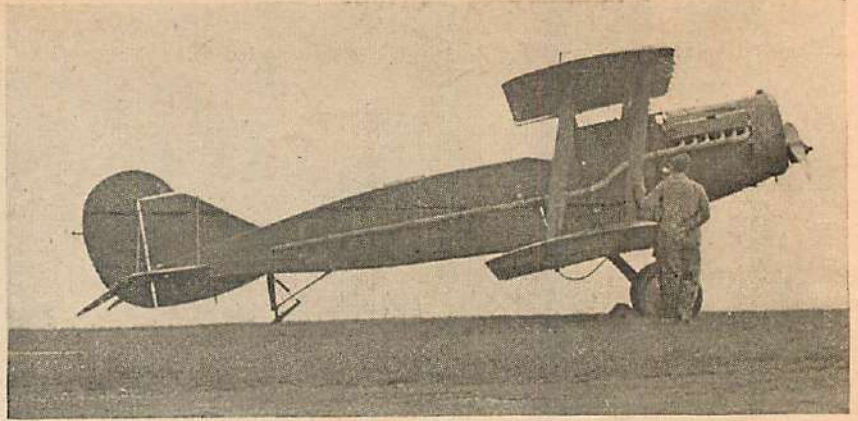


# This Winged World

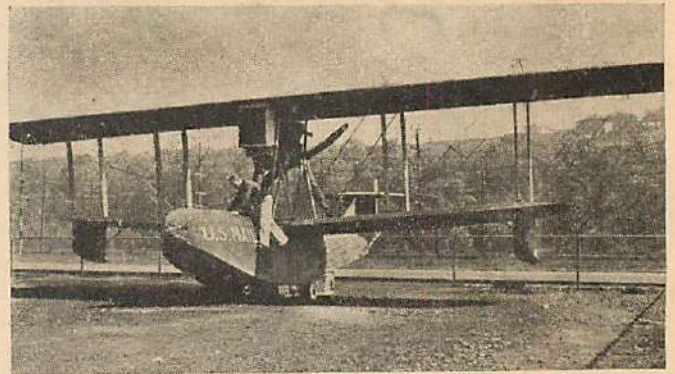
British Press Combine



Now what? Parachutist Rene Vincent ponders his next step, after landing in a tree during French air meet.

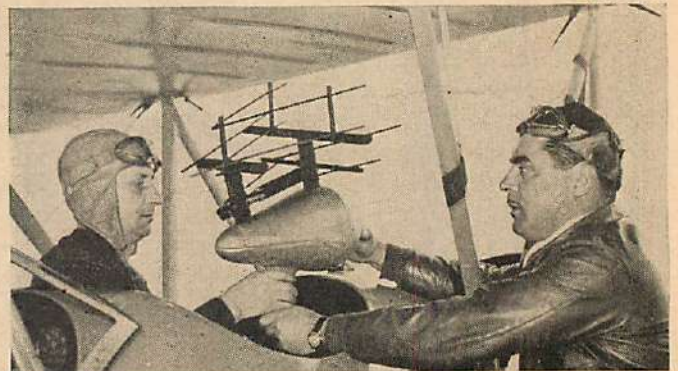


A World War silhouette in the form of a Bristol Fighter stands behind

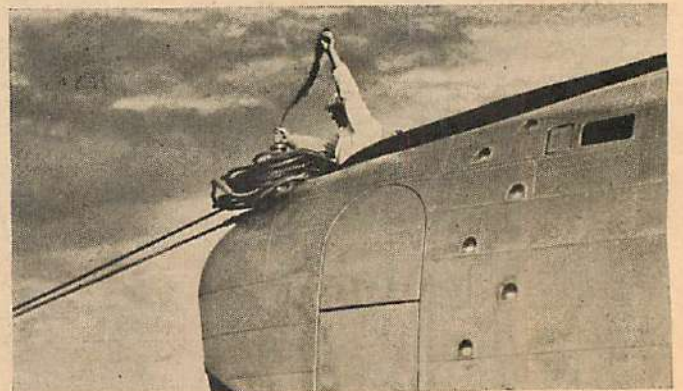


Father of the Clippers, the famous Boeing B-1 that established first international air-mail service, has been placed on exhibition.

Rudy Arnold

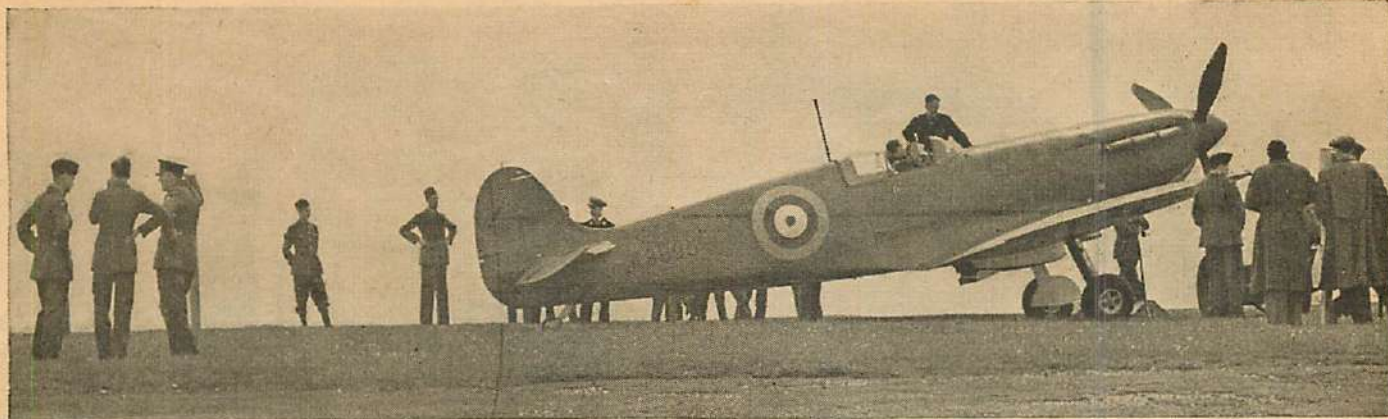


Weird aid to blind flying. The Sensytor Power Beam apparatus that indicates approaching objects or planes at great distances.



Bearing what looks like footprints in wet cement, the P. A. A. Clipper is moored by crew member in the bow compartment.





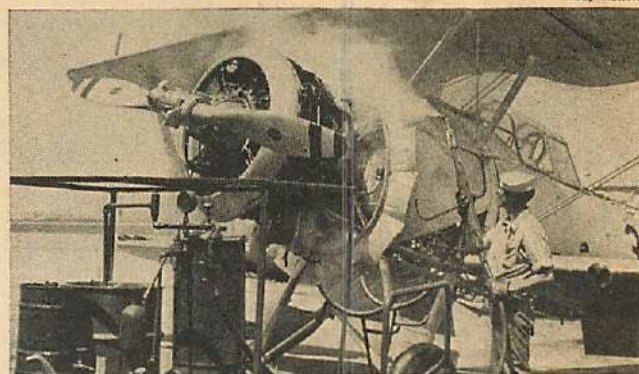
what may be a silhouette in the next World War, a Vickers Spitfire. Both of these planes were on display during British Empire Air Day.

Acme



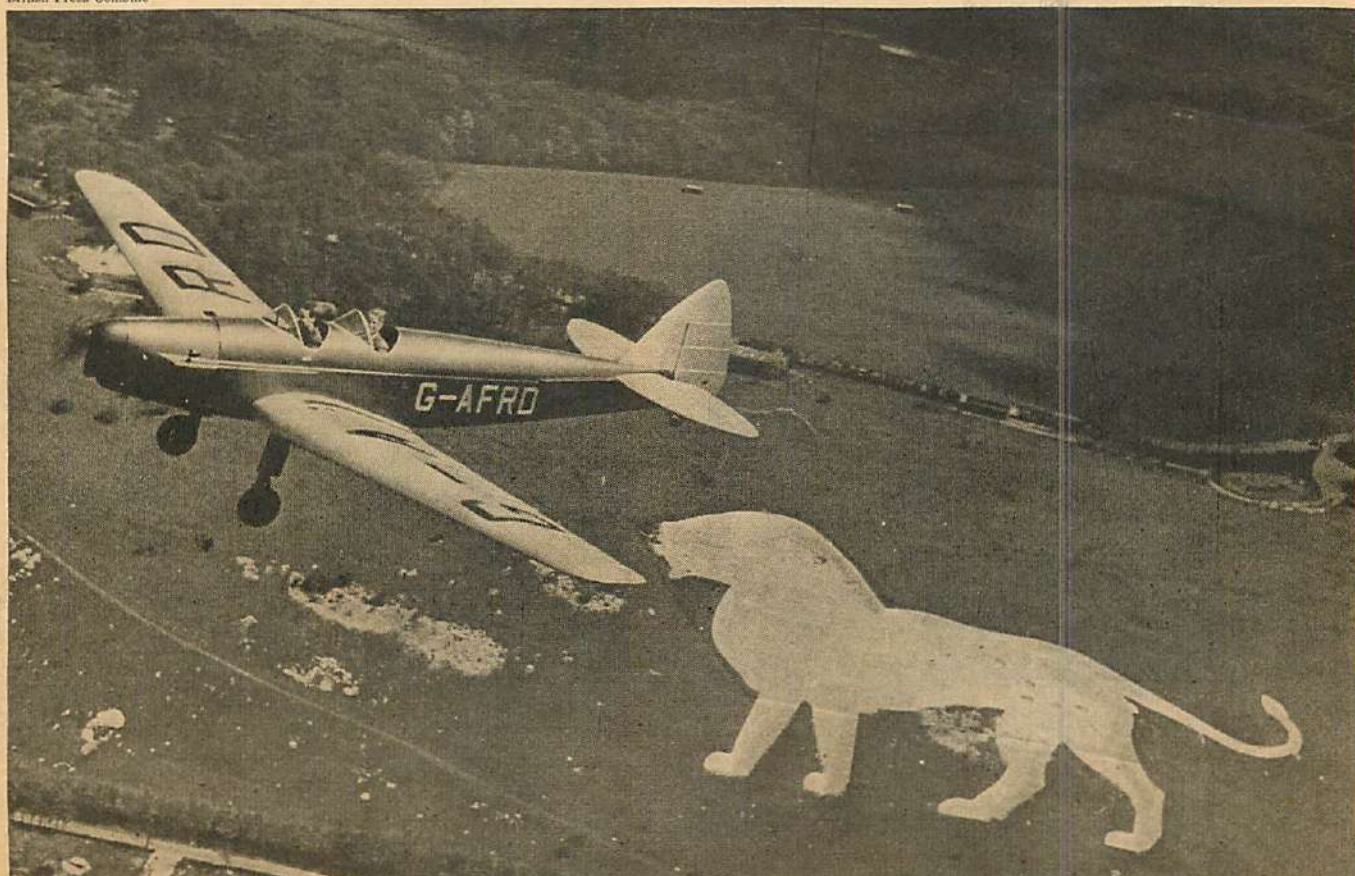
Who says aviation is a young man's game? Aunt Lizzie Dever, of Tulsa, Okla., celebrates her 108th birthday with first hop.

Rudy Arnold



Not smoke but soap! Mixed with live steam, a new soap is sprayed under pressure on navy plane as harmless cleaner.

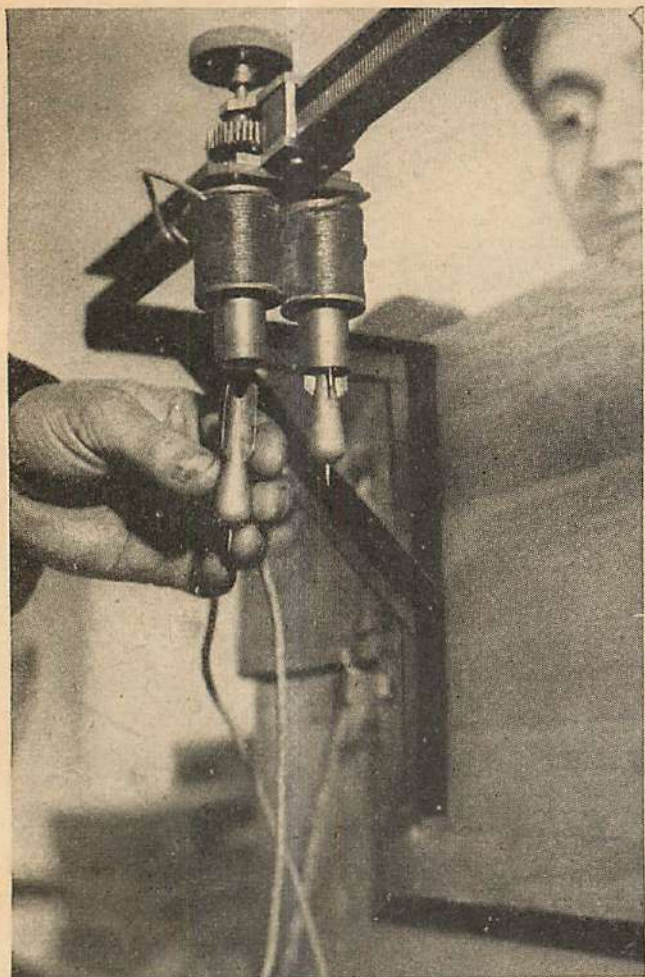
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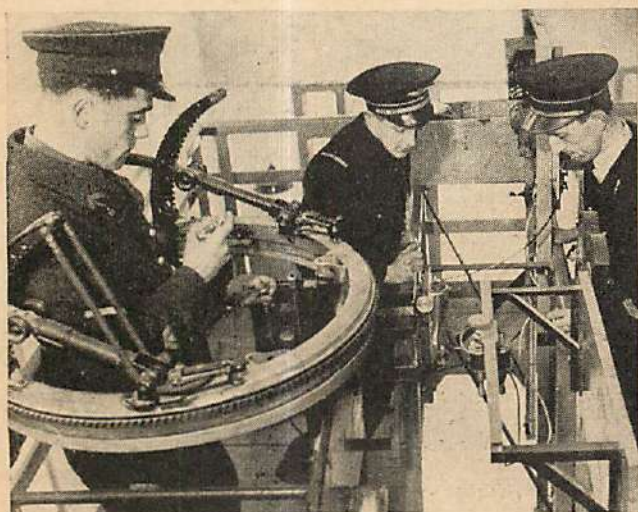
Like a cat after a canary, the famous lion carved into the cliffs at Whipsnade, England, to mark the famous open-air zoo, seems to just miss the little light plane. This D. H. Moth-Minor is a very popular open-cockpit sport plane. Note the fair pilot's hair blowing.



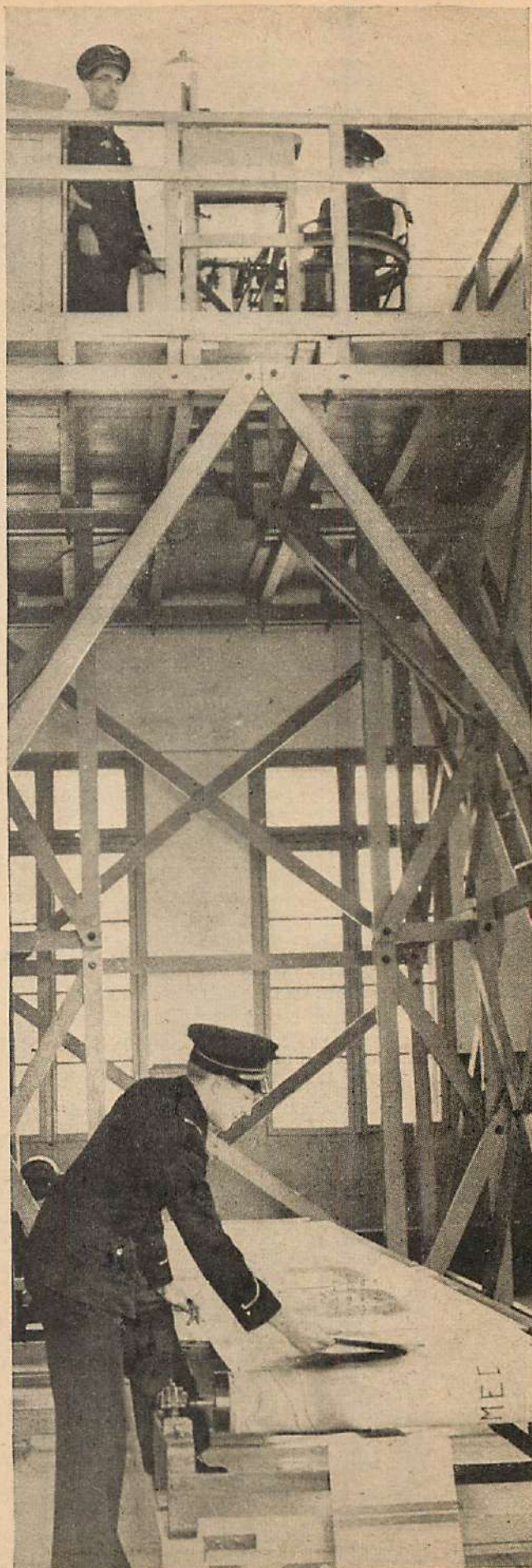
How bombing practice is taught in miniature, in France. Below, the model bombs held by magnets until released by the student.



Below, the student in the dummy plane preparing to press bomb release, dropping the model bomb onto the moving map below.



## This Winged World



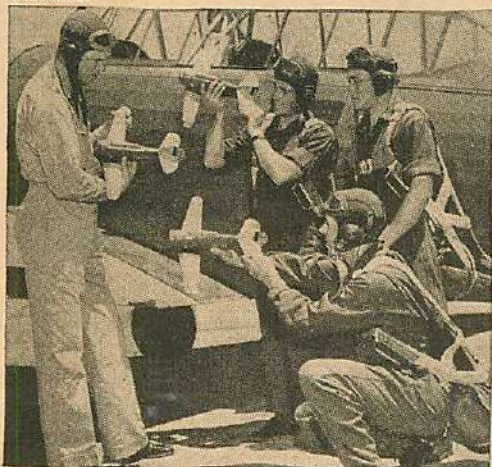
View of practice tower. Above is the bomb-releasing unit while below is the instructor checking hits on moving roller-target.





The Greenfeld triplets, Elliot, Michael and Arthur, decide to give three cheers for aviation.

International



Here's how. Model planes are used at Randolph Field to aid in formation flying instruction.

British Press Combine



Young lions take wing. Over 700 members of the Air Defense Cadets Corps of England are to take gliding instruction this year as part of their training. This group of enthusiastic cadets is taking first lessons at Dunstable.

Like father, like son, even holds true in aviation. The only "father and son" air-line pilots in the world. Ernest E. Basham, Sr., left, and Jr., right.





# THE WORLD'S TRANSPORT RACE

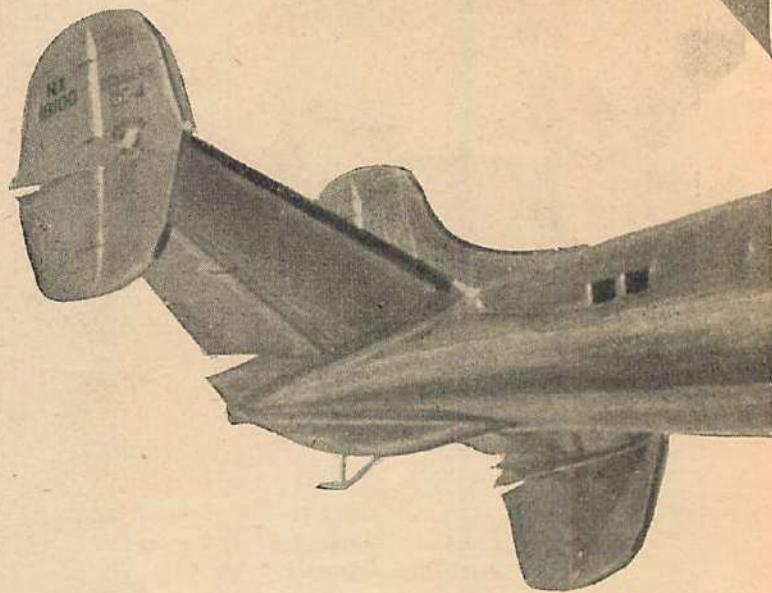
Is this international hustle  
connected with future war  
and colonization plans?



Typical of American ships in use abroad is this Douglas DC-3 employed by ABA-Swedish air lines, being gassed at Bromma.



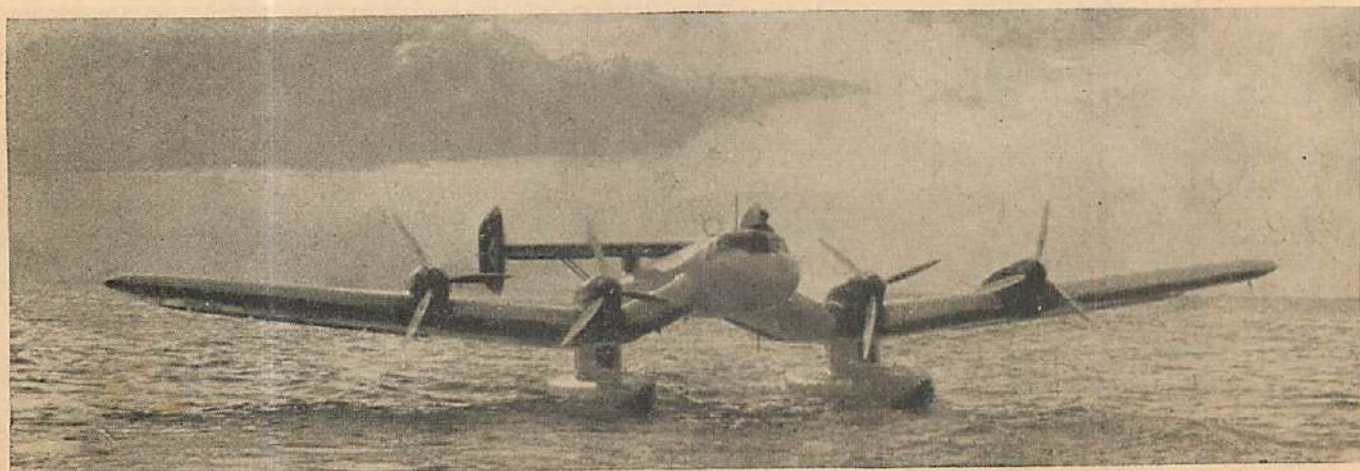
A Savoia-Marchetti SM-75 of the Italian Ala Littoria company with seating capacity up to 24 and a speed of 220 m.p.h.



**W**HAT would be the first logical blow against the United States if we were to go to war tomorrow? Would our ammunition and airplane factories be safe from sabotage? Is there a city that would be safe from a rain of bombs? Would our first-line defense, the navy, be able to steam back and forth from the Atlantic to the Pacific oceans through the Panama Canal?

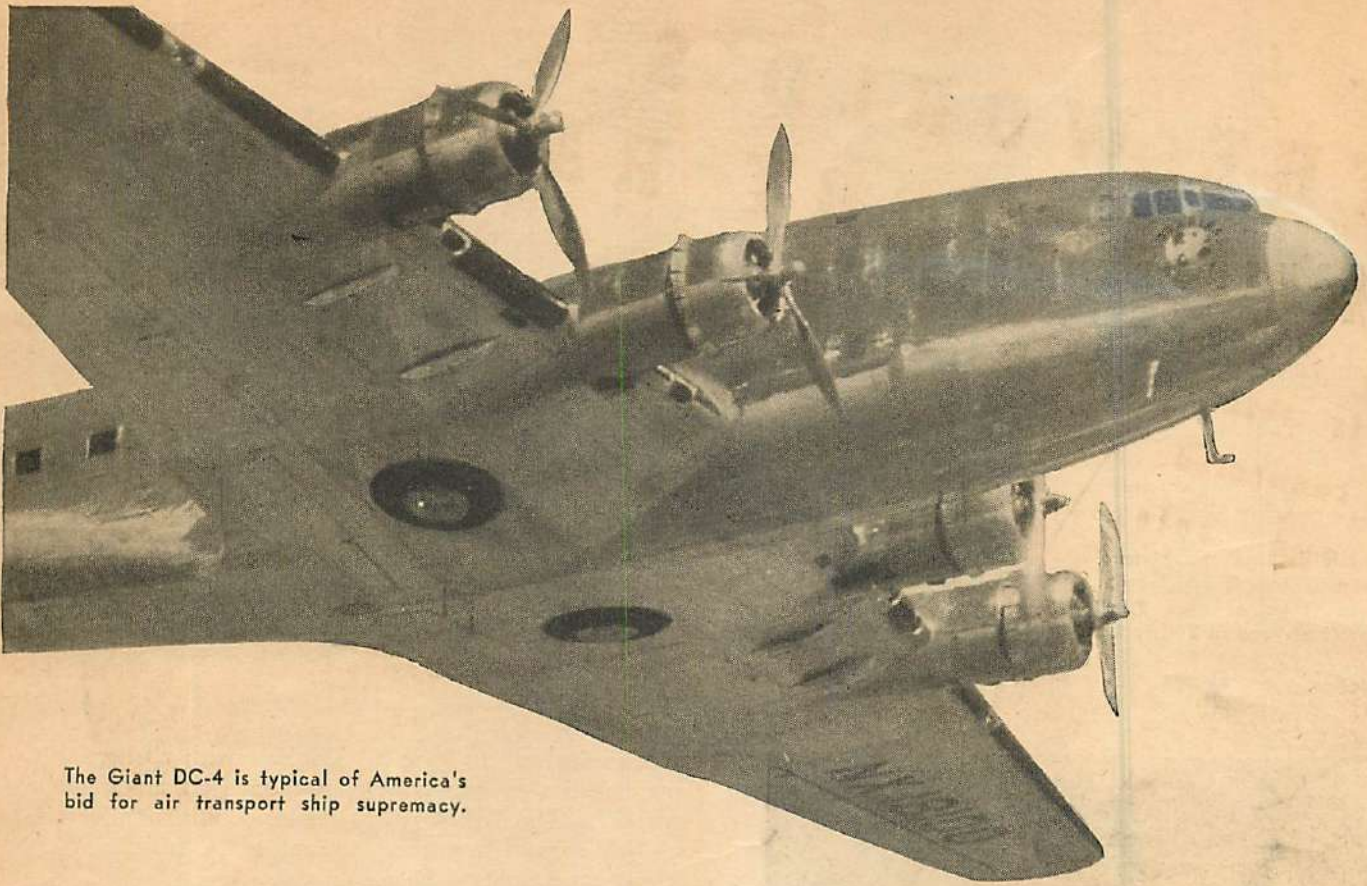
Don't cry wolf! All right, we know there is no wolf. We've been taught right from the days of our three R's that these United States of ours are so splendidly isolated that no power on earth would ever dare attack us. The broad Atlantic and the still wider stretches of the Pacific protect us on the east and west, and to the north and south are the boundaries of nations whose life lines are so closely tied to ours they can never become a menace.

**B Y C O L O N E L**



This striking shot shows the successful Blohm and Voss seaplane, "Nordmeer," that made many flights from Germany to New York.





The Giant DC-4 is typical of America's bid for air transport ship supremacy.

But where is that "splendid isolation" today? There are bombing planes which can span the Atlantic, drop their bombs on our Eastern cities and return to their home base. But it is a fact they could not carry enough bombs to do a great deal of damage; most of their payload would have to be gasoline and oil. So what? Is that the answer to the world's transport race?

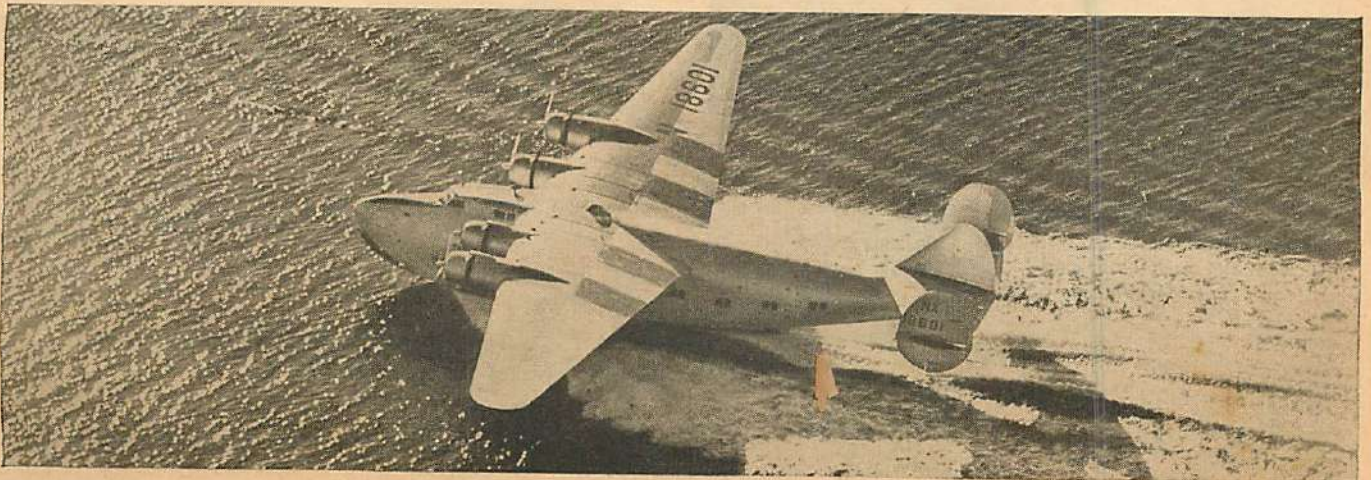
There are nations greedy for conquest. They must have room for their teeming millions to expand. They don't expound birth control; rather, they give bonuses for large families and establish schools where they teach the art of colonization. They must have new territory to furnish raw materials and to consume the manufactured products of the home country. Once it was a peaceful conquest by infiltration. Recently the idea of

conquest has turned military and the plan is the right of might. Few immigrants ever lose their love for their mother country, and to thousands of them naturalization in their adopted country is merely a gesture, something to give them advantages, but never to be taken seriously in face of orders from the homeland.

From the north pole to the south pole, around the belt of the equator, there is not a country where some nation is not striving to secure the rights for aerial transportation. They must have great hopes for the future, for it is a fact that very few transport lines are operated at a profit.

Here in the United States we speak of air transport as a means of carrying passengers and mail, with some express. There is not one air line in the country that

## C H A R L E S   W A Y N E   K E R W O O D

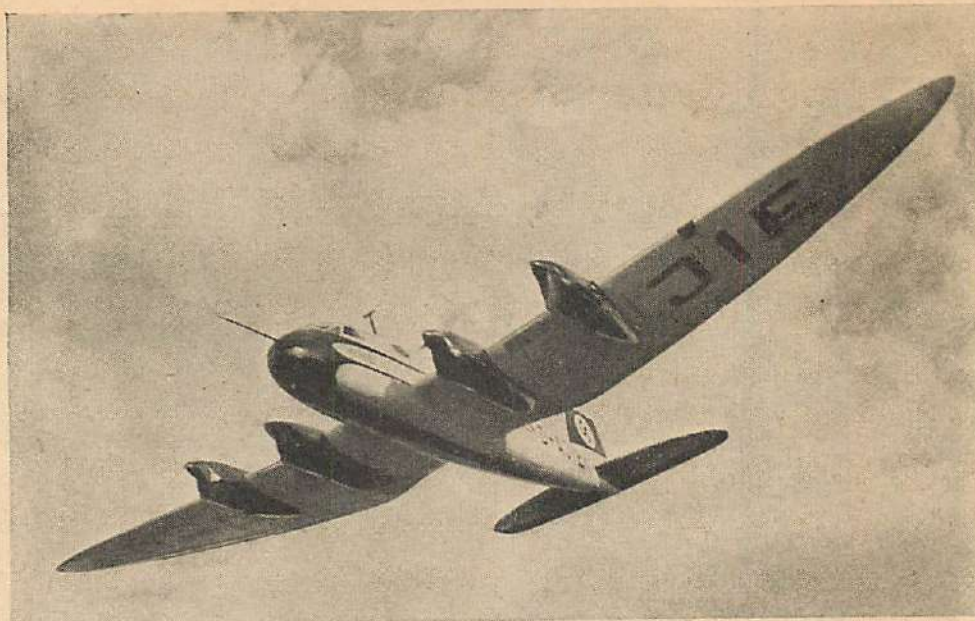


Now in transatlantic service, the Boeing 314, known as the Yankee Clipper, is a proven success in American flying-boat design.



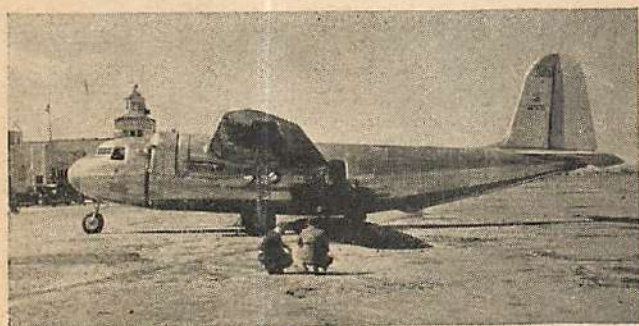
## THE WORLD'S TRANSPORT RACE

Graceful in flight, the Heinkel 116 mail and freight carrier has a range of over 2,500 miles at a speed of 200 m.p.h.

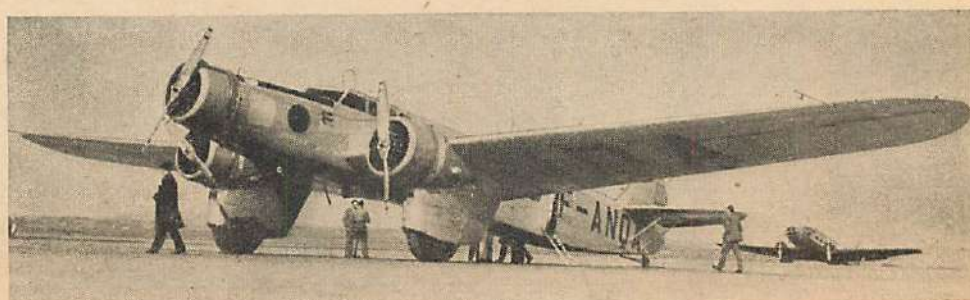


England's bid for transport honors are well supported by the DeHavilland Albatross that carries up to thirty passengers.

In an attempt to increase passenger comfort, the Douglas DC-5 is featured by a high wing and tricycle landing gear.



The French Dewoitine 333 carries eight passengers as well as freight and mail. Later models carry considerably more.



Moockemeyer Photo

caters exclusively to freight. England with all her far-flung colonies to supply does not have an air freight transport. The British carry tremendous quantities of mail by airplanes from the homeland to the colonies, but not enough freight to be mentioned.

On the other hand the colonies, especially Canada and Australia, have made great strides in developing their aerial freight lines—air transport that makes freight the main consideration, with passengers secondary. Australia is now crossed from east to west and north to south by fast freight-carrying lines that bring the wastelands and the great ranches within a few minutes or hours of the centers of commerce.

Canada in freight pounds carried has gone further than any other country—at least where information is obtainable. During the year 1938 forty percent of all the Dominion's freight was transported by airplane. Most of that was to the Far North country. There, through the use of airplanes, they have been able to open up new mining districts which without aviation would have remained undeveloped for years. The most outstanding example is the radium mines. Every piece of machinery, all the fuel, the supplies and personnel have been brought in by planes. The pitchblende concentrates are flown out to the refineries.

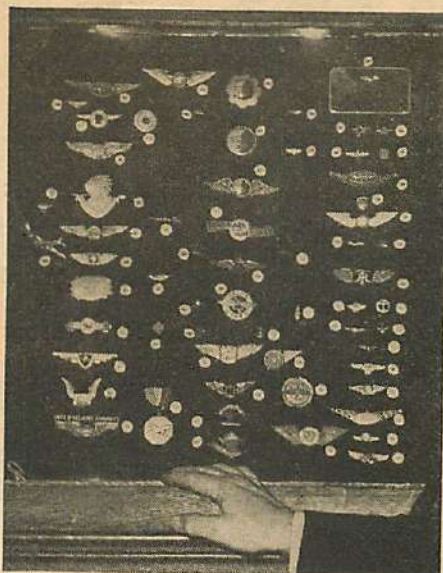
There are tremendous deposits of beryl in northern Canada soon due to be exploited through the use of air transport. This important ally of the (Turn to page 54)



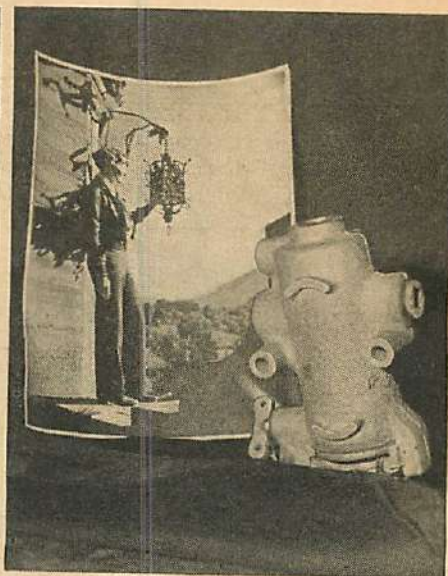
The painting that started this famous shrine. Note the resemblance to "plane" at top.



Part of the collection of transport insignia in the museum attached to the fliers' shrine.



A photo of Amelia Earhart, taken at Inn, beside carburetor of her Hawaiian plane.



## "—and those who fly"

By R. DEWITT MILLER

EVERY flier has his shrine. It may be the yard where he built his first toy plane. It may be the field where he made his first landing. It may be the garden where his girl gave him the good-luck ring. Each has his own little spot—but the birdmen of the world together have one place they call The Shrine.

On the unconsecrated roof of an inn stands the bronze figure of St. Francis of Assisi, patron saint of the birds—and all those who fly. Here they have come for a moment, long lists of them: Major General O. Westover, Lady Hay Drummond-Hay, Colonel Roscoe Turner, Major J. H. Doolittle, Ruth Law, Clyde Pangborn, Gladys O'Donnell, Air Commander P. F. W. Fellowes, Marie Marvingt. Each has written his name on copper wings and nailed those wings into the firm white concrete wall of St. Francis' Court; and each has had his moment of silence before that little bronze figure.

The man whose dream resulted in this shrine was not a flier. He was a collector—and an innkeeper. He traveled widely and to strange places—bringing back a bell from South America, a doll from Africa, a Buddha, a gun, a bit of sand. He enlarged his inn to roof his collections. And then one day he bought a strange painting of St. Francis of Assisi.

More than two hundred years old, it formed a link between that thirteenth-century saint who preached to the birds, and the men and women of today who make the sky their home. For the patron saint of all things that fly looks up to a winged crucifix which seems, from a distance, to be a silver plane. It was (Turn to page 78)



The beautiful interior of the Mission Inn showing the wall upon which are nailed the copper wings of many famous pilots.

In California the birdmen of the world have their own shrine.



# CARRIER PILOTS ARE CRAZY

**L**IEUTENANT MILES BELDEN shouldered his way through the deck door of the pilots' ready room and onto the flight deck of the *Saratoga*. The giant aircraft carrier was headed into the wind in readiness for flight operations at dawn. Floodlights on the solid smokestack lighted up serrated ranks of planes—props turning up at various speeds in warming up and testing. Mechanics swarmed like ants over their own individual charges.

Belden bent his head against the wind and passed under the extended wing of a bomber. Crouching he felt his way in the gloom to his own plane, a new and experimental two-engined low-wing bomber, and looked up at the dungaree-clad man on the wing. The mechanic was intent on replacing the N. A. C. A. cowling over the right motor. Belden slapped the metal wing with the flat of his hand and yelled over the roar of forty-one growling radials.

"Got a tough assignment this morning, Mike—test contact with a destroyer at sea. Is she in good shape?"

"Down in a minute, sir," the mechanic yelled as he slipped the last safety clip into place. He slithered along the wing to the cockpit with the ease of one thoroughly practiced and acquainted with the weak spots of the wing. He

started the motor, set the throttle just above idling speed, and scrambled down onto the deck by Belden.

"You won't have trouble with this crate today, lieutenant," he said with a grin. "I put in a new mag—didn't trust that other one." He looked at the officer questioningly. "You won't get into any trouble over last night, will you, sir?"

Belden smiled at the anxious look on his mechanic's grease-smudged face. "Don't think so. Major Griffith didn't recognize you, and my excuse that you ducked out while I was telephoning for the shore patrol can't be disproved. Couldn't have my mechanic—the only one I trust—in the brig with an assignment like this morning's coming up."

"I won't forget it, lieutenant," Mike said sheepishly. "Next time I get ginhappy and decide to take some guy's girl away from him, I'll look twice to make sure that she isn't with an army officer in civvies."

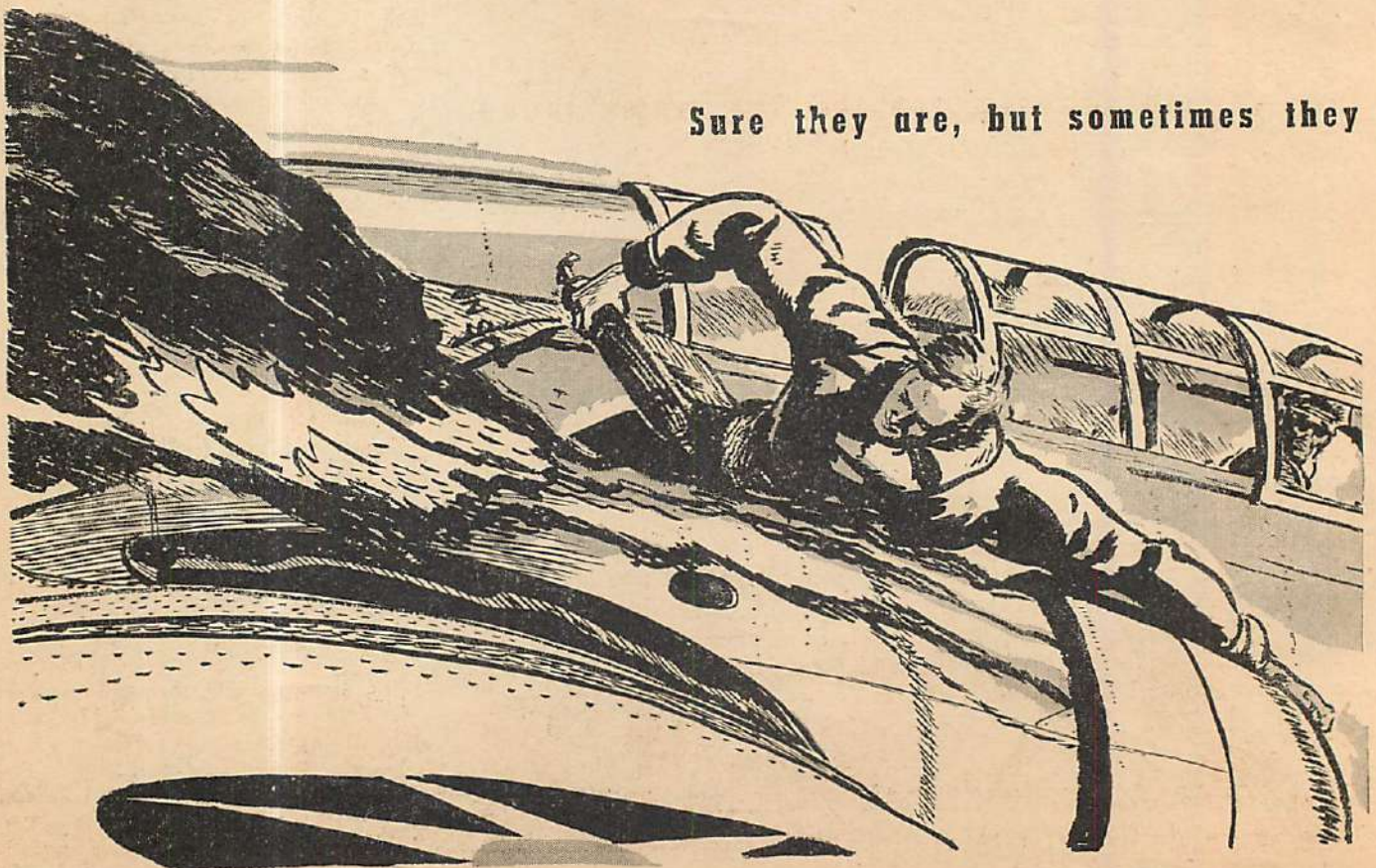
The floodlights blinked out, the loud-speaker burst forth in a raucous command: "Clear the decks, prepare for flight exercises, 2-B-3 to take off for short test flight."

There was a faint rosiness in the east when Belden crawled into the cockpit of his plane and squirmed down comforta-

bly on his parachute. The mechanics on the take-off deck forward scrambled into the safety nets along each side of the ship. Belden set his props at low pitch and looked toward the handling men who held the release wires. Bit by bit he edged the twin throttles open. The rough growling of the radials changed gradually to a smooth purr, then a deep roar as the throttles reached manifold stop. The plane tugged at its wire restrainers while Belden checked his magnetos and synchronized the motors for the narrow take-off. With motors turning up evenly, a straight run down the deck was easier to maintain.

He checked the landing-gear lock, engine pressure and temperature gauges, tapped the flap switch with his forefinger to make sure they were up. Satisfied with his check-off list, he tested the flight controls and looked back at his crew chief. Mike held out his hand with thumb up. Belden held out his hand, thumb up, to the bridge. A green light flashed from the bridge and Fly One's flashlight made circles—the signal to take off. Belden settled himself and slapped his safety belt, the ground men released the restraining wires, and the pilot released the foot brakes. As the bomber darted down the deck, he snapped the prop control to full pitch

**Sure they are, but sometimes they**





## by WILLIAM H. RANDALL

for a quick take-off. Both hands held the control wheel forward—his feet off the rudder holding the nose true on the bow light.

Out of the corner of his right eye, Belden was conscious of the massive stack structure with its identifying stripe, then the bridge tower and forward turrets rushing by. A brief flash and the sea-plane-lifting crane was behind him. The controls began to feel light—he was gaining flying speed. The bomber rushed down the brief clear stretch. He could no longer see the bow light—the wheels cleared the deck and the plane dipped slightly toward the water in front of the *Saratoga*. He pulled back slightly on the stick and slapped the throttles wide open. The bomber roared along forty feet above the surface of the ocean for a fraction of a minute, then lifted gracefully into a climbing turn.

Belden breathed a sigh of pure delight. He never failed to get a thrill out of a take-off from a carrier. Hundreds of them still failed to dull that sense of satisfaction in being able to hold this flying monster in a straight line down that seventy-foot-wide runway—a runway that would brook no swerving, either to the left or right without a crash. The final drop off the bow was breathtaking when the plane hadn't

quite reached flying speed. Sometimes when the wind was strong the plane would be in the air before the bow was reached. And although this was safer, there wasn't as much kick in it as that dip toward the water with that following mass of steel ready to plow you under if you didn't keep clear of the water.

He held the bomber in its climbing turn, checking all his instruments and motors carefully. This test flight must determine the reliability of the ship for its mission today. His critical eye could find nothing wrong. He leveled, then banked in a wide circle to approach the carrier from the rear. He never failed to marvel at the size of the *Saratoga* while he was aboard. One could wander for hours without passing the same spot twice. But, looking down on it from the air, it was startling to think of trying to land a plane on its deck. It looked like a bar of soap in a bathtub. Yet the plane-guard destroyers on each side of the stern were comforting. They could reach you in seconds if you crashed in the water.

Today's problem would use the radio extensively, so Belden purposely approached off-side on the stern and asked for compass bearings. The operators of the twin compass stations on the stern would not be able to see him—they

would have to rely entirely on their instruments—but Belden could see the stern of the ship and check the bearings against them.

The crackle in his radiophone brought him alert for his radio bearings: "Cross bearing to 2-B-3—you are approaching four points off the groove to the starboard."

Belden grinned and acknowledged the bearing, changed his course to approach for a landing—to get "in the groove." He went through his check-off list rapidly. Flaps down? Wheels down? All O. K. as the bomber approached the rolling stern of the carrier. Belden's gaze riveted on the landing-signal platform projecting from the starboard side of the stern. The signal officer held aloft the landing flag, and suddenly the bomber was over the stern and the man drew his finger across his throat.

Belden cut the throttles and the plane settled into the yellow-bounded oblong landing area. The belly hook on the plane caught one of the cables strung across the deck. The compressed-air drums on each end of the cable decelerated the speed while Belden stiffened against the shock of the sudden stop.

He sighed with the satisfaction of another "well-done" landing, cut the switches as the handling crew trundled the plane onto the after elevator. One of the mechanics pulled a ring recessed into the deck. A hundred-foot-square section of the deck dropped downward and a cable guard rail automatically rose around the open space. When the elevator reached the inner hangar space below decks, Belden crawled out of the cockpit, parachute slapping the back of his knees. The mechanics pushed the ship to the fueling pumps and the elevator shot back up to fill the hole left in the deck. When the plane was completely serviced, it would be pushed forward onto the take-off deck elevator and would be in position for an immediate take-off.

Belden's mechanic crawled out of the gunner's pit aft and joined his lieutenant. "Crate's O. K., sir?" Mike questioned, grinning.

An orderly made his way to Belden's side before he could answer. "Skipper wants you in his quarters, Lieutenant Belden. Major Griffith's with him, and he's plenty agitated."

The pilot and mechanic looked at each other meaningfully, their grins fading. "Maybe we didn't get away with it after all!" Belden groaned, turning to follow the orderly.

Mike put a restraining hand on his arm. "Don't get yourself in trouble, lieutenant, to save my (Turn to page 61)

are something else, too, as the major found.

**S**MOKE engulfed him momentarily. The major increased the slant of the slip and the smoke blew away. Coughing, eyes watering until he could hardly see, Belden grasped the hot cowling in front of him.





# NO HEROES NEEDED

GENTLEMEN:

Probably no one has ever put such a proposition before you, but if you will consider this carefully you will see that it will mean much to both of us.

By ALMA HEFLIN

**Foolhardy flying does not make a hero—but other things will do it.**

**A**BOUT twenty-five letters like this a week are received by most of the aircraft companies. Besides the standardized beginning most of them have one of the following ideas in common:

The writer wants to solo without instruction to prove that this light plane is easy to fly. He wants to make a tour of the country and talk to rotary clubs. He doesn't fly, but he is willing to work at the factory for nothing until he learns; or maybe he has twenty hours' solo. He wants to fly the Atlantic or the Pacific, or maybe make a South American tour.

He will do all this without pay because he wants to get into aviation, and it would be well worth the company's expense because he will prove the worth of the light plane to the public.

And there is one more thing in common, the answer they get:

NO.

That answer probably proves the crack about soulless corporations to an ambitious youngster, but it is inevitable. If the companies are going to put on a flight sensational enough to make headlines, isn't it reasonable that they would gamble on a pilot of proven ability—their test pilots or any one of fifty good pilots known to the officials?

A good many would-be heroes have a lamentable lack of knowledge about aviation. Take the "solo without lessons" idea. It has been done, usually by accident when some kid opens a throttle by mistake. Truman Netzley in Laura, Ohio, flew without instruction last summer and came down alive. Two others who tried it, not blessed by the air conditions the gods gave him, were killed. Students have soloed in two or three hours and became first-class pilots—because they happened not to meet crucial conditions before they had gradually learned how to handle a ship.

A light plane is easy to fly, admittedly. Take-off can be a matter of opening the throttle and (*Turn to page 69*)



The flood at Kellogg, Idaho, where Hartnett and others landed.



The Graneres, father and son, skim one wheel of their Cubs along the ground in their exhibition of precision, not foolish, flying.



**W**ITH the exception of one squadron, the total strength of the Royal Air Force in India is concentrated on the northwest frontier in the vicinity of the Kyber Pass. Engaged in the grim business of curbing the rebellious inhabitants, the airmen get little opportunity for sightseeing in other parts of the country.

The exception is No. 28 Army Co-operation Squadron, located at Ambala, the geographical center of India, in the Punjab. The Punjab is one of the largest provinces in India and literally means "the land of the five rivers."

The standing army of India is some sixty thousand British troops and about two hundred thousand native troops under British officers. Routine work for No. 28 Squadron consists of a succession of temporary attachments to the various army corps when they hold their maneuvers.

In addition to the troops in British India, the native princes also maintain armies of their own, partly for self-glorification and partly because the British think it is a good idea to have a reserve army which costs them nothing. During the World War, the native princes were lavish with money and material to the Allied cause. Some military historians have held doubts as to the quality of the material, but as the money was all right, it is generally considered a good thing to foster the warlike spirit of the princes.

Consequently, whenever a native State is holding its war games, a detachment of No. 28 Squadron is literally hired by the ruler to lend a touch of modernity and color, if color be needed, to their own fantastic idea of how military maneuvers should be conducted.

The prospect of an assignment to a native State is always greeted with enthusiasm by the aviators. Erroneous observations when working with the British forces are subject to military discipline, and it is a welcome change to work with a general staff who think more of their genius as hosts than as strategists.

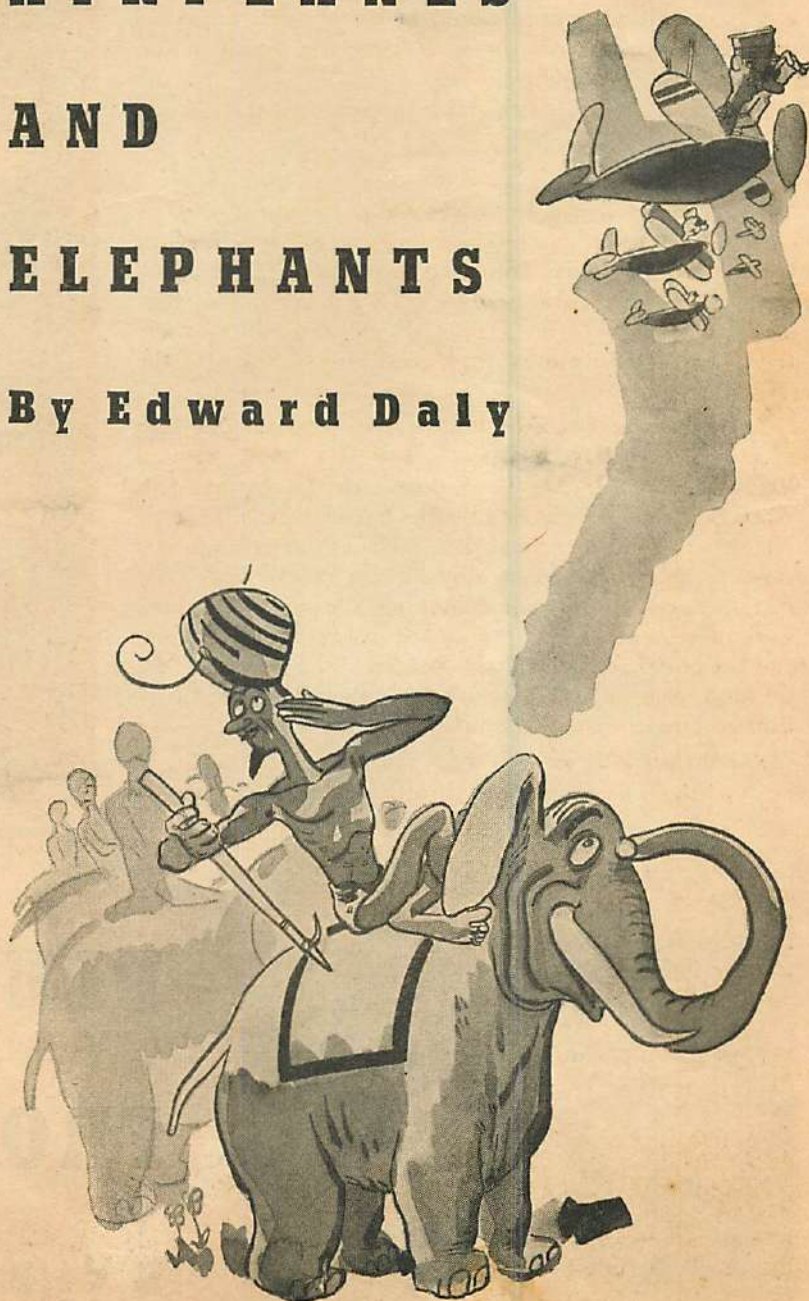
Without exception, the native rulers are men of fabulous wealth. The Nizam of Hyderabad is considered the richest man in the world; his fortune does not depend on the fluctuations of a stock market but is, in toto, stored away in a treasure house. The wealth of these men has been gathered in a unique number of ways through the passage of centuries. The system of one ruler—the Agha (Turn to page 75)



"I am not what the photographers call a good subject," is the note accompanying this shot of the author. Be that as it may, Edward Daly, the son of a retired British army officer, went to India with his family at the age of two, later returned to England, joined the R. A. F., and went back to India for active flying. He spent six years flying on foreign service. From the age of sixteen on, when he passed the entrance exam to the R. A. F. schools at Halton, Buckinghamshire, Mr. Daly has been actively engaged in military aviation. A year ago he came to the U. S. with his American wife and is concentrating on writing on aviation subjects for various publications.

# AIRPLANES AND ELEPHANTS

By Edward Daly



India's war games have more comedy than casualty!



All photos by the author



Scoop! Gull's-eye photos of incoming "Queen Mary" on maiden voyage were on streets even before ship finished docking.



The author checks his equipment before a take-off.

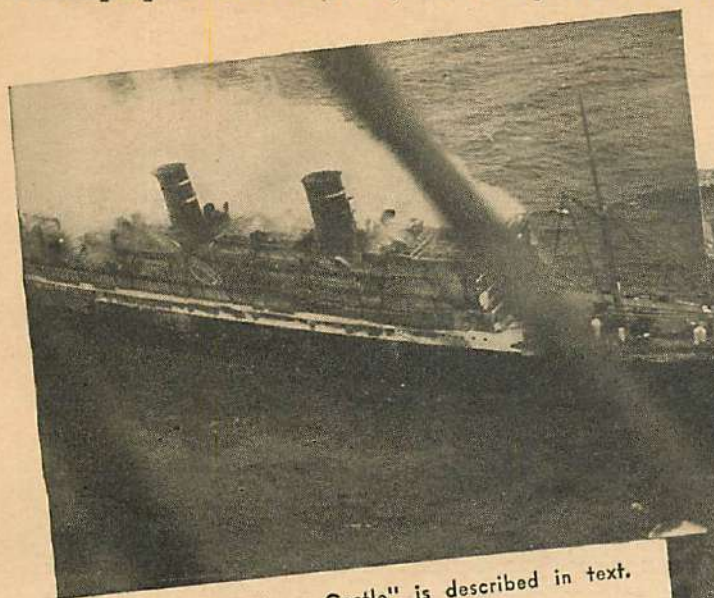
## PLUCKING NEWS FROM THE AIR

BY RUDY ARNOLD

OFFICIAL PHOTOGRAPHER, FLOYD BENNETT FIELD



Just how those thrilling aerial photographs throughout the pages of your newspaper are taken, told by one of the country's ace flying cameramen.



"Shooting" the "Morro Castle" is described in text.



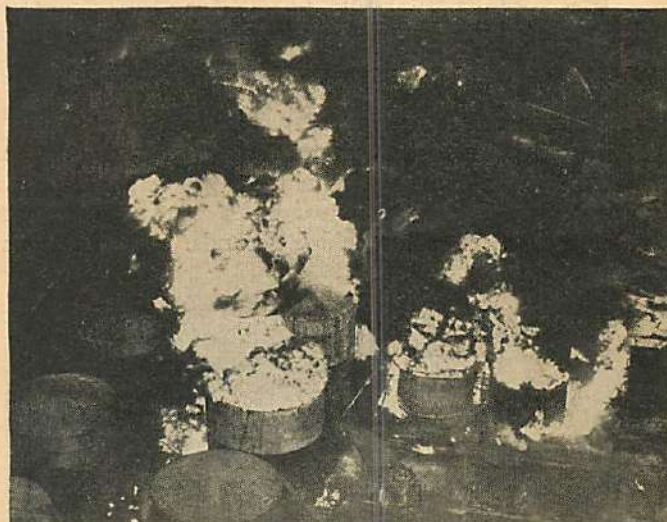
The hurricane blew plenty of business to the aerial camera.

A SUBWAY straphanger leans over another passenger's shoulder to glance at a picture of a burning steamer far out at sea. Three thousand miles away a housewife idly glances at the same illustration as she sits down to a leisurely lunch. And neither pays much attention to the part of the caption underneath the photo that mentions the words "aerial view."

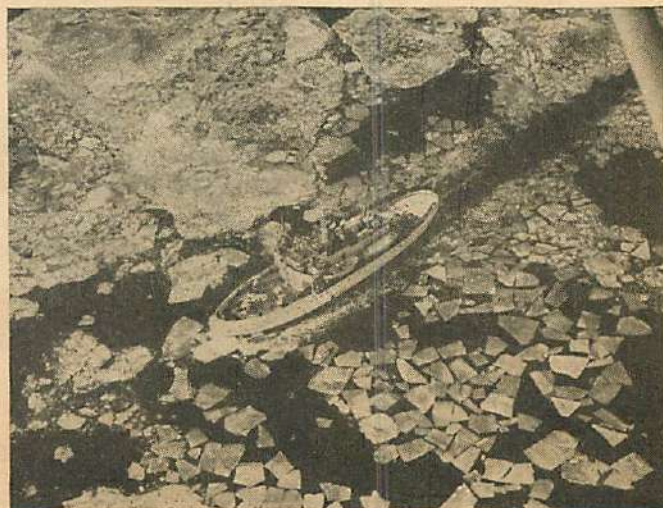
Not so many years in the past an instance like the above could not have occurred, yet today it excites little if any comment. To the airplane can go most of the credit for the amazing development of a new arm of news gathering—aerial photography. Although aerial pictures are not a twentieth-century brain child, it is only in the last ten or twelve years that they have become a necessity in giving speedy and accurate pictorial coverage to big news stories that may occur anywhere from ten to a thousand miles away from the major news agencies' offices.

Picture snapping from the air has engendered a whole new science of photography to keep pace with the demand for more and more pictures, as a restless public began to turn jaundiced eyes away from massed newsprint and insisted on "what's new" in condensed form. A glance at the morning paper replaced hours of reading. As a result, hundreds of earthbound lensmen had to sprout wings, and the process is still going on.

Aerial photography is not so much a dangerous pursuit as it is an exacting one, although occasionally photographers have been killed or banged up in line of duty, becoming in turn themselves subjects for other newsmen's cameras. It is a full life with an abundant quota of thrills; but expecting the unexpected is part of the game, and the satisfaction of bagging a good picture somewhat evens up the score. (Turn to page 67)



Blazing oil tanks make pilot's maneuvering dangerous work.



From flames to ice, the aerial cameraman covers them all.



# WHIRLING WINGS

THE WORLD REARMS  
PART VI

By FRANK TINSLEY

The rotary wing comes  
into its own in the army.



Six of a kind. This fleet of six Kellett autogiros, known as YG-1As, was constructed for the army at Philadelphia. These are being used in observation experiments.

**T**HERE are only two known methods of sustaining a heavier-than-air machine in flight. Both are based upon the use of a wing having an airfoil section which generates lift by the action of the air flowing over its surfaces. In order to generate this lift, the wing must be made to move through the air at comparatively high speeds.

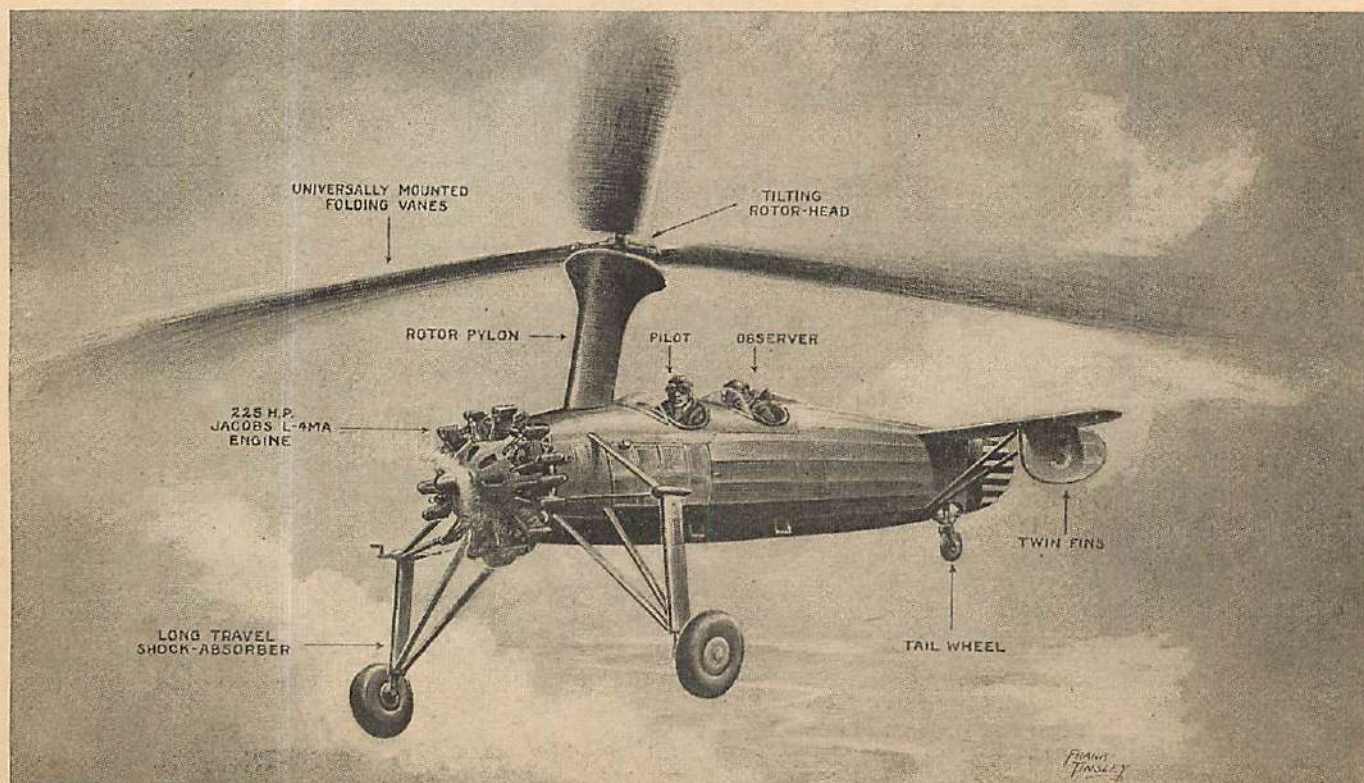
The conventional airplane of today is called a "fixed-wing" aircraft and consists, as you very well know, of a set of rigid wing surfaces supporting both ends of a body or fuselage. These wings are drawn or pushed through the air by means of an engine-driven propeller.

The second system of sustentation derives its lift from a set of long, narrow wings which move through the air at high speed, revolving around a central hub from which the body of the machine depends. This is known

as the "rotating-wing" type of aircraft and includes autogiros, gyroplanes and helicopters. The great advantage of these machines over the fixed-wing airplane lies in the fact that their wings, or vanes, maintain a steady speed and lift regardless of the forward speed of the machine itself. Thus, while the body of a helicopter is hovering at a standstill, its wings are whirling through the air at a speed of nearly two hundred miles per hour. The advantage of this divorce between wing speed and forward speed is the replacement of a potentially dangerous source of support by an inherently safe one.

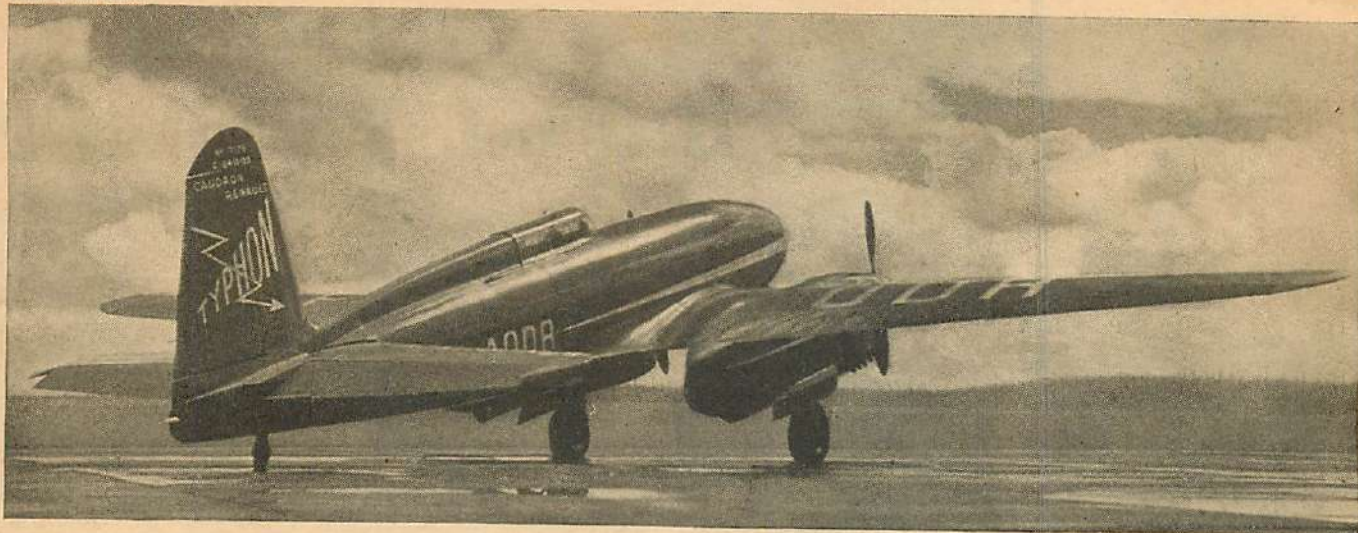
## AN OLD IDEA

The rotating-wing theory of aircraft sustentation is by no means a new idea. As far back as 1825, Vittorio Sarti, of Bologna, Italy, designed a (Turn to page 70)

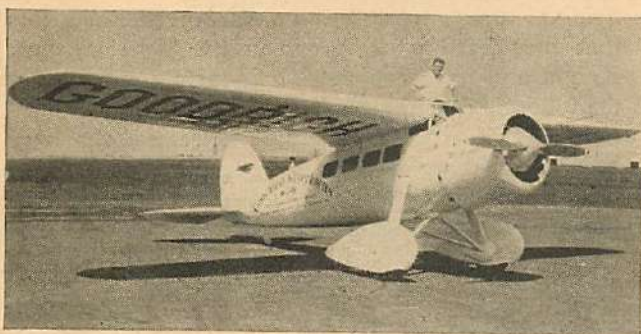


In this cutaway drawing by the author are shown the various essential parts of the army's new experimental observation giro.

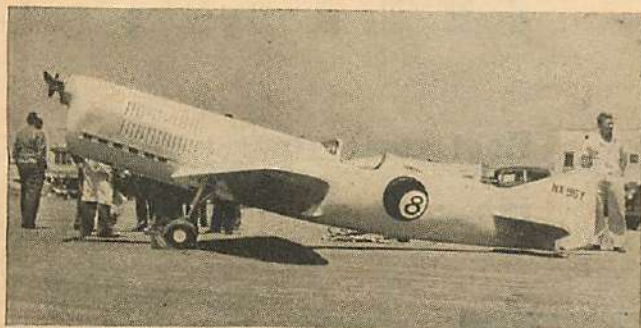




Proof of the efficiency of all-wood construction was the winning of the England-Australia race by the all-wood DeHavilland Comet.



One of the famous all-wooden Lockheed Vegas, popular with Lindbergh, Post, Earhart, Goebel, Turner, Hawks and others.



Wood is particularly adaptable to small racing planes such as the famous "8 Ball" of Keith Rider, using a Menasco engine.



The most sensational of all wooden planes is the Clark 46, sleek in appearance and sensational in performance in the air.

## THE WOODEN AIRPLANE RETURNS

BY GORDON SEAR WILLIAMS

**A**FTER many years of virtual nonexistence in the the American market, the wooden airplane is making important bids to recapture the field it once held. Time was when wood-and-fabric crates were common enough on every airport, but with the introduction of new high-strength, lightweight alloys having weather-resistant properties not known to wood in those days, the wooden airplane gradually did a vanishing act, until, during the last ten years, it all but entirely disappeared.

Many is the pilot who swears by and not at wooden airplanes, pointing to their superiority in maintenance, ease of construction and quietness in flight. Maintenance, chief bugaboo of airplane owners, has long been a headache with designers, who in their search for speed and efficiency must at the same time make allowances for easy servicing, replacements and repairs. Certain it is that many modern ships, using various grades of high-tensile steels and tempered metals, are practically helpless if stranded in some out-of-the-way part of the country. Just as certain is the fact that the majority of wooden ships may often be repaired by any fairly good woodworker who has a knowledge of gluing and woods.

This feature of easy repairability has shown up again in the wars in Spain and China, where it is said the metal-tube-and-wood airplanes proved to be superior in most respects to the more modern skin-stressed metal monoplanes. The sleek metal ships are faster and carry a slightly greater load, but so far have proven to be expensive to keep in the air while at the front. Whereas wooden and steel-tube ships can be easily (Turn to page 77)

**"Wooden ships and iron men" may soon apply to sleek air transports.**



# HOLLYWOOD

**M**OTION-PICTURE stars are at last beginning to take their flying seriously. Today, more are flying than ever before. What is even more interesting than that, they are buying aviation stock, purchasing their own ships and even backing flying services.

A lot of hooley has emanated from the film capital these past several years. Press agents, always reaching out for a line in newspapers or a few words over the radio, have turned practically every noted player into a pilot at one time or another. Whole casts of flying pictures have suddenly discovered in the prints that they have more hours in the air than Jack Knight and have had more hair-raising experiences than Bert Acosta.

In fact, if all the actors and actresses who have been called pilots were suddenly rushed to a flying field, it would take a fleet of DC-4s to get them into the air—if they'd consent to go.

**BY EDWARD  
CHURCHILL**

**Meet some stars who fly for  
fun and not for publicity.**



"Wally" Beery, outstanding flying star and his seventh plane, a high-speed Howard.

Jimmy Stewart, licensed pilot, spends his spare time getting in more flying hours.



Brian Aherne's Waco is familiar about Los Angeles Municipal Airport.



# GETS NEW WINGS

Stripping right down to the facts, you can classify Hollywood pilots somewhat in this way:

Cecil B. DeMille, producer-director, who no longer pilots, was one of the first air-minded men in motion pictures. He established one of the first, if not the first, commercial air lines in the world in 1919. That makes him daddy of them all. Reginald Denny, erstwhile star, now an excellent character actor, flew considerably in the '20s, and got a great deal of publicity. The stories printed about his flying were all true, and he deserved them. Today, he's out of the air and in the model-airplane business up to his neck. He explains it:

"Some pals of mine cracked up my last ship in the late '20s. I decided flying was too expensive and quit. Now that flying is cheap, I'm too busy with model and motor building—including a radio-controlled job for the government—to pick up where I left off."

In Denny's class and era was Ben Lyon, now in England with his wife, Bebe Daniels, making pictures. Also contemporary were Hoot Gibson, ex-Western star, and Ken Maynard, who also alternated wings with horses. They had a race at the National Air Races held in Los Angeles in the early '30s and Hoot stacked his ship. Hoot dropped out, but Maynard is still interested. It was during these days that Paul Lukas bought a biplane, hopped around considerably, and Edna May Cooper, leading woman, won a private ticket which she still holds.

This brings us to the Hollywood ace of aces, that flier and gentleman, Wallace Beery. Wally, now flying a Howard special, whips it around the skies at a guaranteed two hundred and eight miles per hour. He became interested in flying fourteen years ago in 1925—after

working in an aviation picture. He played around with the idea of soloing for nearly two years, letting Frank Clarke and several other pilots do the work for him. One instructor, George Naves, asked him when he was going to fly the ship he owned.

"Right now," he replied. And did.

That was in 1926, and he's held a ticket ever since. Not only that. He has owned seven airplanes, having a gross value of about one hundred and fifty thousand dollars, which makes him Hollywood's gift to the builders. Three Travelairs, a Bellanca, two Stinsons and a Howard. From time to time he has crossed the continent, has made Canada and Mexico, and now sets his Howard down at a mountain hide-out eight thousand feet above sea level! Right now he has a shack, three hundred and sixty acres, and a rough two-way airport seven hundred and fifty miles air line from Hollywood, seventy-five miles from the town of McCall, Idaho. At fifty-three, Wally, who is still a kid in enthusiasm and activity, wishes he was twenty years younger.

"You could have your movies," he says. "I'd be flying an airliner."

Wally has accumulated about five thousand hours, figures on at least that many more before he bags his last elk, brings back his last mess of trout from some sky-touching mountain stream to which he has flown. And, what's more, he clips dividends from both air transport and air manufacturing stock.

With a bow to Miss Cooper, Ruth Chatterton ranks as top feminine pilot by virtue of several hundred hours and because she has twice sponsored the Ruth Chatterton Sportsmen Pilots Air Derbies in (*Turn to page 64*)



Ruth Chatterton ranks as top feminine star pilot by several hundred hours.

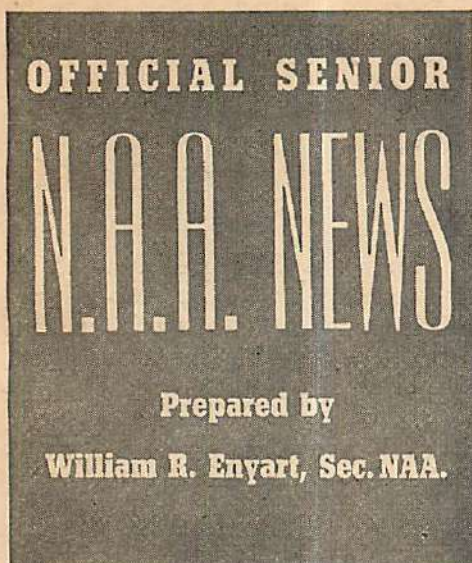


Robert Cummings, who has taught flying to many, stands by his Cessna monoplane.



Harvey Stephens, famous also as a sailplane pilot, demonstrates his "Zanonia."





Dr. George W. Lewis, chairman of the N. A. A. Contest Board for 1939.



Chas. McReynolds, president, Hangar No. 1, Licensed Airmen of America.



#### SEVEN CIVILIAN SCHOOLS TO TRAIN AIR CORPS MECHANICS

**S** EVEN civilian schools, approved by the C. A. A., have been selected to train one thousand air corps enlisted men as aviation mechanics. Meanwhile, the army schools at Chanute Field, Rantoul, Illinois, and Lowry Field, Dover, Colorado, will be expanded. Civilian schools will give only courses in the operation, repair and maintenance of airplanes and airplane engines, and the graduates will be termed airplane mechanics. They are expected to qualify as crew chiefs upon graduation, and will receive instruction in special technical subjects at army schools later.

If the trial proves successful, the utilization of such civilian schools in wartime will be of vast assistance for building up the force of mechanics. The schools selected are: Curtiss-Wright Technical Institute of Aeronautics, Glendale, California; Aeronautical University, Inc., Chicago; Roosevelt Field, Inc., Mineola, New York; Spartan School of Aeronautics, Tulsa, Oklahoma; Casey Jones School of Aeronautics, Inc., Newark, New Jersey; New England Aircraft School, Boston; and Parks Air College, Inc., East St. Louis, Illinois.

#### NEW FEMININE RECORD

A new feminine national altitude record for airplanes of the first category—those powered with engines between 397 to 549 cubic-inch cylinder displacement—was chalked up by Miss Grace G. Huntington on May 31st. Miss Huntington made the start from Union Air Terminal, Burbank, California, and after reaching her maximum altitude landed at Grand Central Air Terminal, Glendale, Los Angeles.

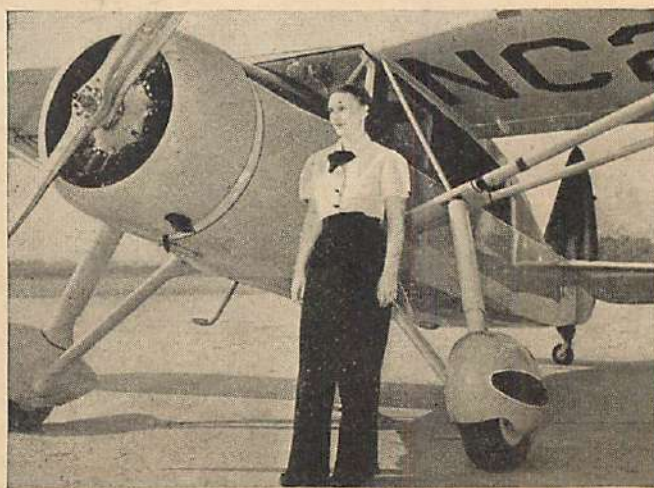
Just how high the flier went will not be known until the work of calibrating her barograph, which was sent to N. A. A. headquarters following the flight, is completed. However, a record will automatically be established since none previously existed in this category.

#### AVIATION DAY SET

Hereafter, August 19th will be known as Aviation Day. A joint resolution establishing it was passed by both houses of Congress and signed by the president. The day selected is the birthday of Orville Wright, who flew the first heavier-than-air machine above the sands of Kitty Hawk, N. C., on December 17, 1903. (Turn to page 66)



J. L. Morris, Miami Chamber of Com.; W. Vermilya, Gov. Fla. N. A. A.; H. C. Whitney, Fla. Aviation Dir.; and F. Winchell, N. A. A.

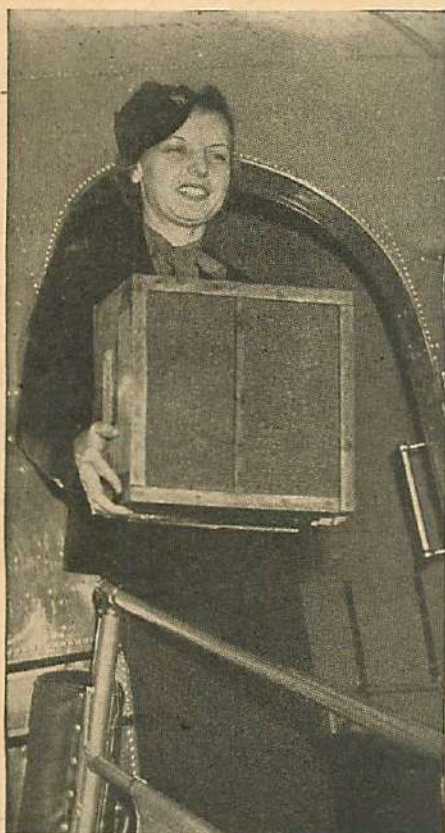


The record holder! Miss Grace G. Huntington, who recently established a new altitude record for her particular plane class.



# AIR FIGHTING BEATS PESTS

By EDWIN LAIRD CADY



**W**HILE the newspaper headlines are crammed with howls about air wars against human beings, there is going on a much more important air war in behalf of human beings. And this is the air war on pests.

Take anopheles, for instance. That is, take her if you want her. She is a mosquito who sings quite soothingly, and whose bite is only a little itchily unpleasant. But she carries malaria germs around as passengers who want an air ride. And if she gives you a few to be your guests, you may have chills that will make your teeth rattle, followed by fevers that feel as if you could light your cigarette with your fingertip. She is unpopular.

Air war on anopheles is by direct air attack, and also by airplane-borne submarines—the submarines being fish.

In the direct attack, airplane hoppers are loaded with a mixture of powdered soapstone and Paris green, and this is dusted onto the stagnant waters where the mosquitoes breed. The foolish anopheles larvæ or "wrigglers" eat it and then cease to wiggle. The dusting operation itself is like the familiar one of dusting cotton and other agricultural crops. For it are needed a variety of planes.

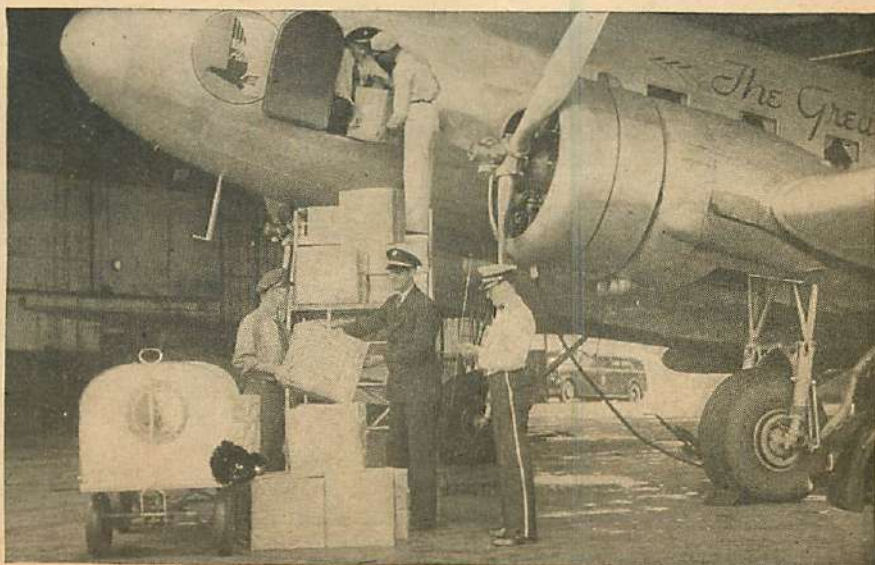
When actually on the job, the ideal dusting plane has maximum maneuverability and travels very slowly—so the flier can stay close to the ground and dodge bushes and trees while the (Turn to page 68)

Upper right. Unloading eggs to be used in vaccine for sleeping sickness.

Center. A shipment of ladybugs being rushed to repel a plague of pests.

Right. Serum starts on a long flight to Caracas, Venezuela, to combat disease.

**The wings of man are  
drafted to battle wing-  
ed pests and plagues.**





# GLIDING and SOARING

CONDUCTED BY  
ALEXIS DAWYDOFF

## Why not do something about forming that club?

**R**ESPONDING to numerous requests, we are devoting the department this month to a general plan for forming a gliding club.

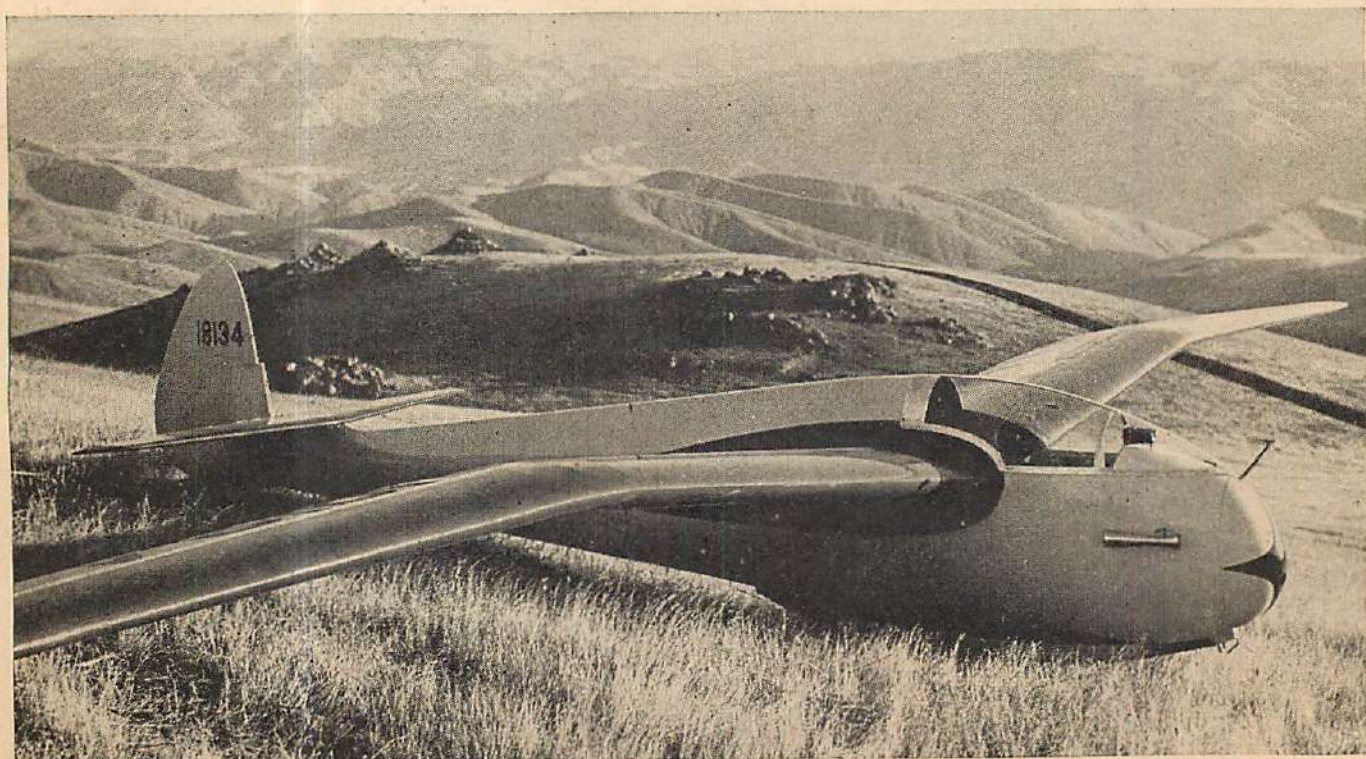
Let us assume that fifteen fellows have gotten together and decided to form a club. Their first problems are to purchase flying equipment, a primary or secondary glider, depending on their financial status, locate a field from which to fly, elect club officers and come to an agreement as to initiation fee and monthly club dues to be paid by members.

If the group is small, a primary glider is sufficient for the beginning; a good ship of that type can be purchased in knocked-down form for one hundred and sixty dollars. A trailer and a tow car—a secondhand Model A Ford roadster or similar automobile—should also be obtained; usually somebody in the club has one of the latter already and is willing to lend it. Then get six to eight hundred feet of five-eighths-inch manila rope, and tools, and your flying equipment is complete.

Locating a suitable field presents a certain amount of

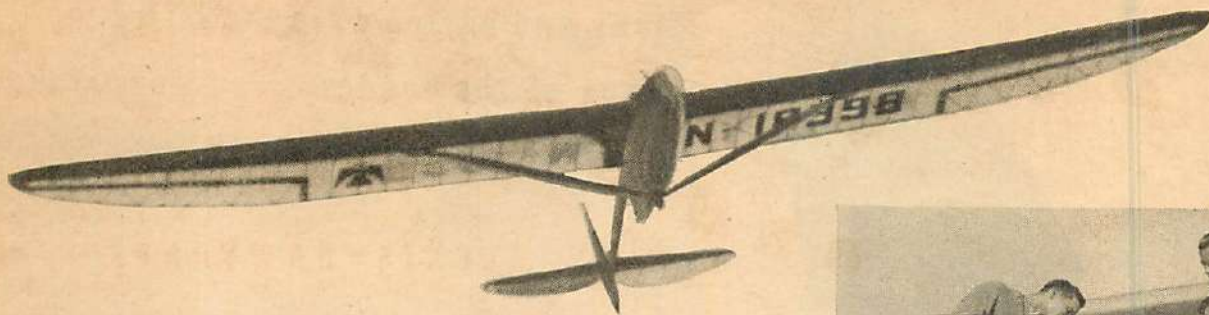
difficulty. Occasionally small airports permit glider flying on their field, but unless the group is alert and acquainted with air-traffic regulations, this constitutes a degree of risk; either the rope is carried away on the tail skid of the ship or the glider gets in the way of the power planes, and vice versa. The best solution is an abandoned farm or field about two thousand feet square with clear approaches all around. If your group is progressive, try to interest your civic organizations in your activities, enough to permit you to fly on some city-owned property. Chambers of commerce of a number of cities have helped their local glider clubs.

Elect your officers from those members who believe that there is something to be won and will work to win it. The governing body of the club consists of the president, vice president, secretary and treasurer. The president shall control all business of the club and preside at all regular club meetings. The vice president shall assist the president in all matters and take his place whenever necessary. The secretary shall carry on all the corre-



A beautiful photo of a beautiful sailplane. Harvey Stephens' sleek Zanonia poised ready to fly on a California soaring site.





Bearing the Indian sign emblematic of its name, "Woodie" Brown's record-holding Baby Albatross "Thunderbird" soars overhead.

spondence of the club and also be in charge of all public relations with newspapers, aviation magazines and the general public. The treasurer shall have charge of the club's finances and membership business. All officers should be elected for a period of one year.

The initiation fee represents an option of each club member in the flying equipment, and is arrived at by dividing the cost of the equipment by the number of club organizers, known as charter members. For example: primary glider, two hundred dollars; trailer, fifty dollars; tow car, seventy-five dollars; eight hundred feet of rope, eight dollars; tools, five dollars; grand total, three hundred and thirty-eight dollars. This total divided by the fifteen charter members makes the initiation fee twenty-two dollars and sixty cents.

All new members joining the club will have to pay this sum, which ought to be set aside for the purchase of another ship when the club grows too big for the use of only one glider. The monthly dues, usually ten percent of the initiation fee, two dollars and fifty cents per month, are to provide for the incidental expenses such as operating, maintenance, repair and storage of equipment. Some clubs charge a flight fee of five cents a flight to take care of operating expenses of the tow car.

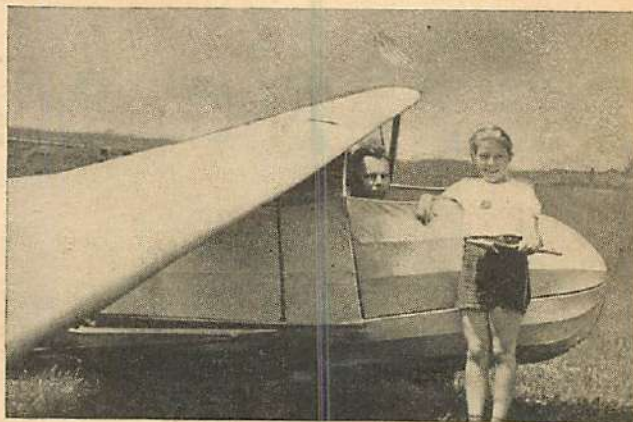
We suggest that after the first year of operation, if the club has been successful and aroused sufficient interest, that it attempt to get enough members to be able to purchase a utility glider. A good ship of that kind costs in the neighborhood of six hundred dollars. It is possible to obtain a used ship in good condition for around three hundred dollars. The Soaring Society of America, 1909 Massachusetts Avenue, Washington, D. C., has a list of secondhand utilities for sale. It would also be wise for all members of the club to join the Society and in this way keep in touch with all latest developments in gliding. Motion pictures of gliding and soaring can be obtained from the S. S. A. free, the required deposit of fifteen dollars being returned as soon as the pictures are sent back. These motion pictures will help your club a lot in getting new members and selling your club to civic organizations.

One part of equipment which the club has to build itself is a trailer for transporting the ship. All mechanical parts for this, axle, wheels, and springs, can be purchased at an automobile junk yard. The framework uprights, wing racks, are of wood and can be bought at a lumber yard. The tow bar may be purchased from any of the trailer manufacturers or can be made up by the members.

Do not be afraid of getting too many members, thinking that there won't be enough flying per member. Rarely



Franklin Wolcott, West coast soaring pilot, fills in a take-off card before soaring toward clouds in his famous utility ship.



Like father, like daughter. Louis Mehmel, president of the Air-hoppers Club, is checked in by his daughter acting as timer.

is there a full complement of them during the flying day, and each additional member means more revenue to the club.

As your club grows in size and experience you will no doubt want to go soaring. A good intermediary sailplane can be bought now in kit form, semifinished, and requires only moderate skill with tools to assemble. It can be purchased on the installment plan, and the price of the whole kit is less than that of a ready-built secondary. A winch should then be added to the equipment of the club. Up until now winches have been built by clubs, and each has had its own design. However, in the near future a good tow winch will be available at a very reasonable price.

Although it is not necessary to bind the organization with strict rules, for safety's sake the word of whoever is in charge of flying and instructing should be law.

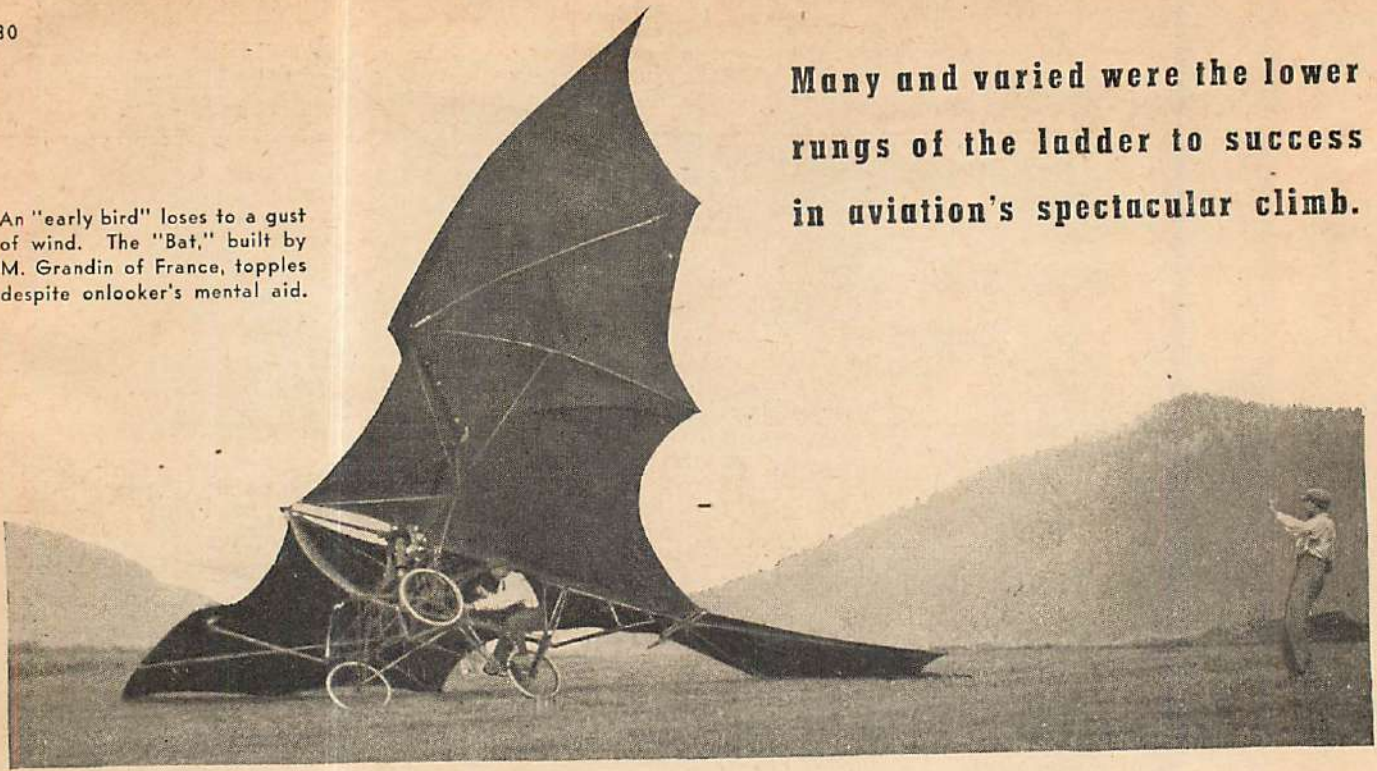
There is infinite fun in store for you in this greatest of all sports, but do not forget that it is as safe as you make it.

#### NEWS AND EVENTS

A new American distance record was established on June 8th during the Second Annual Southwestern Soaring Meet held at Wichita Falls, Texas, (Turn to page 63)

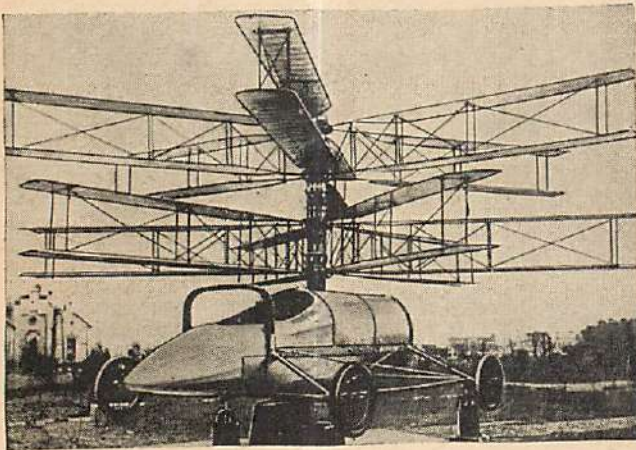


An "early bird" loses to a gust of wind. The "Bat," built by M. Grandin of France, topples despite onlooker's mental aid.



Many and varied were the lower rungs of the ladder to success in aviation's spectacular climb.

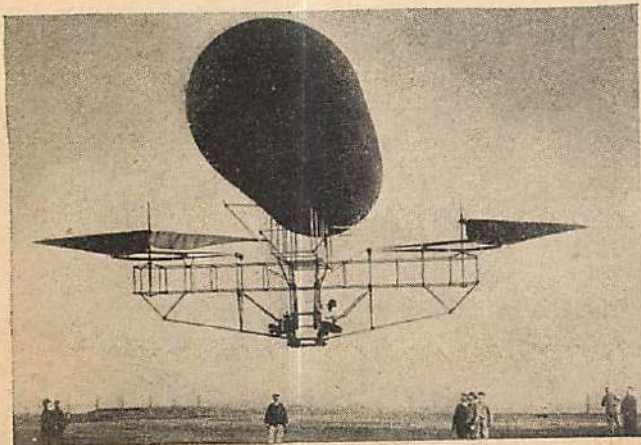
## FLYING MACHINES OF



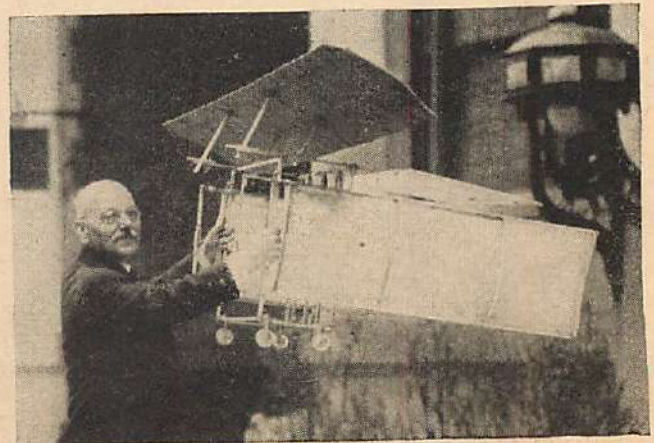
This weird combination of an auto and helicopter, according to data, "may cross sea in six hours." (Pan American take note.)



"Grey Goose," an American invention in the wing-flapping class, flapped so hard on its initial flight its tail flapped off.



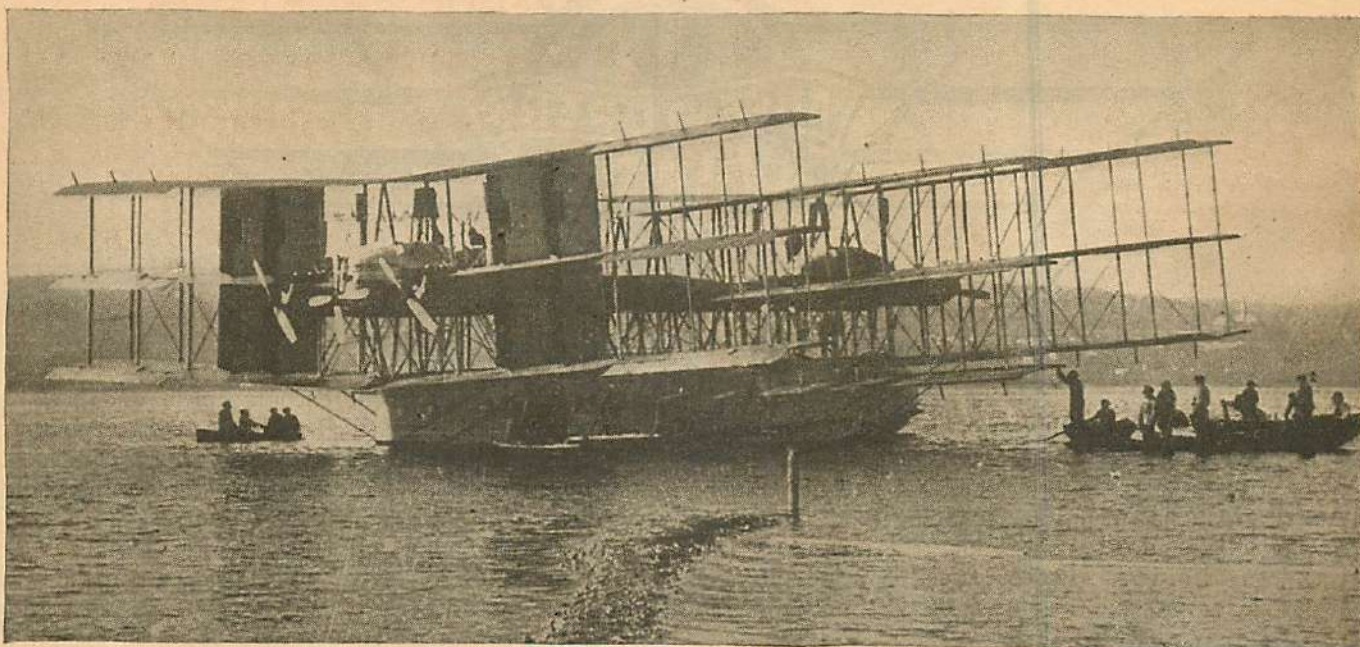
The secret of vertical flight is solved at last—more or less. In spite of the various gadgets, this blimp staggered aloft.



The rowboat of the air appears in model form. The vertical side wings are worked by hand. (Feet are used as you see fit.)



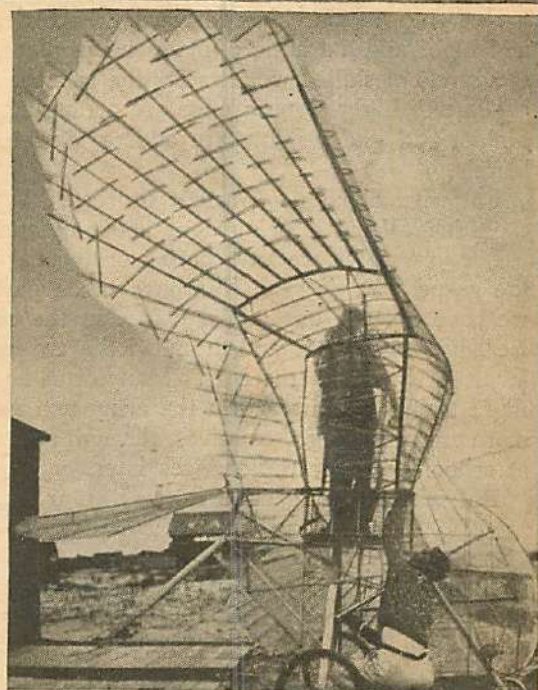
This flying wood lot, designed for transocean travel with a hundred passengers, had eight liberty engines, nine wings and a mortgage.



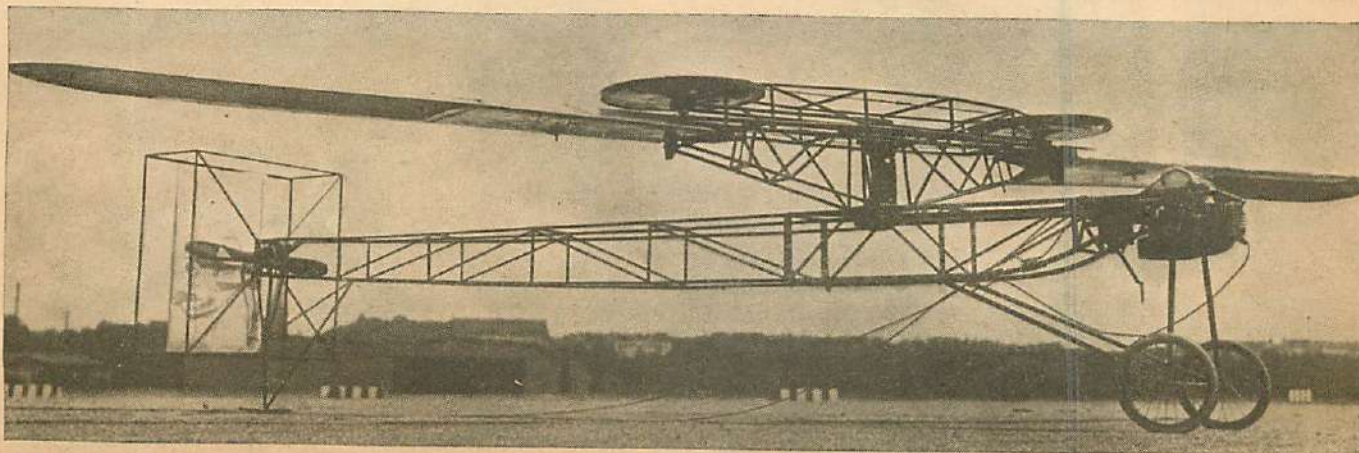
## YESTERDAY



Aviation at its beak. According to the data this contraption rose ten feet off the ground. Complete with bird's-eye view and goose pimples.



Anyone can see through this one. This beautifully finished ornithopter has a transparent fabric cover.



This "fan plane" bears a marked resemblance to a poised dragonfly, with the exception that the latter flies. This German craft combines a rotating helicopter propeller with a small pusher prop. The pilot might have had a nice ride if there'd been a place to sit.





## THE FORGOTTEN ADVENTURER

**G**REETINGS, Air Adventurers! Well, here another month has passed and aviation continues to advance and prosper. New speed records are being chalked up here and there. American Clipper planes are spanning the Atlantic and Pacific on scheduled runs, aviation firms are choked with back-logs of orders, new equipment is being delivered to our air services and the effort to train twenty thousand pilots continues.

Everyone is marching forward. Factories buzz day and night and a frantic effort is being planned to train thousands of skilled workers for the benches and assembly lines. Light-plane groups are arranging more mass flights, and glider pilots are adding gloriously to their laurels.

But what about us Air Adventurers? Where do we come in? What is being done about us and our kind?

For years now we have been working hard spreading the gospel of aviation. We have taken part in rallies, we have entered our model planes in the competitions, we have turned out and attended the air races and all forms of aviation gatherings. Many of us have taken up flight training, some are in the army and navy. Many more are preparing themselves, through selective courses at school, to enter the services later.

But what is being done for us? Our manufacturers

are receiving government encouragement and backing. Our schools are being filled with C. A. A. appointees. The army and navy are getting plenty of new equipment, and those in aviation professionally are receiving boosts in pay and position.

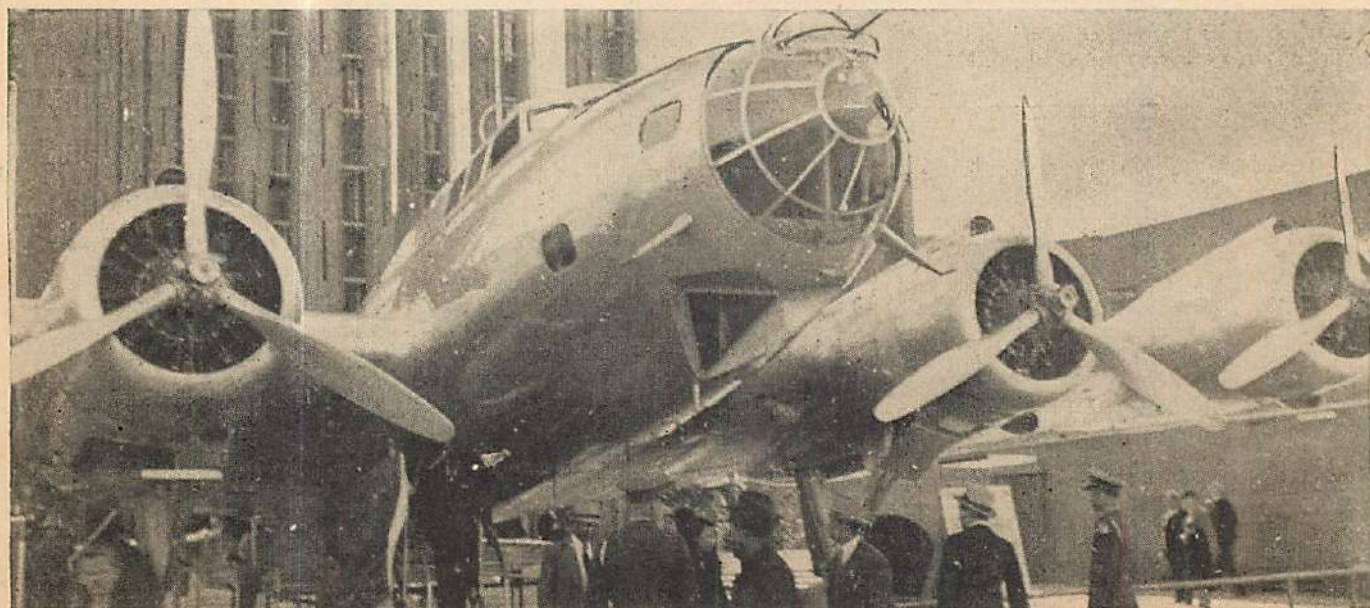
But what about our Air Adventurers?

Throughout the rest of the world, air enthusiasts within the classification of Air Adventurers are getting the same government support and encouragement that other groups are enjoying. They are getting official training and are allowed to take up in their spare time the study of official types and modern engines, and to witness modern aeronautical practice.

You may say: "Yes, all that is all right for the dictator nations, but we here in the United States do not subscribe to that form of youth movement. We are democratic and do not wish to be herded into mass groups."

Right! We do not want any form of youth movement of that sort, but let us take a look at the British air defense cadet corps, where boys between the ages of fifteen and eighteen are carefully trained in the preliminary courses which eventually lead into civil aviation or the ranks of the royal air force. Great Britain is the most democratic nation in the world, but they have seen the writing on the wall, and with the aid of their aëro-

This is the way the army sells the public on Flying Fortresses. Out at Treasure Island, where San Francisco's Exposition is holding forth, Air Adventurer Bob Fee, of Berkeley, California, snapped this Boeing. Note man coming down out of opened bomb bay door.





nautical publications they have managed to formulate a plan to encourage these youngsters and develop them to spread the gospel of true airmindedness, for a very small sum of money.

The air defense cadet corps was started in September, 1938, and since then one hundred squadrons have been raised. It is being backed by the Air League of the British Empire which has undertaken to train twenty thousand youngsters. So far they have more than ten thousand enrolled.

This is how the plan works.

First off, ex-R. A. F. officers are banded together in each town. Then the town government is advised of the formation of a squadron and the initial costs are carried by contributions from loyal citizens and town officials. The boys themselves purchase their own uniforms, which consist of air force blue cap, tunic, belt and trousers. Rank, good conduct and efficiency insignia are also part of the scheme, and boys can pass through several grades, such as lance corporal, corporal, sergeant and sergeant major. The uniform costs about seven dollars, but it is paid for at something like six cents a week by the cadet, and in some instances where local contributions are sufficient, it comes practically free.

Once a squadron or unit has been organized and obtains suitable headquarters from the area organizers, the air ministry grants a sum of approximately eighty-seven cents per cadet for his training and instruction. An additional grant has been made to provide gliding training for about seven hundred of these boys.

Candidates are passed by a town committee. They also take a nominal physical examination and are required to attend at least two group meetings a week. The air ministry also provides instructional equipment such as an aëro engine, course and distance calculators, radio sets, diagrams and various aircraft parts. In some cases, too, local engineering firms have donated special machinery and other gear.

The training consists of two distinct parts, physical and technical. The two divisions, however, (Turn to page 57)

## Why not an Air Cadet Corps as they have in England?

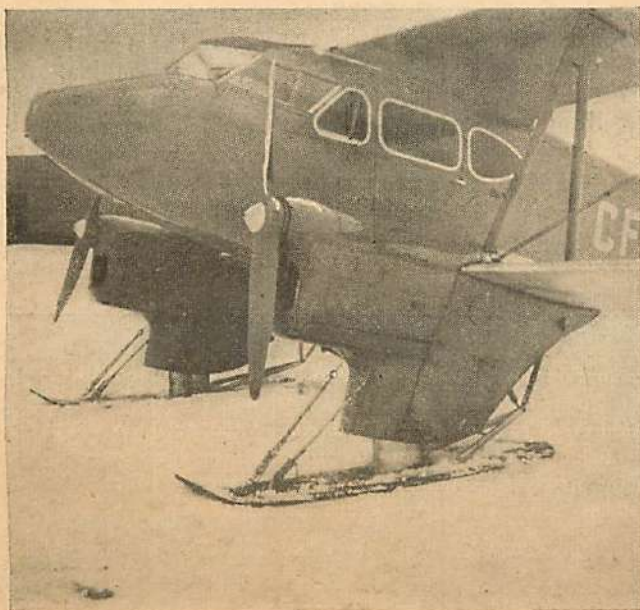


Similar to the Ryan XPT-16 recently purchased by the army for primary training is this Ryan S-T, snapped by R. R. Meyers.



Up from Puerto Rico comes this Air Adventurer's photo of a coast guard Grumman amphibian, snapped by H. C. Benny.

Br-r-r-r! A cold snap by Adventurer Pat Leslie of Vernon, B. C., Canada, of a D. H. Dragon equipped with skis for winter.



Actual size of your Air Adventurers pin.

### (MEMBERSHIP COUPON)

To the Flight Commander, Air Adventurers,  
79-89 Seventh Avenue, New York, N. Y.

I am interested in aviation and its future developments. To the best of my ability I pledge myself to support the principles and ideals of AIR ADVENTURERS and will do all in my power to further the advance of aviation.

Please enroll me as a member of AIR ADVENTURERS and send me my certificate and badge. I enclose ten cents to cover postage.

Name ..... Age .....

Address .....

☐ Check here if interested in model building.

(This coupon not to be used after Oct. 15, 1939.)



# WHAT'S YOUR QUESTION?

*Question: What is the top speed of the Douglas DC-4? J. C. C., Compton, Cal.*

**Answer:** The top speed of the Douglas DC-4 is 240 miles per hour.

*Question: Where could I obtain a section of an airway strip map like the one shown in Air Progress? P. D. J., Wilmington, Del.*

**Answer:** Airway strip maps can be obtained from the Civil Aeronautics Authority, Washington, D. C. They cost thirty-five cents each.

*Question: In the June issue of Air Trails on page 10 there is a cut of a small two-place monoplane. Could you give me information as to make, motor, et cetera, and if plans are available for it? L. L. L., Ontario, Ore.*

**Answer:** There are two pictures of small two-place monoplanes on page 10 of the June issue. One is a low-wing monoplane built especially for two Australian boys and the other is a conventional Piper Cub powered by a Continental forty horsepower engine. Plans for either of the ships are not available. If you want plans for a small home-built ship write to Heath Airplane Co., Benton Harbor, Mich.

*Question: If I wanted to become a limited commercial pilot, what kind of education would I need? What are the necessary requirements for obtaining an L. C. license? Also, what kind of flying can one do with this type of license? B. B., Brooklyn, N. Y.*

**Answer:** The only educational requirement for a limited commercial pilot is that he be able to write and read English. Aeronautical experience for this license is: minimum of sixty hours solo time, five hours of which have to be logged in the previous sixty days; five

hours of cross-country flying, three of which must be solo. A written examination is given on air-traffic regulations, meteorology, air navigation, theory and practice of flight, and maintenance of aircraft. A person holding a limited commercial license can carry passengers for hire not beyond the geographical limits specified on his license, and cannot conduct instruction unless he holds an instructor's certificate.

*Question: Can you tell me if an army private can get a post as an aircraft gunner? R. S., Philadelphia, Pa.*

**Answer:** He has to ask for a transfer to the air corps and get his gunnery training there.

*Question: How long is the flight training in the army and navy? O. L., Philadelphia, Pa.*

**Answer:** The flight training in these branches lasts one year.

*Question: Would you please tell me the name of the book or books on elementary mechanics, and where procured? B. H., Dillon, Col.*

**Answer:** "Aeronautics Simplified," by Lieut. Ernest G. Vetter, published by Foster & Stewart, 77 Swan St., Buffalo, N. Y.

*Question: I am in the eleventh grade and expect to finish high school next year, after which I need two years of college to get into the army air corps. Which university or college or military academy would be the best to attend? I would also like to know if the Ryan ST is for sale to the public? What are its specifications and speed, and has it good maneuverability and dual control? R. E. R., Alberta, Can.*

**Answer:** Inasmuch as the air corps requires only academic education from

prospective cadets, any good college or university would qualify you for application. The Ryan ST is available to anybody who has money to pay for it. It's very maneuverable, has a top speed of 150 miles per hour, a span of 29 feet, 11 inches, and overall length of 21 feet, 5 <sup>3</sup>/<sub>8</sub> inches. It has a 150 horsepower Menasco engine and is equipped with dual controls.

*Question: Will the new plastic material used in airplane construction replace sheet metal to a large extent? Will it require less help in factories? J. H., Idaho Falls, Idaho.*

**Answer:** Use of plastic material for aircraft construction is still in its infancy. It has very good possibilities, but I doubt if it will replace metal. It is hard to say how it will affect the labor problem at airplane factories.

*Question: Could you tell me where I could get or buy plans for a cheap glider? J. B., New Brighton, Pa.*

**Answer:** Write to the Stone Aircraft Co., Box 57, Detroit, Mich. They sell plans and kits for a primary glider.

*Question: I would like to know if there is a school in the U. S. navy for airplane and engine mechanics like the army school at Rantoul? Does an aeronautical engineer have a good chance of getting a job, and is the pay good? M. B., Cleveland, O.*

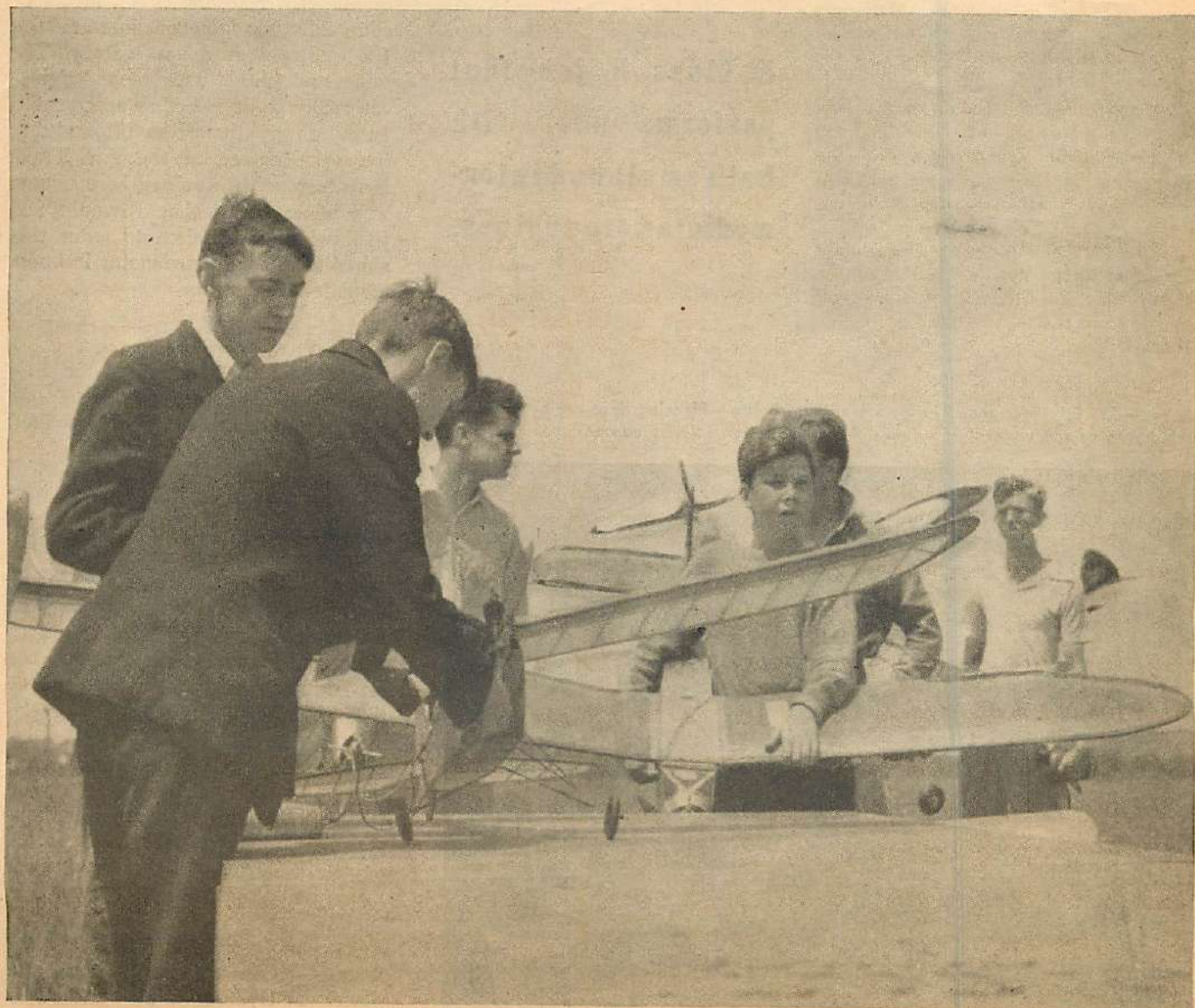
**Answer:** The navy has a mechanics' training school at Pensacola, Fla. An aeronautical engineer has an excellent chance of getting a job, especially now when aircraft factories are busy with a great number of orders. The pay varies depending on his specialty and the size of the concern he works for, but usually it is pretty good.

This department will attempt to answer any questions concerning aviation. Those of general interest will appear on this page; others will be answered by mail. Inclose a three-cent stamp to insure a reply. ★ All inquiries regarding appointments for U. S. army air corps flight training should be addressed to the Adjutant General of the Army, Washington, D. C. Those concerning application for naval aviation training should be addressed to U. S. Navy Bureau of Navigation, Washington, D. C. ★ Persons interested in applying for air corps ground training, such as that for airplane and engine mechanics, riggers, instrument and radio men, as well as aerial photography and parachute work, should address the Commandant, Aircraft Technical School, Rantoul, Ill.

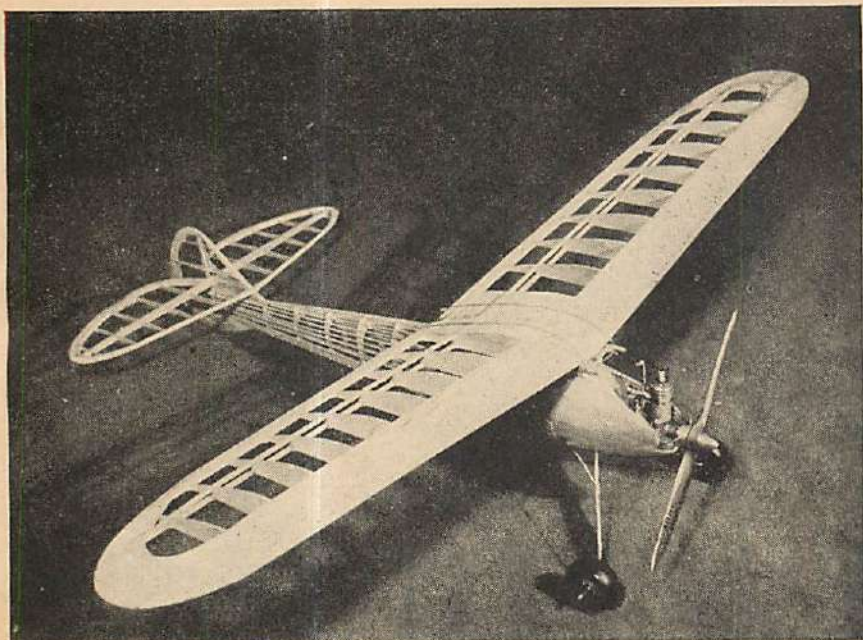


THE LATEST NEWS, PLANS AND TECHNICAL DEVELOPMENTS IN BUILDING AND FLYING MODEL AIRPLANES.

# AIR TRAILS **m**odel building SECTION





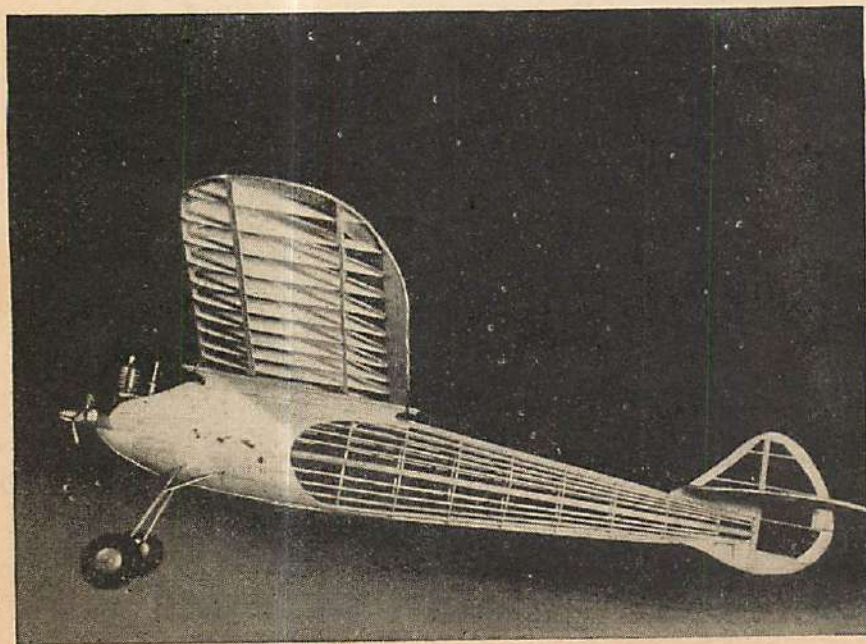


A baby streamliner, rugged and efficient. For this type of model the construction is not complicated. Looks somewhat like a Cavalier, Shereshaw's most famous design.



**A Class B job that performs well with both small and intermediate bore engines.**

Above—The Privateer comes in for a landing. Below—Pleasing lines are apparent in this photo of the uncovered frame. All construction follows conventional practice.



# THE PRIVATEER

By BEN SHERESHAU

**T**HE advent of the new ruling limiting small-bore motors to models of 225 square inches has created a problem among modelers possessing motors under .2 cubic inches.

The Air Trails Privateer, although its wing area is slightly over 300 square inches, by far makes up for the increase in efficiency gained by the added span chord and a proportionately lighter wing loading. Thus it can easily be seen that models of this type and size may be flown efficiently with motors of .2 cubic inches or under. The model is also very adaptable for intermediate motors (.2 to .3 cubic inches inclusive). The glide and climb with these engines can really be described as spectacular. In my observations I have found that the performance of the Air Trails Privateer with a small-bore motor was so excellent that I would feel justified and confident to enter this ship with a small-bore motor in intermediate-class events.

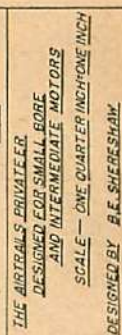
## FUSELAGE

We start construction of the Privateer with the construction of our fuselage bulkheads. The laminated sheets are cemented together first and allowed to dry thoroughly before any of the cutting is attempted. The bulkheads should be cut and sanded smooth to the exact contours as illustrated. Our next step is the cutting of the notches for main stringers or longerons, of which there are four. Both side longerons are then marked off simultaneously at points where they connect with bulkheads.

The side longerons are then inserted into the bulkhead notches together, and are securely cemented in place. Be sure that both longerons possess similar contours. After the check, the lower and upper longerons can next be inserted and cemented in place.

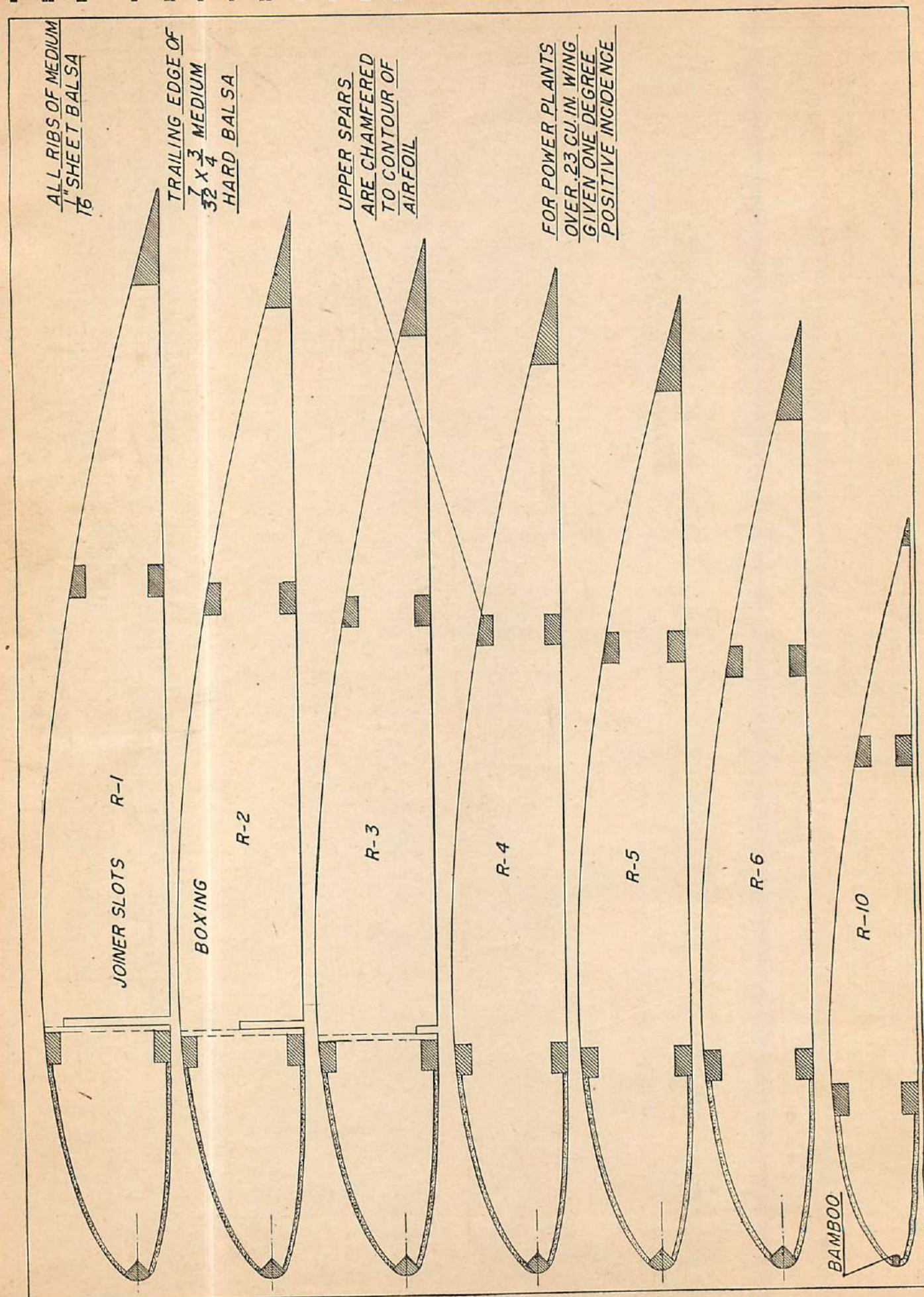
The motor bearers and landing-gear supports are then slipped into place, and several (Turn to page 73)







# THE PRIVATEER





RIBS & BULKHEADS FULL SIZE

B-1-2-3 ARE LAMINATED OF 2 PCS. OF  $\frac{1}{16}$ " SHEET BALSA WITH GRAIN AT RIGHT ANGLES

ALL OTHER BULKHEADS OF OVERSIZED  $\frac{1}{16}$ " SHEET

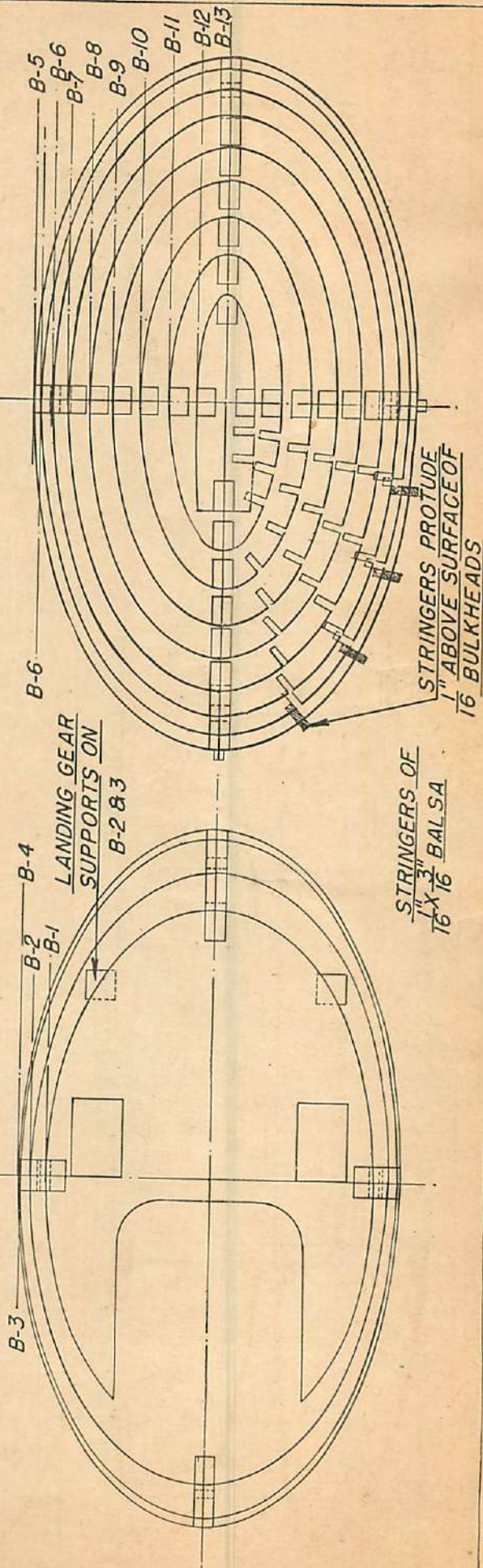
R-7

R-8

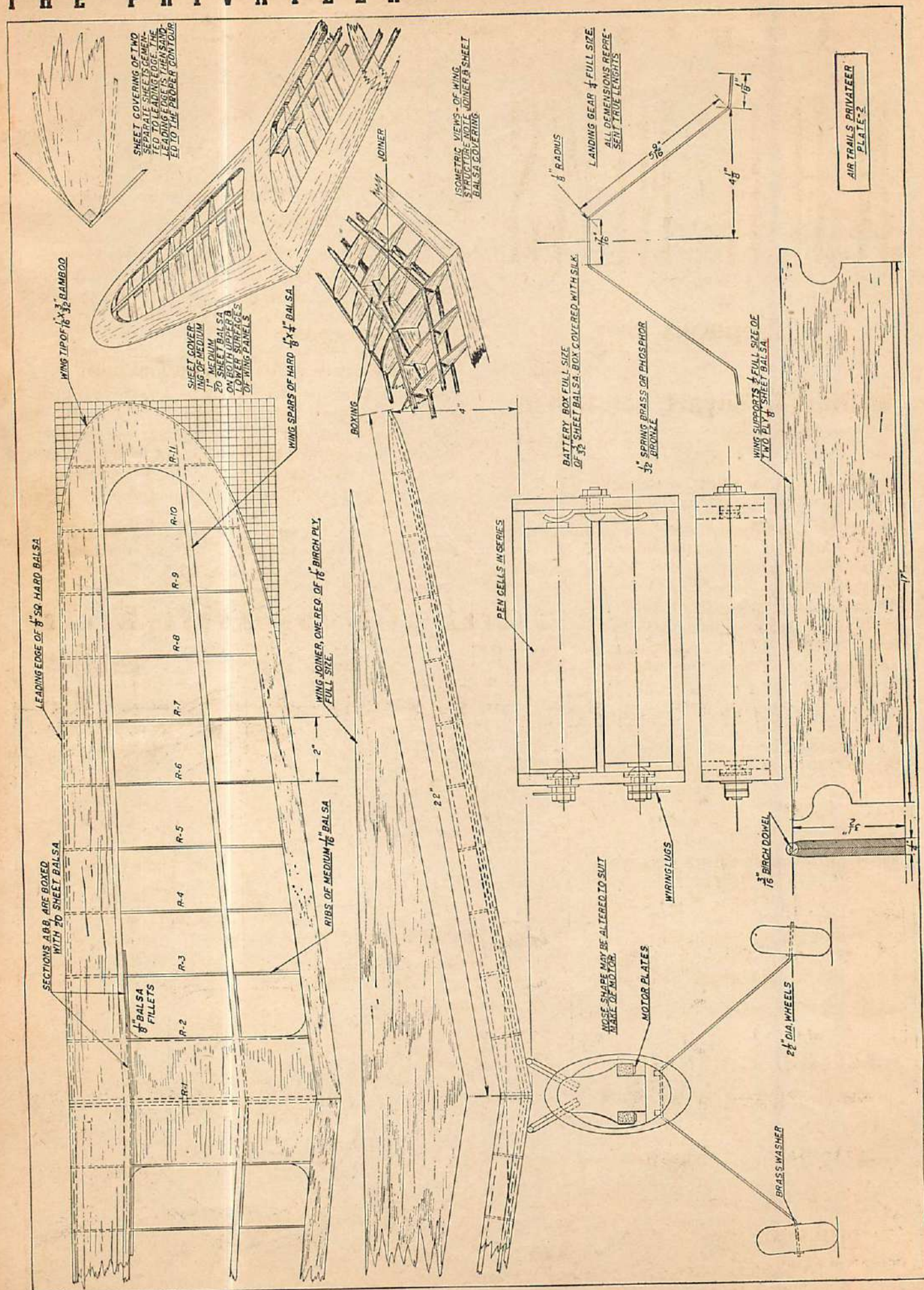
R-9

R-11

REAR SPARS TAPERED TO  $\frac{1}{16}$ " X  $\frac{1}{4}$ " AT R-11









# junior N.A.A. NEWS

Prepared by

**William R. Enyart, Sec. N.A.A.**

## N. A. A. MODEL MEMBERSHIP

**T**HE N. A. A. model division has ready for distribution a printed announcement setting forth the various kinds of membership available to individuals and clubs interested in furthering model aviation advancement in the United States.

This form briefly presents the benefits of such membership and explains the various membership fees. The entire announcement is designed to enable you to find the information you want in a moment.

Clubs and builders are cordially invited to write for this helpful explanatory bulletin. Please include a three-cent stamp with your request. Address N. A. A. Model Division, National Aeronautic Association, Dupont Circle, Washington, D. C.

## THREE-FLIGHT-AVERAGE RULING GETS WARM RESPONSE

The N. A. A. academy of model aeronautics' new ruling, which calls for a "three-flight-average" compilation of duration times for meet and record purposes, has met with widespread approval even in

the indoor field, where some felt that it was not quite so well adapted. However, the number of enthusiastic messages warmly approving the move show beyond doubt that the academy was representing nation-wide sentiment when it made the decision.

In conjunction with the ruling, the A. M. A. states:

"In the glider events where nine flights are permitted with no delayed flights allowed, the three highest officially recorded 'times' would be totaled, and divided by three to obtain the 'three-flight-average' duration for contest and record application purposes.

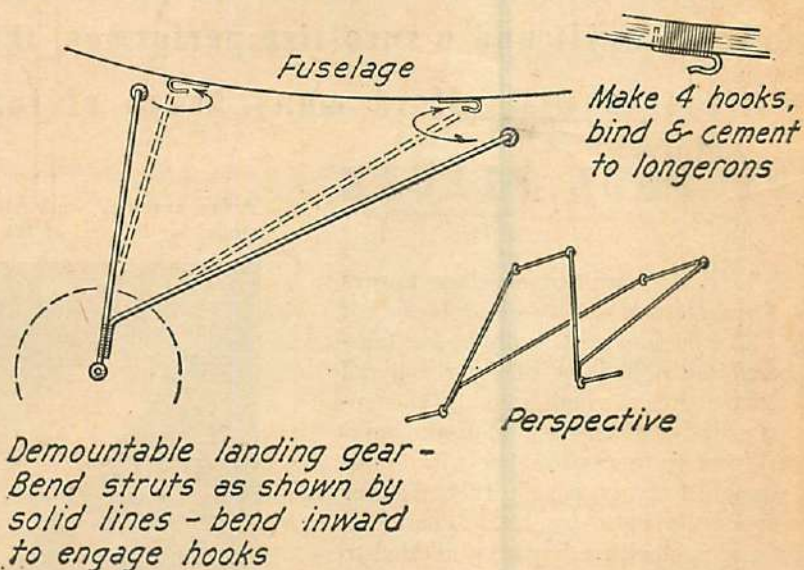
"In the standard categories, where three flights are permitted with the 'three-delays-constitute-an-official-flight' ruling in effect, in the event a delayed flight exceeds the time of an official flight, in totaling the three official flights, the delayed flight shall replace the official flight which it exceeded."

## MEMBERSHIP FORMS FOR AFFILIATED CLUBS

Model airplane clubs who have signed "affiliation" membership papers with the model division of the National Aeronautic Association will be interested in learning that a supply of membership forms is now available on request at Washington headquarters which will permit such club members to compete in out-of-town rubber model meets.

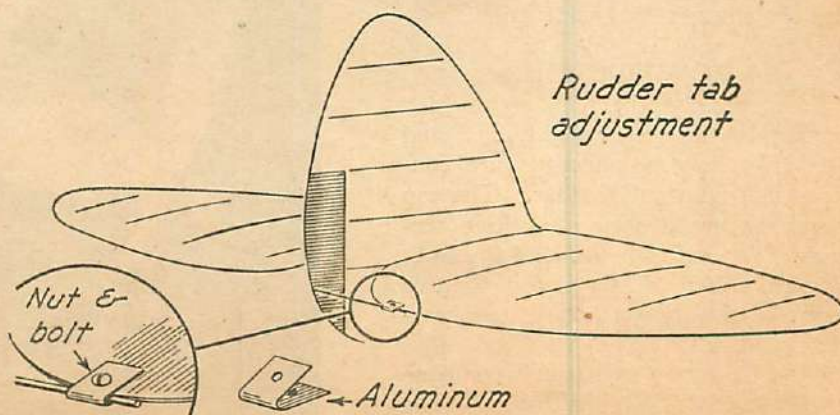
This form certifies that the person presenting it is a member in good standing of the affiliated clubs and as such is eligible to compete in all (Turn to page 59)

## USEFUL TIPS FOR MODEL MAKERS

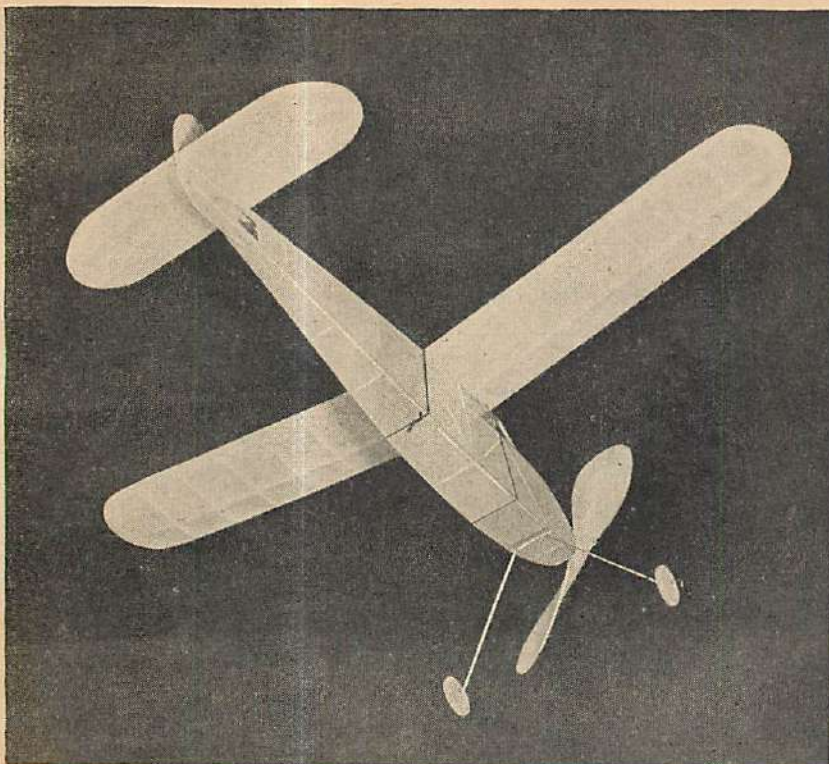


## BECOME A MEMBER OF THE N.A.A.

WRITE THE NATIONAL AERONAUTIC  
ASSOCIATION, DUPONT CIRCLE,  
WASHINGTON, D. C., FOR  
APPLICATION BLANK.







She looks like a contest ship and would perform like one if built a little larger. The fuselage plans are given full-size. Even a beginner is able to make this one.

## THE FLYABOUT

Quickly built and a sure-fire performer, this little ship will afford many hours of fun.

BY PAUL PLECAN

**T**HE first built-up fuselage always presents a variety of problems for the beginner. Usually he has mastered the difficulties of wing and tail construction through making elementary stick designs. Fashioning the built-up fuselage to a true shape with ample strength for carrying the rubber motor causes the most trouble. Therefore, considerable space has been allotted to a detailed description of the fuselage and the steps in its construction.

### CONSTRUCTION

Longerons are the main items in a fuselage structure. (##1, 2, 3 and 4). The bottom longerons are continuous from front to rear. The top longerons are broken into three sections. Top and side views of the fuselage are shown full-size. Join the two pages of drawings to make the complete picture.

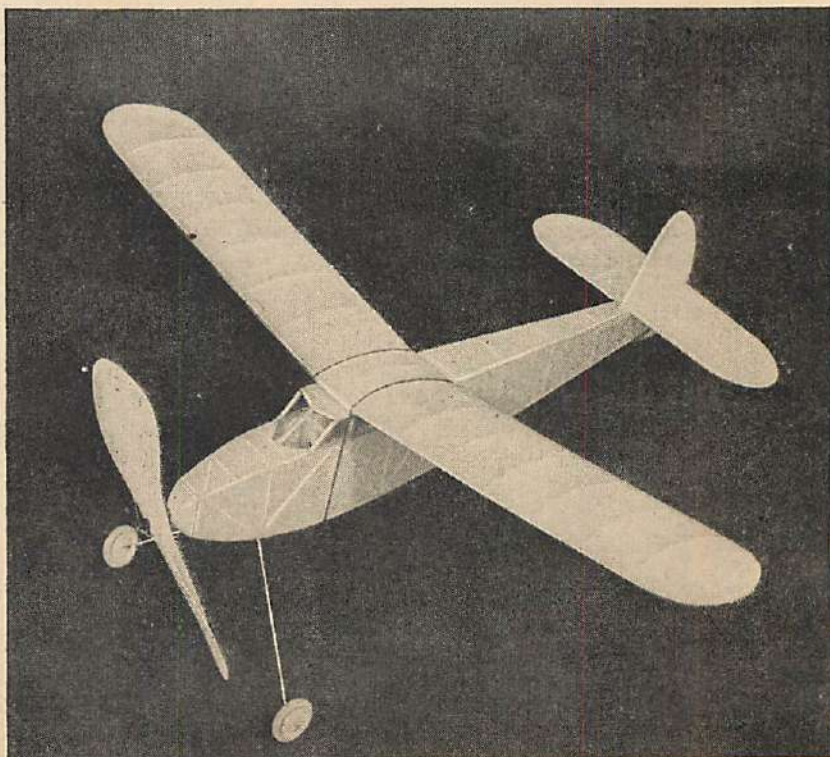
First build two side panels complete with upright and diagonal bracing. The

balsa should be pinned directly to the drawing. The two panels can be built at the same time—one atop the other—to insure identical shape and therefore a true fuselage. The balsa can be bent to the required shape without moistening or steaming. Use pins to hold in shape while the cement is drying. Do not insert pins through the balsa but along either edge. Joints between the longerons and the braces should be carefully made. Note that a double brace is used at the front of the fuselage (the nosing bears against the fuselage at this point).

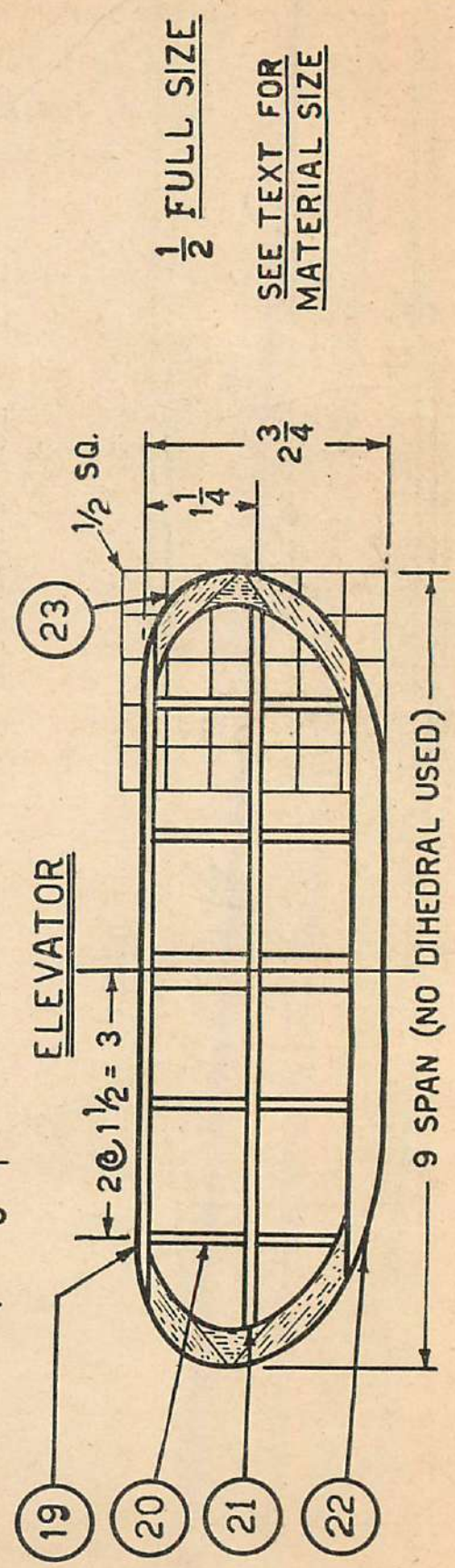
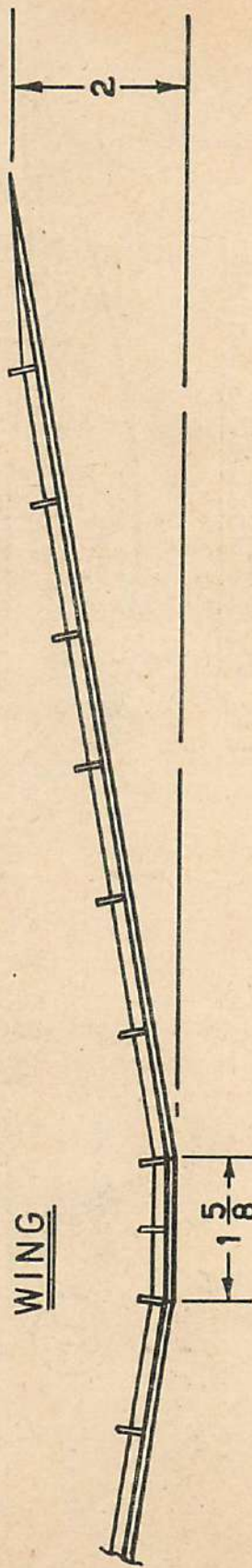
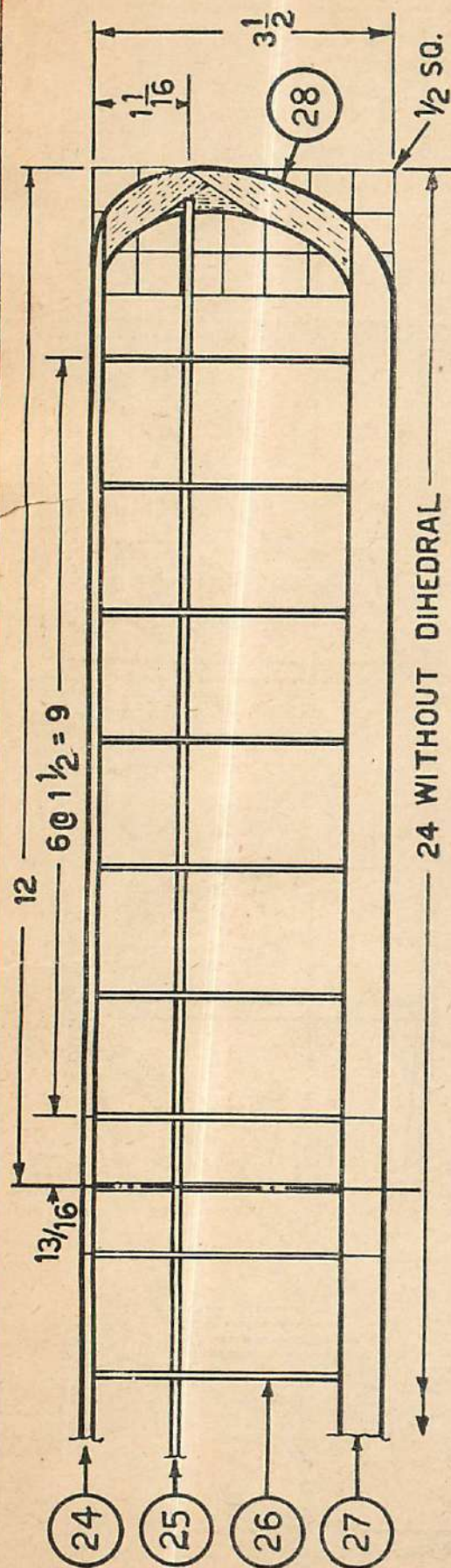
Allow ample time for the cement to dry, before lifting the two halves off the drawing. The best precaution would be letting them dry overnight. At joints the cement has undoubtedly spread over the two panels, joining them together. Separate them by inserting a thin razor blade.

The top longerons aft of the cabin window are flat to maintain correct incidence for the wing regardless of its position on the fuselage. But this flat top has more immediate benefits—serving as a convenient working basis for joining the two side panels. Rest the two panels upside down on a flat board. Square up the sides with a triangle or square. Cement the cross braces in place. Wherever it is necessary to bend the side panels, insert a small straight pin (*Turn to page 60*)

A few evenings' work will be well repaid. You'll have a consistent and staunch model for the rest of the flying season. And don't be careless how you fly her.

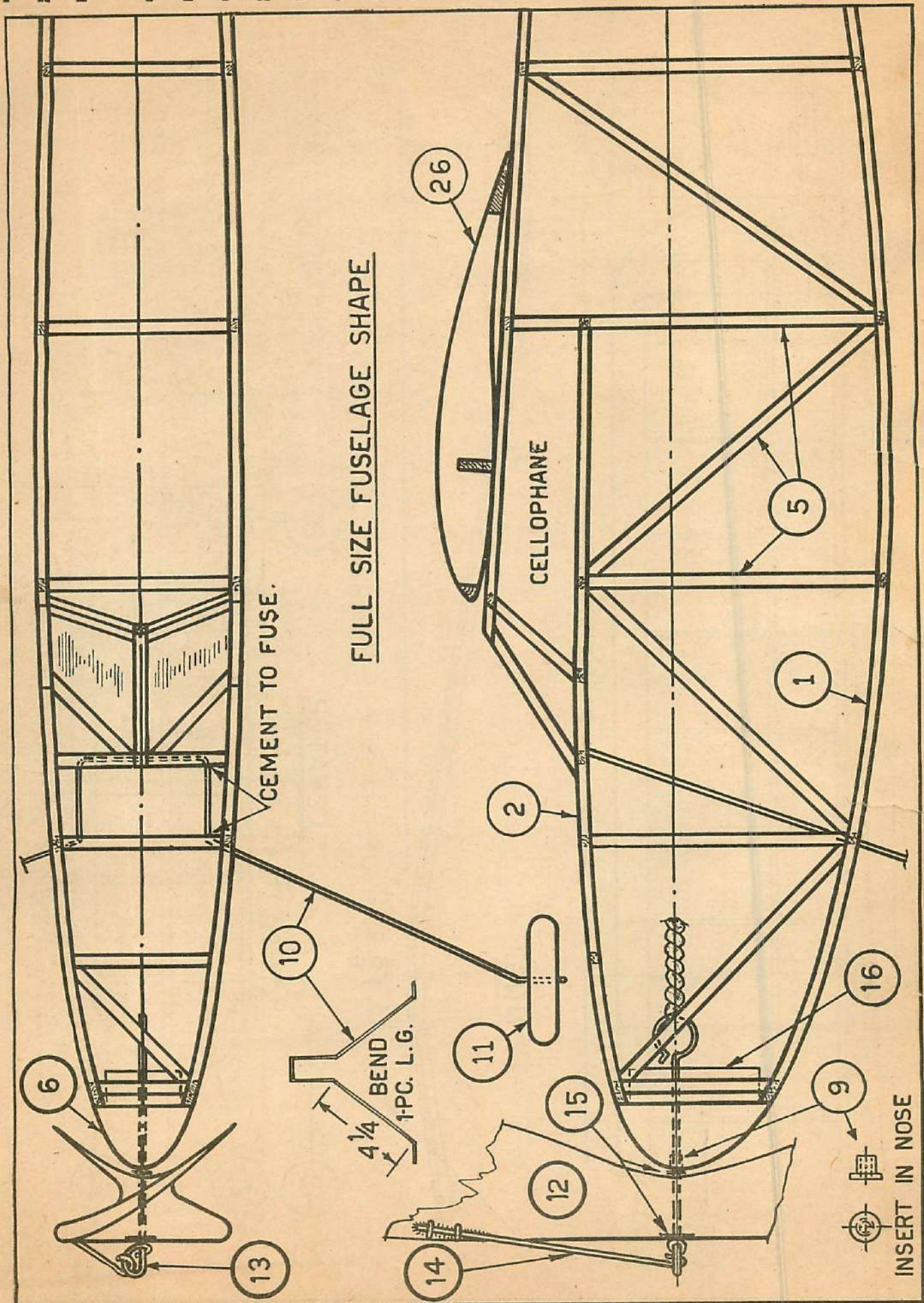




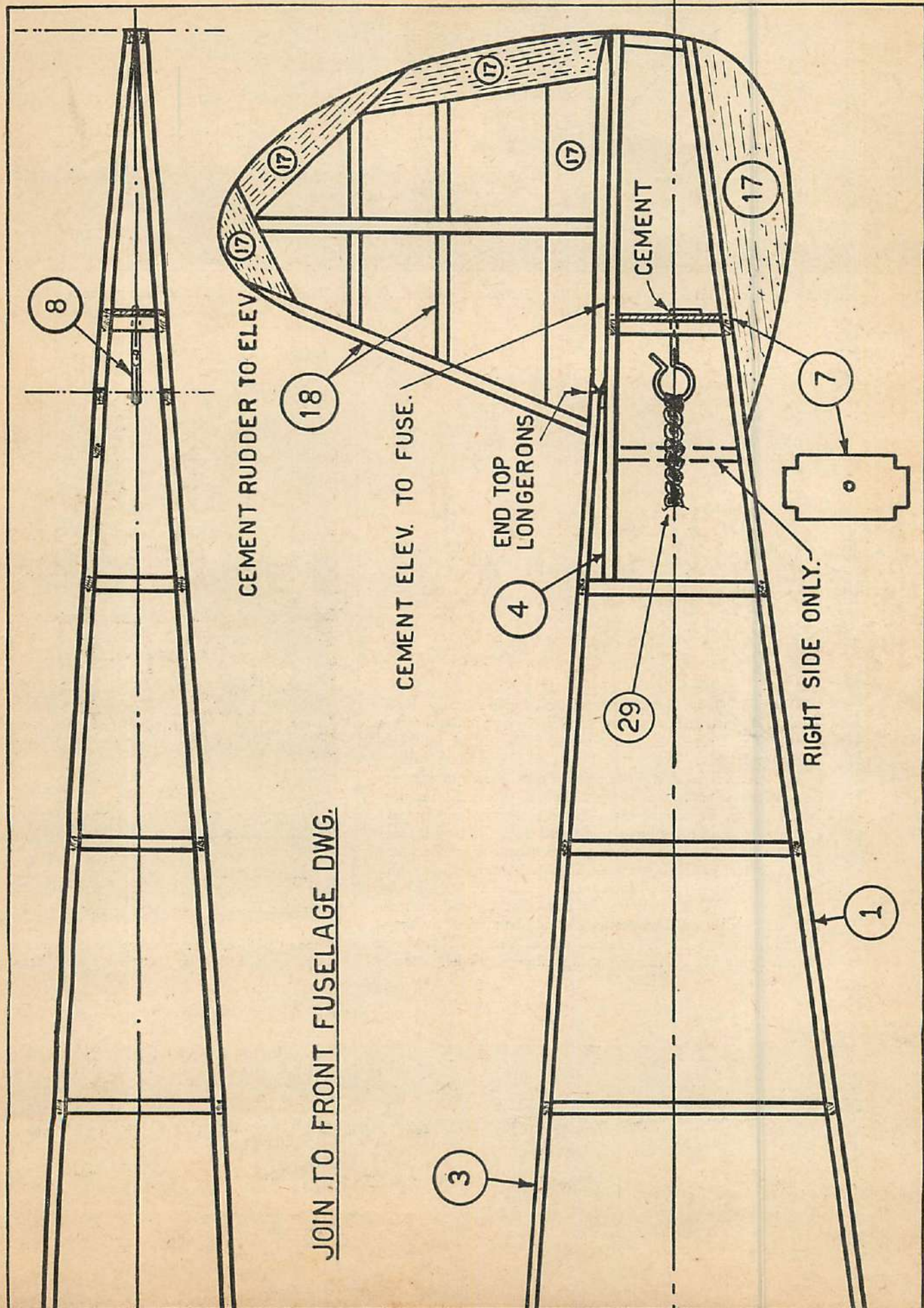


$\frac{1}{2}$  FULL SIZE  
SEE TEXT FOR  
MATERIAL SIZE













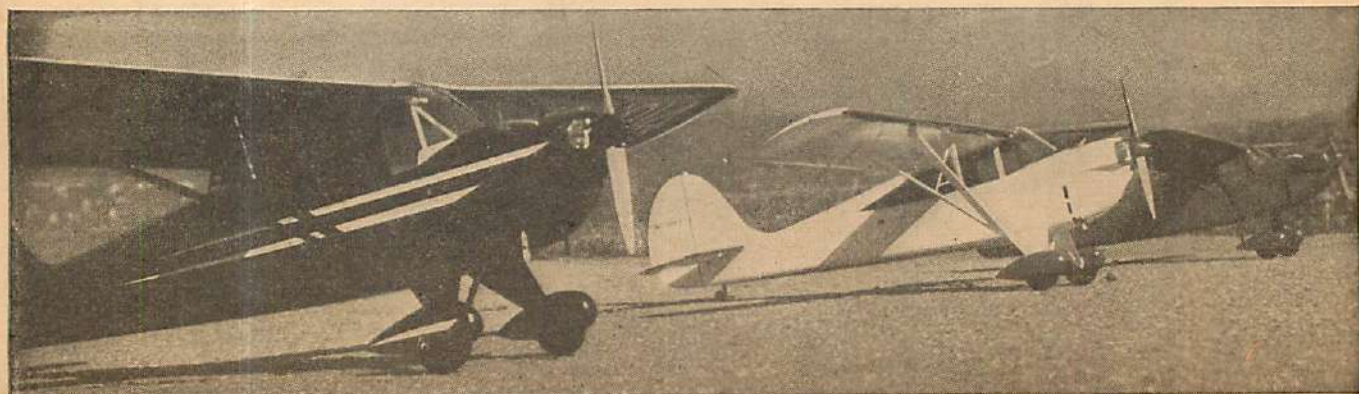
A really detailed flying scale model of an army Flying Fortress, built by K. A. Pouch, New Brighton, N. Y. Rubber power is utilized.

# model matters

**HERE'S THE DOPE:** Bob Sommers of St. Louis recently soloed—following instruction at Lambert Field. Bob is the director of the Stix, Baer, and Fuller model club. Most modelers sooner or later try getting both feet off the ground. We're trying it ourselves, but have several more hours of instruction before solo. . . . Mary Elizabeth Thornhill recently joined the S. B. and F. club—another recruit for the fast-growing group of feminine modelers. . . . Mary Louise Thomas, of Little Rock, Arkansas, recently took second place at the contest of the Razorback Gas Model Association. She missed first place (which included a free trip to Detroit) by one second. What shall we do with that too-gallant man who insists all women contestants should be allowed a thirty-second handicap! . . . J. L. Sadler, Sr., won the Razorback contest flying (of all things!) a *low-wing* gas model. Please,



William Hall, of Australia, and his 90-minute Korda model built from plans in Feb., '38, issue.



These are not real Aeroncas. It's just a line-up of scale models especially built for Aeronca by Klosterman. Looks realistic, eh?

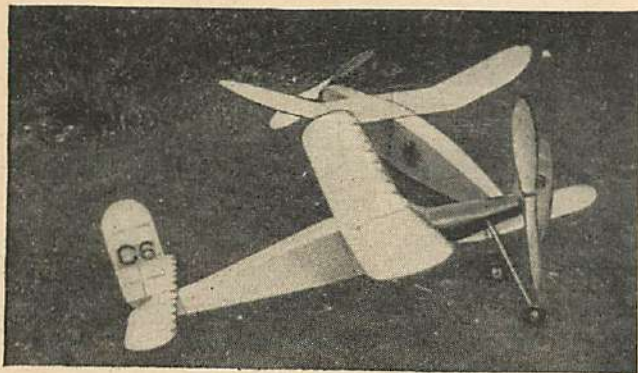


Mr. Sadler, for the sake of the "experts," don't do that again. Think of all the high-flown theories of model aerodynamics that will have to be revised! (Mr. Sadler was coauthor of "Low-down on Low Wings" in the August issue.)

A headline for an article in the Philadelphia *Inquirer* describes a model that won a Philadelphia contest as being a "super" model. What, no colossal? . . . Recently we heard a sad story about an ardent modeler who hangs his models on a wire stretched across his bedroom. He was awakened one night by a sharp bump on his head. The wire supporting the models had broken, and his gas job had dropped right smack on his cranium. . . . Another sad tale is about a modeler who gave up his girl friend so he could concentrate on building models for the national meet. Is there any greater sacrifice that a modeler can make? Another modeler solved this problem by getting married and enlisting his

setback. Five hundred subscribers are necessary before the plan is feasible. . . . How about some insurance to guarantee that our new models will fly properly? Will the insurance agents please send us their terms before we launch our new Baby R. O. G.? We don't want to take any unnecessary risk.

Jim Cahill passes out a good hearty phooey to the designers who insist on using only *one* wheel in their designs. He suggests they carefully read the definition of R. O. G. in the digest of the N. A. A. rules governing models. In this particular paragraph the rules read: "Wheels must turn freely when taxiing." Jim doesn't think very much of take-off carriages, either. He thinks the two wheels should be an integral part of the model to qualify under the landing and taxiing tests required by the rules. . . . Elbert Weathers, do you agree with Cahill? (Heh-heh.) (Note: Weathers



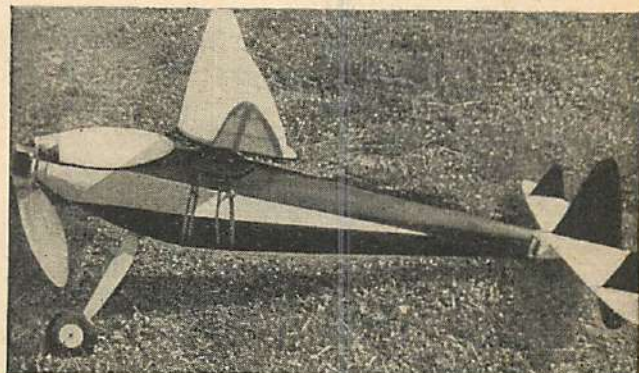
Another Korda job and Gordon Light's Wakefield winner, both from plans in Air Trails. Picture from Peter Chinn, England.



A Wriston Diamond, built by David Alexander, Aiken, S. C., from plans in the October, 1937, Air Trails. Good contest flier.



Maxwell Bassett's record gas job duplicated by Grant Lumley, St. Thomas, Ont., from plans in the March, 1938, issue.



A unique Wakefield design by Harry Evans, Laurel, Md. Ship has three fins, single landing wheel, and a folding prop.

wife's aid in preparing contest models. The last we heard she was sanding the fuselage of his contest job. . . . At a recent gas-model contest we watched a modeler's wife enthusiastically retrieve the ship after each flight—a brisk wind and good flights made this no mean job. The gentleman is to be congratulated on having overcome a difficulty that always troubled us—how to retrieve a model with as little work as possible.

Jon C. Fox writes that the San Francisco Gas Model Club is considering a group-insurance plan for models that fly out of sight and never are recovered. No details are available as yet. Fox is particularly interested in this plan—at a recent club contest he lost his gas model. Club insurance sounds like a good way to protect contestants against financial losses when a model sails away into the wide open spaces. . . . N. A. A. insurance scheme of \$1,000 liability coverage for a dollar seems to be gaining headway after a temporary

designed the Mystery Man, recently presented in our model department, which uses a two-wheeled carriage for take-off, but which is not attached to the model in any way.) . . . Cahill has another peeve. He won the Wakefield Trophy last August in France. But he hasn't been able to take the trophy to his home in Indianapolis for exhibition. The model-minded citizens of Indianapolis who financed Jim's trip to France are certainly entitled to a first-hand inspection of the famous trophy. We can sympathize with Jim. It was well worth the cost of the insurance to have the trophy on our mantel for a year. Photo and press reports may be ever so glowing—but it takes the trophy itself to really stir up enthusiasm, especially since the Wakefield is just about the most attractive trophy in existence, for models or any other sport.

Robert Stoneman exhibited a radio-control model of his own design at the recent Wisconsin State (Turn to page 79)



# A SIMPLE WORKSHOP SCALE

**Here's how to make a scale for weighing your models that costs practically nothing and is surprisingly strong and accurate. Try it!**

**S**CALES are something every model builder needs; in fact, they're almost indispensable in the construction of contest jobs. But unfortunately a scale sensitive enough to handle the featherweight parts of a model airplane is often quite expensive. Of course a great many model builders make their own, but the problem of constructing the usual type is a little too difficult for anyone who hasn't had much experience.

Presented herewith are construction details for an extremely simple but accurate scale that even a beginner can make in less than ten minutes. And the cost is practically nothing, for all you need is a toothpick, a piece of sewing thread, and a little glue. Working on the steel-yard principle, the scale uses ordinary coins for weights. The beam itself can be cut directly from the opposite page, folded and glued together, but if you don't want to spoil the opposite page, just trace the beam carefully on a sheet of stiff typewriter paper.

The beam is made with a triangular cross section because this form provides greater rigidity and also keeps the threads from rubbing against the sides of the beam, as you'll notice in the isometric drawing. To insure accuracy, it's essential that the beam be absolutely true, which means that you'll have to be careful and exact in making the folds and gluing it together. It's a good idea to trace the lines on the opposite side of the beam and crease them with a straight-edge and the dull side of a knife before making the folds. A pencil inserted inside the beam will make it easier to press the parts together when you apply the glue.

An ordinary toothpick or a similar piece of balsa wood, glued in the position illustrated, serves as a pointer to indicate when the scale is balanced. Check it carefully with a square before the glue dries to see that it's absolutely perpendicular to the beam.

The loop of thread that acts as a fulcrum passes around the beam and fits into tiny notches cut in its edges with a razor blade. Before applying the cement to hold it in place, tie a knot in the loop a little above

the pointer and adjust the beam so that the pointer is in direct alignment with the knot when viewed from the end. The thread that supports the object you're weighing also fits into small notches, but isn't glued to the beam. This thread, and the one that holds the coin, weighs something, of course, but it's such a negligible amount that it doesn't affect the reading of the scale if you don't make the threads unnecessarily long. If the beam itself doesn't balance correctly, apply tiny spots of cement inside the light end until the fault is remedied.

Since the weights given in the table on the plans are for *new* or *unworn* coins, be sure to use only those that show little or no signs of wear. Check your scales against those in your school laboratory, or ask your neighborhood druggist to help you. Once the accuracy is established, keep the same set of coins to avoid the slight errors introduced through variations in the coins' weights. A quarter or half dollar will be the most convenient ones to use when weighing completed models of the outdoor type, while one of the smaller coins, such as a dime or penny, is more satisfactory for individual parts and light indoor models. The capacity of the scale using the half-dollar weight is slightly more than eight ounces.

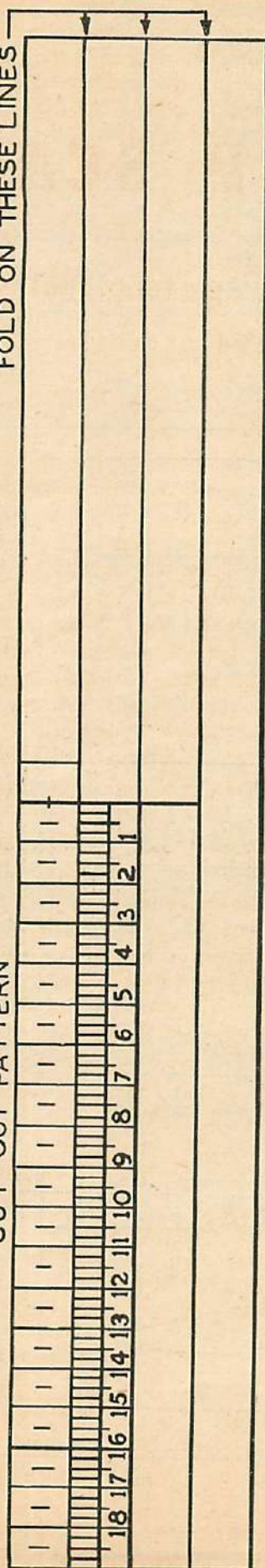
To weigh anything, simply hang it on the scale and slide the coin along the beam until it balances, then multiply the weight of the coin by the number indicated on the scale. For example, suppose you're weighing a model with a quarter for a weight, and the scale balances at 10. Since the weight of a quarter is .22 ounces, you multiply .22 by 10 and get 2.2 ounces, which is the weight of the model.

Just because the scale is made of paper, and ridiculously simple in construction, don't get the impression that it's just a flimsy and inaccurate toy. When made carefully it's amazingly strong, and results compare favorably with those obtained with commercial model-making scales.

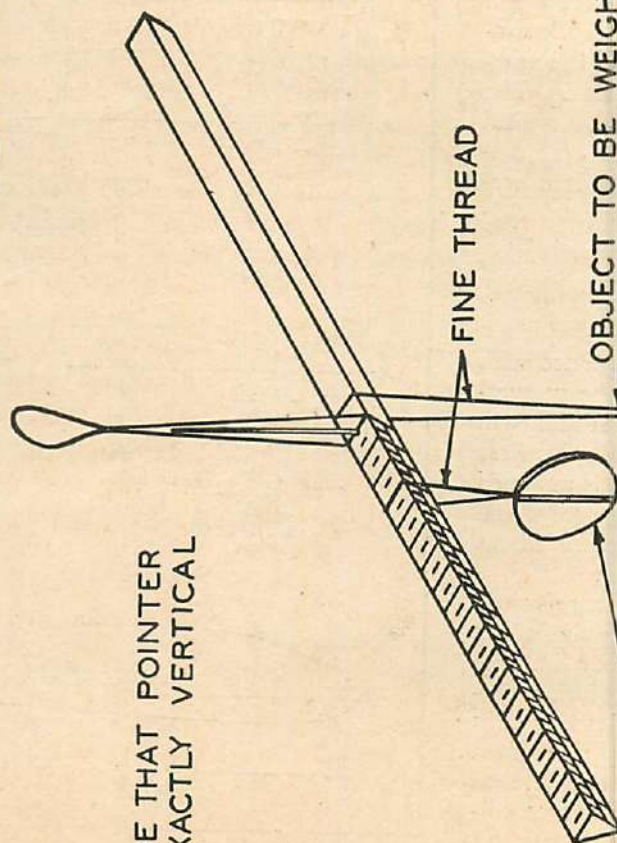
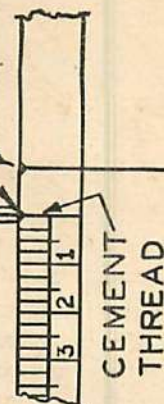


CUT OUT PATTERN

FOLD ON THESE LINES



BEAM

BE SURE THAT POINTER  
IS EXACTLY VERTICALTOOTHPICK  
POINTERCUT SMALL NOTCHES  
IN EDGES OF BEAM  
TO HOLD THREADSTABLE OF WEIGHTS

DIME	-----	.088	OZ.
PENNY	-----	.105	OZ.
NICKEL	-----	.176	"
QUARTER	-----	.220	OZ
HALF-DOLLAR	-----	.440	"



# PLOTTING AIRFOILS

By AVRUM ZIER

**A**LTHOUGH most model builders are aware of the influence the airfoil shape of a wing has on performance, many are unable accurately to plot an airfoil section for any given chord—the distance from leading edge to trailing edge.

Though at first glance the plotting of an airfoil section may seem like a complicated affair, it is a simple layout problem. All that is actually required is to be able to multiply two numbers and read a ruler. The general procedure of laying out an airfoil is the same for all sections, so knowing how to plot one section is knowing how to plot all sections. The airfoil section chosen here as a typical example is the N. A. C. A. 4415 section. This section is a modern section developed by the National Advisory Committee for Aeronautics.

The accuracy with which an airfoil section will perform depends primarily upon the accuracy with which it has been laid out in accordance with the layout data. So that the geometrical shape for any given section will be proportionally the same regardless of chord length, the chord is assumed as equal to one hundred percent and all other dimensions measured as fractional percents thereof.

Assuming the chord as a reference line, then to locate any point along the upper and lower contour lines, all that's necessary is to be given a certain distance in from the leading edge and a certain distance up and down with respect to the chord, or reference line. Thus for any section three columns of figures would establish all the necessary points to outline the upper and lower camber lines. In the accompanying figure the three columns of figures would establish all the necessary points to outline the upper and lower camber lines. In the accompanying figure the three columns of figures would establish all the necessary points to outline the upper and lower camber lines.

The first column is referred to as

the "station." It establishes a series of vertical lines along the chord at a fractional percentage of the chord length away from the leading edge. The locations of the stations along the chord are proportionally the same for every section. They range, as can be observed from the first column, from 1.25%, 2.5%, 5%, 7.5%, 10%, 15%, et cetera, of the chord length. After 30%, the intervals are in 10%, except for the 95% station. Because the leading edge of an airfoil is of greater curvature than any other portion of the section, the use of several stations at the leading edge is essential to achieving an accurate leading-edge contour.

The second and third columns establish the point along the upper and lower contour lines with (Turn to page 80)

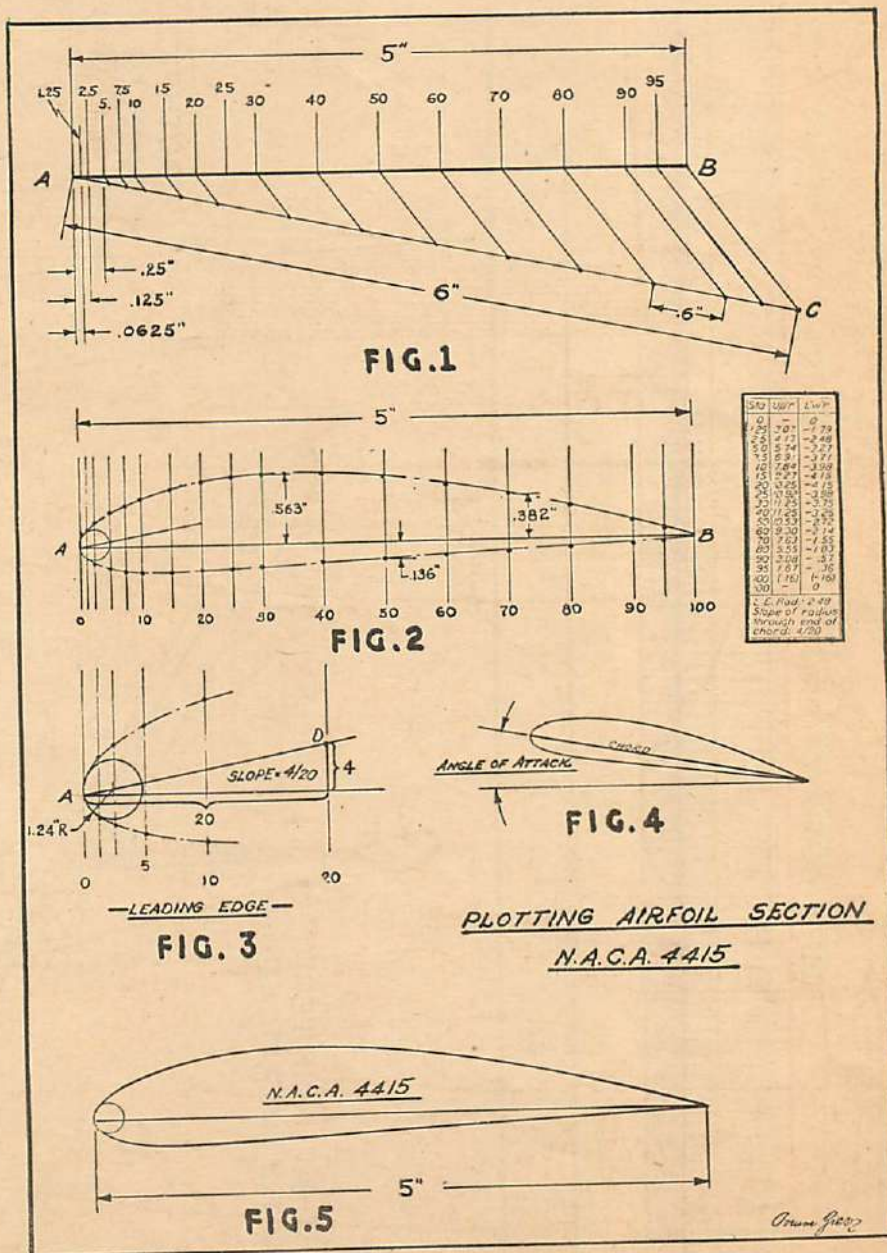
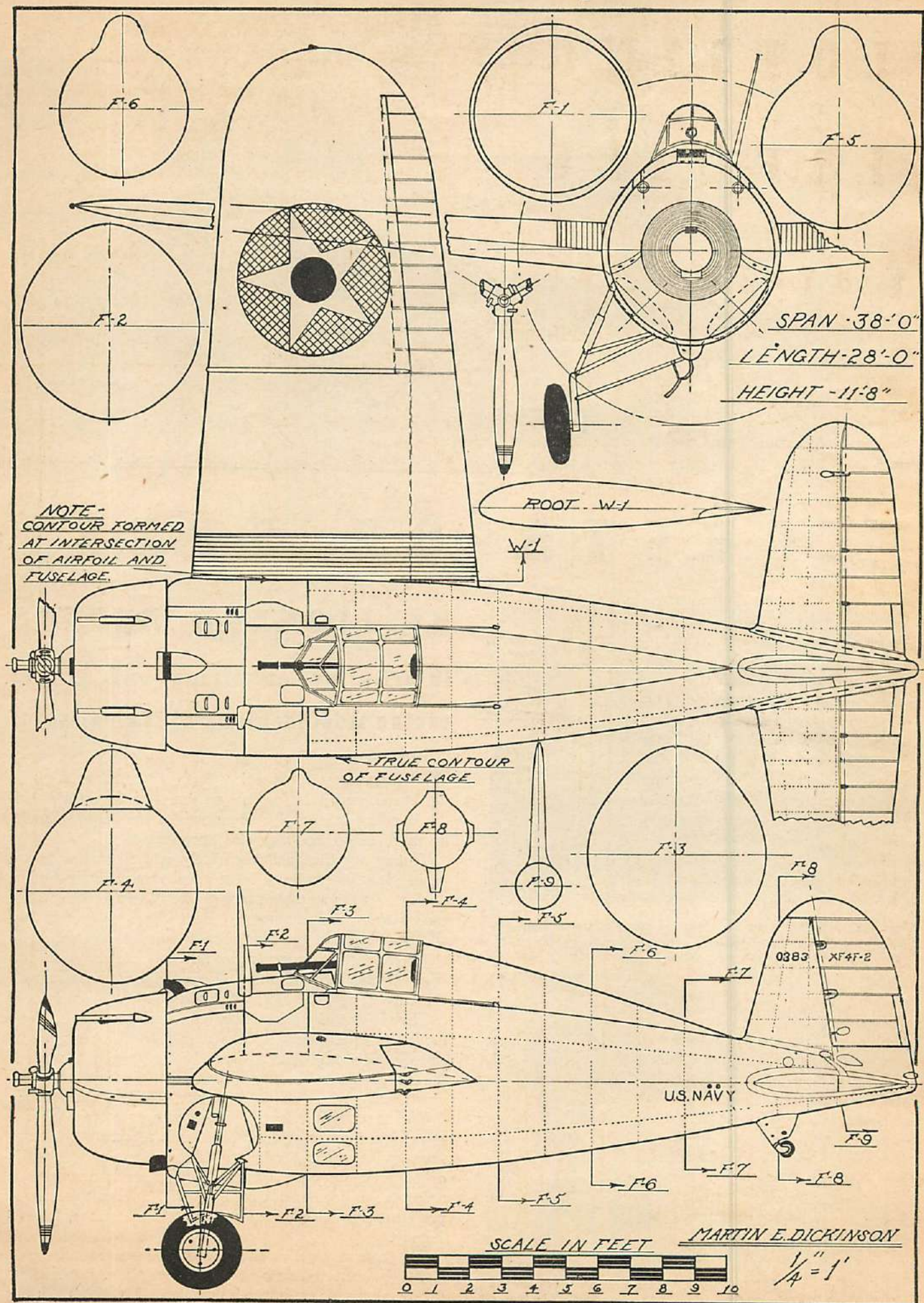


Figure 1—Method used by model builders for subdividing the chord line when the chord is an odd measurement. Figure 2—From the ordinates given, the outline of the airfoil is determined. Figure 3—How leading-edge shape is determined (see text). Figure 4—Angle of attack measured between chord line (line through trailing edge and extreme leading edge). The N. A. A. 4415 example used. N. A. C. A. compiled much data.

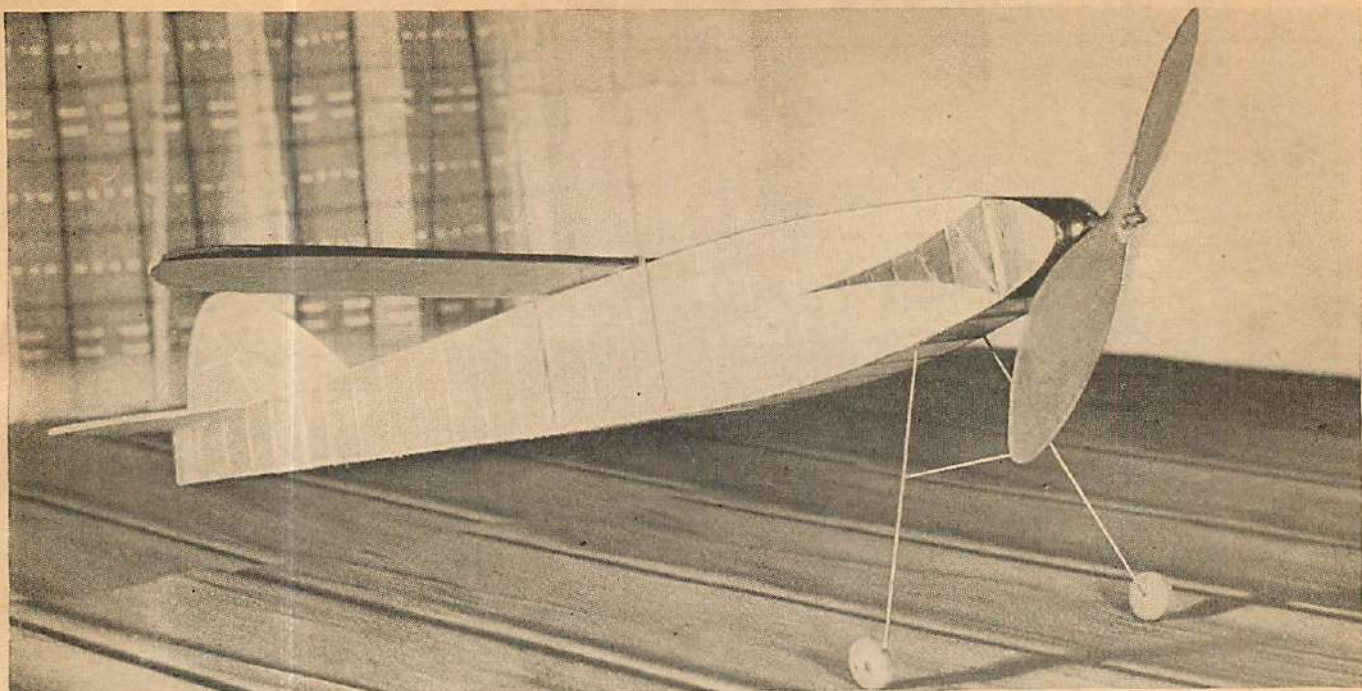


# THE GRUMMAN XF4F-2 MIDWING By Martin E. Dickinson



Editor's Note—The XF4F-2 was modified after test flights. Changes included more squarish wing tips and extremely large spinner.



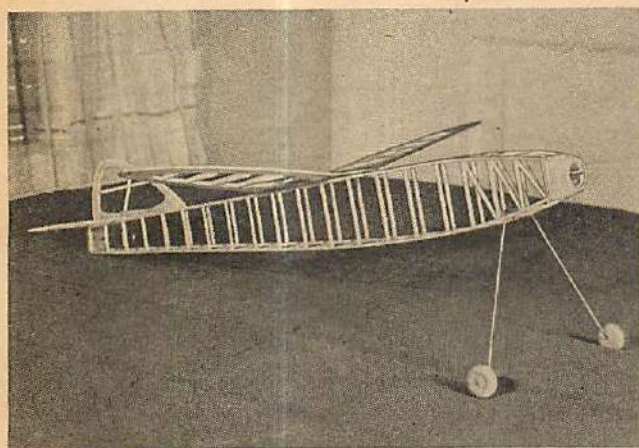


This is what a speed model looks like. Ships similar to one shown in this photograph have flown as fast as 75 m.p.h. Span is 18".

# SECRETS OF SPEED

By **LEONARD BECKER**

Information on flying and timing racing models; plans of typical ship.



The most amazing thing about speed models is that they are unusually simple to construct. Notice simplicity in photo.



The speed event is quite popular. Here are but a few of the trophies awarded at the Junior Aviators National Air Races.

**T**HE greatest asset of modern air transportation is speed, and it is for this reason that the field is expanding so rapidly; therefore I feel that we should do more experimenting with speed models.

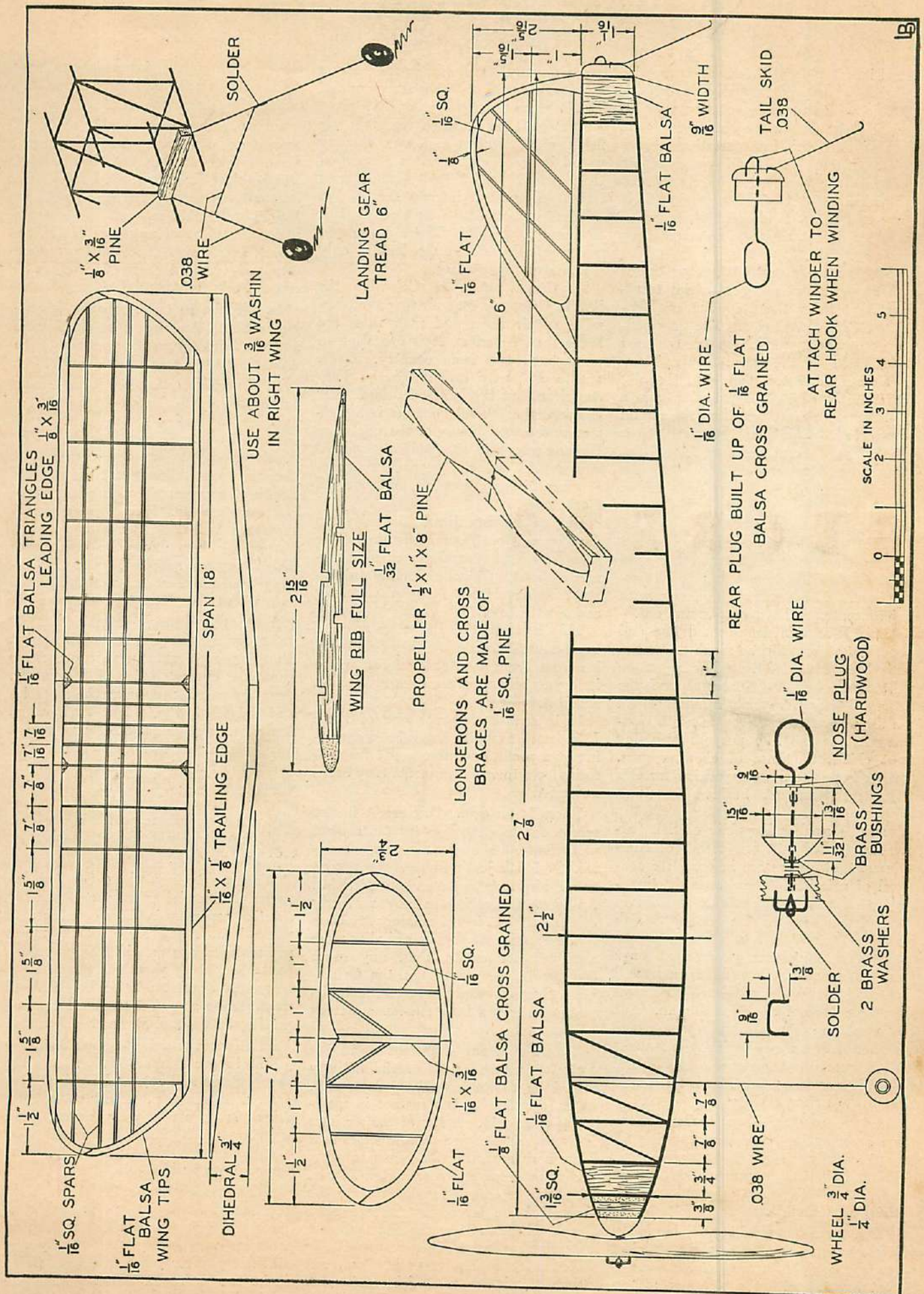
Timing speed models accurately is the greatest drawback. In Cleveland we have an electromagnetic timing device. At the starting platform we have a button which causes the electromagnet to start the stop watch and another button at the finish line to stop the watch. The electromagnet is quite powerful and responds to the slightest touch of the button. Four large dry cells furnish the current for the electromagnet.

This is not the most accurate way of timing speed models, as photoelectric cells would be absolutely accurate, but it would take a whole battery of them to cover the finish line. A stop watch with finer graduations would help, when using either method.

We have been experimenting with speed models for about seven years around Cleveland, attaining speeds of seventy-five miles per hour. These tremendous speeds of between sixty and seventy miles per hour must be accurate; I have had wings rip off, due to the terrific pressure exerted on the wing when the ship climbs too steeply.

The course used at the Junior Aviator contests was eighty-eight feet long and thirty feet wide, it being an unofficial flight when the ship swerved (Turn to page 65)







## THE WORLD'S TRANSPORT RACE

(Continued from page 14)

steel industry—and aviation—cannot be worked at a profit by any of the ordinary means of transportation now in use in that part of the country.

This is aerial transportation at its best. Lines owned and operated by Canadians, ships piloted by Americans, Canadians and Englishmen, paying their way and not a shadow of doubt as to whether or not they are commercial or military.

Perhaps the most outstanding example of the adaptability of aerial transportation is in the Republic of Honduras, Central America. The only railroads of the republic are on the east coast and serve the banana trade. There is a passable motor road from the east coast to the capital, Tegucigalpa, and a good macadamized road from the capital down to the port on the west coast. With these exceptions everything that travels or is transported throughout the entire republic must go by pack mules. That is, this was true until the advent of the air transport lines.

The El Oro mines were opened by airplane after the cost of any other form of transportation was found to be prohibitive. Three million dollars' worth of concentrates have been flown out.

This is an American-owned line and operates at a profit, so much so that it has been extended into Nicaragua on the south and to Guatemala on the north. They have built a landing field in the wilderness of Peten, in north Guatemala, for the sole purpose of flying out chicle, the base of chewing gum. There is no foreign competition for this lucrative transport business in Honduras.

In the smaller Republic of San Salvador, tucked into one corner of Honduras, the Italians are in complete control of aviation. They have the transport business, such as it is, and are in complete charge of the training of all military pilots. Of course this means that the Salvadoran government buys Italian planes and replacements, and naturally—they deny it—would be sympathetic toward anything Italian. But of most importance—at least some people see it that way—it gives the Italians dominance of an airport in Central America; and San Salvador is not so far from the Panama Canal.

As we cross the Panama Canal Zone we come again to air lines catering almost wholly to passengers and mail. What freight is carried is usually in planes owned by the companies whose freight is handled.

A prominent public official of the Republic of Colombia recently attacked the ownership of transport air lines in that country with the statement: "In case of war between the United States

and Germany, Colombia would become a German vassal state almost overnight. The Panama Canal and even the United States could be attacked from the air fields of Colombia and our country would suffer in even greater proportion than would the United States, with whom our greatest interest lies."

What were the facts that caused this alarming prediction? There are wheels within wheels; and we can look at only what is on the surface.

In the Republic of Colombia the Scadta Company controls four thousand miles of air lines, and their rates are lower than American lines operating in or through the same country. True, Scadta is partly owned by the Pan-American, but the largest stockholder is German, the general manager is a German and a great many of the pilots are German reservists who, while naturalized citizens of Colombia, thumb their noses at everything non-German and give the Nazi salute.

Rio de Janeiro, Brazil, is only two days by air from Berlin, four days closer than New York. Germans control thirty-nine airports in Brazil and maintain constant flying service between Germany and South America.

This summer the Italians started a trans-South-Atlantic air-passenger service from Rome to Buenos Aires, where it connected up with existing Italian air lines.

It is a fact that not one of these European transport companies is operating at a profit, and were it not for subsidies from their governments they could not exist.

There is no deep, dark secret in the reason for this struggle for the control of air routes and airports in South America. No! It's just business. They want to sell airplanes to the Indians of South America. Colombia, the most northerly of the southern republics, and very close to the Panama Canal, probably has more airplanes per capita than any other country in the world, but the Colombians themselves do not buy enough airplanes to keep a little one-horse factory going.

To make a flat statement as to the "why" of much of this aerial activity would be to set myself up as a seer. What appears on the surface is something else again. A few of the air lines in South America are old companies that have been operating for years, carrying passengers, mail and some freight. Most of the large cities from Panama to the Argentine are served by these regular lines. The Pan-American has the most extensive system, while the Fawcett Air Lines, with headquarters in Peru, are doing a mighty good job with passengers, mail and freight. They have

the reputation of flying anywhere, any time and being the most accommodating air line in South America.

In between, from Colombia to Chile, there are many smaller lines, the parentage of most of them cloaked in obscurity and political diplomacy. A few of them are out-and-out German, French or Italian owned, but most of them operate under the guise of nationals of the respective countries. The Italians are exerting a constantly growing influence, especially in military aviation.

In addition to the companies operating in South America, both the French and Germans fly mail across the South Atlantic by the way of Africa.

In almost every capital from Mexico south there are European agents of aviation companies, most of them subsidized by their governments. The American agents are there, too, but there is a vast difference. As a rule the European representatives are men especially trained for their jobs, some of them are high-ranking military officers, but all of them know the country to which they are assigned, speak the language and make a study of the people with whom they have to deal.

American industry as a whole has the unfortunate habit of sending to foreign countries representatives who neither know the characteristics of the people, their language, nor have the slightest knowledge of the political situation. American aviation has always received a favorable market in South America, but under the changing conditions and the diplomatic salesmanship of European representatives, this sales market of today will not continue, and it is a market that, intelligently exploited, should be wholly American.

It's hard to say where the line between commercial aviation and military aviation separates in these countries. A plane built solely for bombing might not make a very good transport plane, but a freight or passenger plane might be readily converted into a bomber, and would make a perfect vehicle for transporting troops and war materials.

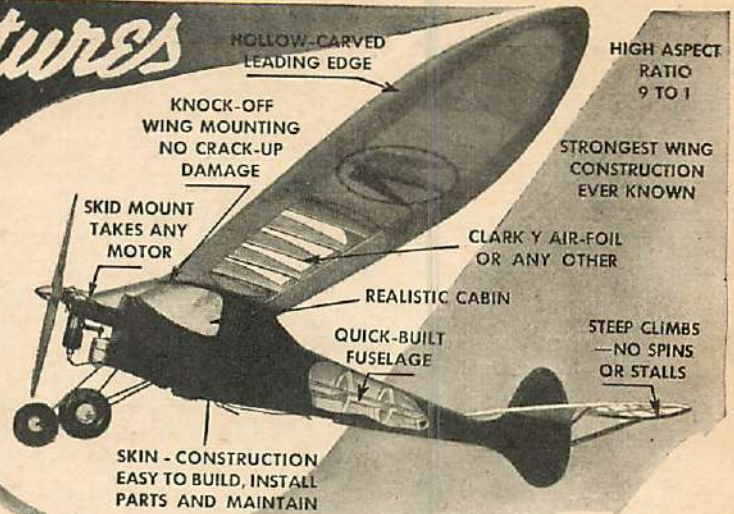
In Panama and Costa Rica, both adjacent to our Panama Canal, there are cotton fields and sugar plantations that grow neither sugar cane nor cotton. So far as is known they have never been used for landing fields, but investigation shows they would be admirably suited for such purposes.

All of which causes doubt as to the real reason for trying to establish commercial air lines in South and Central America where they do not pay and will not pay for years to come. Could it be the desire for colonies which directs the attention of (Turn to page 56)

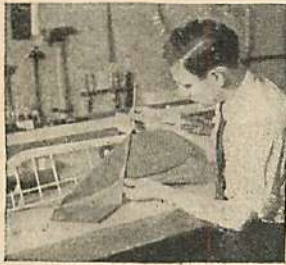


# Unmatched Features

## of MEGOW'S Super Gas Powered Commander



With so many new, original and exclusive ideas coming out of the Megow Research Department lately, an entirely new and different type of gas model has been designed to use them. The result: two amazingly strong, extremely light models that can be built in a few hours . . . the COMMANDER and the CADET.



**PLANEFILM** A light, tough, non-porous smooth covering, easy and quick to apply. Elastic, PLANEFILM stretches into a drumlike, almost indestructible colorful covering without glue or dope.

**COLORS:** Red, Blue, Yellow, Silver, White, Black.

### RETAIL PRICES

Sq. Yd.	Solvent & Post.
36" x 18" . . . . .	\$1.50 .30
18" x 18" . . . . .	.80 .25
18" x 12" . . . . .	.45 .20
12" x 12" . . . . .	.32 .15
9" x 12" . . . . .	.23 .10
9" x 12" . . . . .	.18 .10

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(Continued from page 54)

certain nations that way, despite the Monroe Doctrine? If they should ever become ambitious to take over any part or all of a country, there is no doubt the control of aviation facilities would be of the utmost importance, perhaps the dominating factor.

For years the Italians and Germans have been conducting a subtle invasion of South America, a peaceful conquest. Nearly sixty percent of the blood of the Argentine is Italian. The army and police of Peru have been trained by Italians, who also dominate the banking interests.

Germans occupy large districts of Brazil where German is the prevailing language and Portuguese seldom heard. And Brazil is a larger country than the United States. There are broad plains in Brazil that could be used for landing fields, and her beaches extend for thousands of miles, wide-open for enemy forces and lending themselves as ideal air bases from which to operate against the Panama Canal or even farther north.

Sixty young Bolivians are trained yearly in the Italian air force, and forty more are serving with the forces of Hitler. When they return from Europe they will be flying politicians, loaded with an ambition they have learned in Europe but which has no place in North or South America. Nevertheless, they will exert a powerful influence on the political future of South America.

If another world war should come, it might mean a lot to certain belligerents to have the Panama Canal rendered inoperative, and the powers that already have their air bases established under the guise of peaceful commercial air transport; that might have imported war material, bombs, machine guns and ammunition under the cover of airplanes and replacements—these powers would be able to give the defenders plenty of headaches.

I don't say that all of this is true. We're just looking for the reason for all this scramble for air routes and airports over the world, and taking South America for our nearest, and to us, the most important example. It brings us back to that vexing question: Why should any European country subsidize to establish air lines in a foreign, friendly country, knowing they will not return a profit?

The answer to this vexing question is always "business." They want to sell airplanes, airplane parts and run air lines. All the Pan-American equipment is American manufactured. The Fawcett lines use American planes, and most of their pilots are Americans. Yerks of the Honduran lines is an American, uses American equipment and American pilots where possible. The French lines that operate from Europe to South America use American motors on at

least part of their planes. In almost every case where aviation equipment has been bought by our southern neighbors on competitive bids and practical demonstrations, the "business" has gone to American firms. But the European competition grows stronger every day.

To compete with this European subsidized system, the American firms have had to pare profits to the bone, and despite some of the business representatives they have sent to these countries, Americans have built some of the finest transport air lines down there.

This rivalry for air lines and bases is by no means confined to South America. Throughout the Far East it has been just as strong, and as ruthless. Air bases have been established on islands where there could be no possible excuse for the word "business," mandate islands that under the protocol of the League of Nations were intended to be neutral points. Which again brings up the question, when is commercial aviation military aviation?

The Dutch air lines operate over a far-flung system from Holland to its possessions in the Dutch East Indies. A large proportion of their equipment is of American manufacture. China has always been a good customer for American airplanes and equipment. Japan has purchased numbers of American airplanes and motors. A recent large order from Japan for American transport planes were for a commercial air line that even the Japanese officials profess to know nothing about. And there isn't a tighter little country in the world, as far as official information is concerned, than Japan. So it would seem that there is a lot of secret boondoggling going on in transport aviation, here, there and everywhere.

In these days of keen competition and espionage in things aviation, it is foolish to say that one country's aviation products are so much superior to another's.

Every major nation has airplanes that can safely cross the Atlantic Ocean. While everyone in the know says the transatlantic transport service will not pay dividends, at least for many years, there has been a race to be the first to establish such a line. While these transoceanic lines may not pay a profit in dollars and cents, they certainly will be wonderful schooling for pilots of long-range bombers, and a proving ground for long-range bombers.

So it would seem this race for transport supremacy might be tied up with the same kind of contest for the first place in the world's air armament. Already the Russians have used transport planes to move an entire regiment of foot soldiers, fully equipped with machine guns, light artillery and even light tanks, and dropped them with parachutes behind the lines of a theoretical

enemy. Today Russia has more parachutes than all other military forces of the world combined.

In building transport airplanes under a government subsidy, it is only reasonable to expect that they would be so constructed as to be readily converted into bombing planes or transports to carry troops and supplies from one part of the country to another.

Likewise, there could be no better school for training pilot bombers, outside the army and navy training schools, than the aerial transport service. Freight planes can and will be developed for the sole purpose of carrying freight. These planes do not have to be refined to the point of luxury air liners for passenger comfort. They would be sturdy and strong and not too expensive. They will be capable of flying great distances and carry large payloads and land in small fields or on water, as the case may be.

On declaration of war, these all-purpose freighters could at once be converted into bombers or troop transports. There would be a trained personnel to pilot them, and—who knows?—these commercial transports might become the balance of power.

In peace times they make money carrying freight and developing outlying regions otherwise inaccessible, and they serve the added function of being training schools for pilots. When the time comes that pilots are needed for military service, this reserve supply would be to hand, trained to the minute for the work to be done.

All men have ideas or they would be imbeciles. In this race for world domination of aerial transportation there are people who think they know the answer, but only the directing brains know their own full intentions. Are they desirous of the profits of future aerial transportation, or do they seek to garner to their coffers not only the lines and airports of the countries, but the very countries themselves?

Aviation is one of the greatest boons ever presented to mankind. Opium and its derivatives have likewise been a great aid to medical science. The abuse of either in the hands of fanatics or unscrupulous persons can do a great deal to offset the good they do, at least temporarily.

Let us hope that aerial transportation continues to carry passengers and freight for the convenience and betterment of mankind, instead of lethal loads of bombs to wipe out our civilization.

As aviation shrinks the contours of the world, we must from time to time revise our thoughts of other nations. This closer contact should develop a new and better understanding and firmer friendships. But some great spirit once said, "Watch, wait, and keep your powder dry."

Above all, let us keep our powder dry.



## AIR ADVENTURERS

(Continued from page 33)

proceed side by side. The physical program includes physical exercises, boxing, games and military drill. The technical program covers all aspects of aviation such as engineering, air-frame construction, rules of the air, theory of flight, aviation radio, and model making. Some of the squadrons are specializing in such subjects as photography and the building of gliders.

It should be noticed also that there is no particular stress placed on military aviation. There are no guns or bombs connected with it, and the drill involved is included only as a basis of discipline, just as it is a part of the Boy Scout movement.

This is how the British are doing it, and a grand job it is. A boy may stay in the Air Defense Cadet Corps until he is nineteen, and after that he will presumably have learned enough to wish to take a post with the regular services, the Auxiliary Air Force or in the older branch known as the Civil Air Guard.

What, then, we ask, can be done about our Air Adventurers here in the United States? Surely boys of this age are entitled to official recognition and are worthy of a chance to take their place in an organization of this sort. If you are interested, why not attempt to get your local outfit, your present group to approach your city or town officials and see what can be done in your own section. We feel sure that there are hundreds of men who are loyal enough to take part in this plan, and once we can get a few moving, there is no reason why we can't get some form of official recognition and possibly government support. Actually, it will take so little effort and will bring such glorious rewards.

Anyway, it's an idea. Let's know what you think about it.

Your Flight Commander,

ALBERT J. CARLSON.

### AIR ADVENTURERS' NEWS

And now for a deep dip into the very deep mailbag.

Jimmy Martin of Vancouver, B. C., sends in a long letter concerning his visit to the local airport where they have a lot of Hawker Hurricanes on display, and believe it or not, they allow people to go in the hangars up there and actually look at them. Jimmy tells us that it seems queer to see these 300-miles-per-hour Hurricanes passing the slower Blackburn Sharks and the Vickers Vancouvers that are part of the Royal Canadian Air Force. Jimmy also saw that now-famous accident that wrecked one of the Hurricanes. It seems that a new sergeant pilot was given a chance to fly one, but on the take-off he allowed the plane to pull off to the right, as all

high-speed ships do, and before he knew it he was plowing into an old Ford trimotor job. He jumped in time but the Hurricane burned up.

Glen Lunde of La Crosse, Wisc., has qualified for his Airplane Mechanic's ticket with pictures of his model Messerschmitt M-29 which appears to be very well done. He also rewards us with a neatly drawn scale map of the French Island Airfield, which is one of the Northwest Airlines' emergency landing fields. We have to give him his Topographer award on that, too.

Phil S. Rougere of New Zealand sends in a long letter telling us all about the New Zealand air defense plans. He is a member of the Civil Air Reserve and gets about sixty hours of flight training free, as a civilian. All he has to do is to show a good educational standard and pass a medical test. Groups of thirty such young men are selected every six months and they get full training in their own time and simply have to sign to serve in a national emergency.

Adolph Scolavino, an Air Adventurer of Providence, R. I., sends in a nice pack of snapshots he took at the Rhode Island State Airport where bombers of the 49th and 96th Bombardment Squadrons were stationed during the recent air maneuvers. Adolph tells us that as usual the public was barred from the field, but somehow he managed to get a few shots of the planes by flashing his Air Trails membership card on gate policemen. At any rate, his Air Adventurers badge was recognized and he was let through, so he went to work with his camera. Now there's a real idea!

James R. Harper, a new member from Asheboro, N. C., tells us his plans for bringing in a flock of new members. He has his own gang and has promised to take them on a long trip if they will work hard and earn their badges.

Pat Leslie, a Canadian Air Adventurer, tells us that the Ginger Coates we mentioned some time back should have been Ginger Coote, who is Pat's uncle. Pat has been on a seven-hundred-mile flight with Ginger on a plane of the Yukon and Southern Air Transport line, which is now using Barkley-Grows. Pat also sends in several very interesting pictures taken up there with his Tearett camera. Leslie is now in Vernon, British Columbia.

J. H. McKiltrick of Thornbury, Ontario, qualifies for his Mechanic's ticket with a twenty-inch-span glider which he photographed in flight.

Howard W. Smeltzer of Greensburg, Pa., writes in and tells us how he listens in on the air activity around the Allegheny Airport on a special-wave radio set. He knows all the routine of

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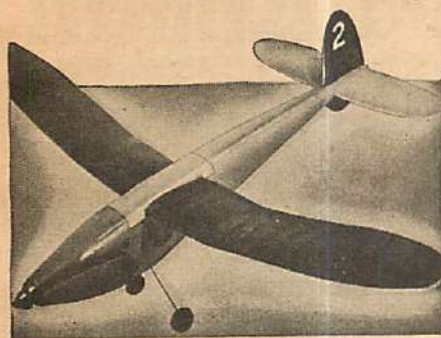
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Inclosed, please find 10c for my booklet on How to Organize a Model Plane Club.

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bringing ships in by radio and gets quite a kick from the airliners reporting in and out. We might tell Howard that we, too, pull that stunt regularly with our special Hallicrafter set. One of the most interesting things Howard heard recently was the actual report being made by Lieutenant Ben Kelsey who was flying the Lockheed twin-engined fighter across the continent. He reported his height as 20,000 feet and his speed at 390 miles per hour. This at least gives us some idea what that plane could do, if Smeltzer heard correctly.

Jim Gibbon of Scarsdale, N. Y., sends in two nice shots of a Stinson at the Armonk Airport. He also has a cousin in England who is said to be quite a model builder. How about getting your cousin to join up in our outfit, Jim? We can use birds like him if he wins prizes for his models. The more the merrier.

R. Richard Meyers of Allentown can always be relied on to provide some good shots. This time he comes through with some unusual pictures of the new Ryan monoplane which offer splendid details.

Another craftsman's award for Photography has been forwarded to Julia Morley of Lansing, Mich. The picture was a Waco of the Art Davis school at the Capital City Airport. A Kodak Bantam f.8 was used.

Wow! Here's a new member who admits he has built only about two hundred model planes. He is K. L. Shofter of Barberton, Ohio. He is also the youngest member of the Chartered Institute of American Inventors. How did he get in? Well, he designed a new type of tailless plane, and the institute is trying to negotiate the sale of the invention. Shofter has been working on the design for more than five years, and he is only seventeen now. Boy, did we pick up a member that time! Glad to have you with us, Shofter. Let's see a photo of that plane, will you?

Another new member from Down Under is A. Kerrison of Tasmania, who is wild about Air Trails and the Air Adventurers outfit. He sends us a picture of one of the D.H. 96s that fly over the route from the Australian mainland to West Hobart in Tasmania. Interested? Well, look it all up on your map and you will get a better idea.

Another new member is Floyd Morrey of Spanish Fork, Utah, who sends in two pictures and suggests that more space be given to aeronautical motors. He is also something of a specialist in model building, and sends in some pictures of his work.

J. R. Settle of Edmonton, Alberta, comes through with a long letter and many details about his section. His new Hurricane Aero Club which he told us about some time ago has now branched

out into three complete divisions. One group goes in strong for photography, another leans toward aeronautical art, and the third prefers model building. Each member of the Hurricane Aero Club also joins Air Adventurers, and Settle signs them up for us in groups of ten after they pass certain examinations.

Settle also includes a new snapshot of a Northrop Delta used as an observation plane by the Royal Canadian Air Force. These planes, of which they have ten, have been doing special map-making and survey flights in the Northwest.

Harold Aaron of Richmond, Ind., has started taking flying lessons and his teacher is Robert A. McDaniels, former coholder of the world's light-plane endurance record of one hundred and thirty-six hours, and the present holder of the tailspin record of fifty-five complete spins. Aaron, by the way, has qualified as a Photographer with his two shots of a Stinson and a Davis D-1 taken at the Dayton Municipal Airport.

Kenneth Goodlet of North Perth, Western Australia, writes in to ask about the picture published of Arch Whitehouse's studio and a model that appears in the picture. It seems that Ken got in an argument with a pal concerning the model. Ken said it was a Bristol fighter and his pal argued that it was a Spad. We asked Arch, and it turns out to be a very detailed model of his own Bristol fighter flown on the Western Front in 1917 when he was a member of No. 22 Squadron, Royal Flying Corps.

Bob Fee of Berkeley, Cal., has been to the San Francisco Fair and sends us some shots of the Boeing Flying Fortresses taken at Treasure Island. Bob is a new member but an old Air Trails reader.

Other members who have sent in suitable photographs for Photographers' awards are Charles West of Chicago, for a neat print of a Waco; Hector A. Benny of Puerto Rico for a shot of a Grumman amphibian belonging to the U. S. coast guard; Charles Peterson of Avenel, N. J., for a shot of an Aeronca; Herbert Hartley of Pepperill, Ala., for several negatives of light planes; Gordon Whiddon of Edmonton, Alberta, for a shot of a Barkley-Grow; Kenneth W. Thomas of Binghamton, N. Y., for a picture of an Aeronca; Roy Stewart of Vancouver, B. C., for his print of a United Air Lines Boeing; Joseph Arena of Seattle, Wash., for a number of fine pictures of various types of Boeings taken at the Boeing plant.

That's all the room we have. Will you see that we are well taken care of again next month? More pictures, more drawings—and more members. And don't forget to report on any favorable reaction to our idea of getting something done for Air Adventurers all over the United States.



## JUNIOR N. A. A. NEWS

(Continued from page 41)

N. A. A.-sanctioned rubber meets, providing such competitions are open to all N. A. A.'ers and are not restricted to members of the sponsoring group.

This privilege is granted to affiliated clubs and is in addition to the right to print on club membership cards the words "affiliated with the National Aeronautic Association." Such a card, or this new form, will provide the proper credentials for entering invitation rubber battles.

### NEW N. A. A. MODEL CHAPTERS

For modelers interested in contacting new N. A. A. model chapters, we list here a number of chapters which have recently joined the N. A. A. The name of the club is in *italics*, immediately followed by its official representative, who is the man to contact about club matters:

*Schenectady Aeroneers GMC* (gas model chapter): John Schneider, 355 Mohawk Avenue, Scotia, N. Y. *Kewanee GMC*: F. W. Priestman, 330 McKinley Ave., Kewanee, Ill. *New Britain Aero Club*: Frank W. Schade, No. 402, City Hall, New Britain, Conn. *Madison GMC*: Harvey L. Bartsch, 10 N. Hancock St., Madison, Wisc. *Milc High Modelers*: Dr. Newton Ferguson, Bashford Block, Prescott, Ariz. *Savannah Gas Model Engineers*: J. T. Landsberg, 1301 E. Duffy St., Savannah, Ga. *North Shore Junior Craftsmen*: Irving H. Lamson, 406 S. Genesee St., Waukegan, Ill. *Muncie "Gas Hawks"*: Herschel Knight, 514 S. Proud St., Muncie, Ind. *Ames "Prop Busters" GMC*: Charles G. Ray,

223 South Russell, Ames, Iowa. *Sioux Hell-divers GMC*: Glenn A. Gehan, 2708 Myrtle St., Sioux City, Iowa. *Portland Flying Service GMC*: Clayton H. Tucker, 81 Sherwood St., Portland, Me. *Aero-Craftmen GMC*: Theodore W. Schindler, 3221 Brightwood Ave., Baltimore, Md. *East Paterson GMC*: Hans Schroeder, 154 Maher Avenue, Clifton, N. J. *Capital Aviation Society, Gas Model Division*: Albert L. Hurd, 17 Locust Park, Stop 29, Albany-Schenectady Rd., Albany, N. Y. *East Rockaway Model Chapter*: John L. Scherer, Box No. 35, East Rockaway, L. I., N. Y. *Queen Aero Model Assn.*: John L. Ogilvie, 350 E. 84th St., New York, N. Y. *Tuscarawas Co. Model Airplane Club*: Wm. H. Gowan, Jr., 422 Ray Avenue, N. E., New Philadelphia, Pa. *Portland GMC*: Harry N. Fosbury, 5409 S. E. 92nd Ave., Portland, Ore. *Flying Keystone Model Airplane Club*: Ernest Schaffhauser, 717 Greenleaf St., Allentown, Penna. *Burlington Junior Chapter*: John Couture, 28 Hungerford Terrace, Burlington, Vt. *V. F. W. GMC*: Roger Williams, 197 Liberty Ave., Clarksburg, W. Va. *Clipper City GMC*: Kenneth C. Healy, 1207 S. 8th St., Manitowoc, Wisc. *Milwaukee Aeroneuts MC*: James Noonan, 2015 W. Wisconsin Ave., Milwaukee, Wisc. *Wheatland Junior Chapter*: Dr. L. B. Seerest, Wheatland, Wyo. *Missoula GM Aviation Club*: George Kreitzberg, 505 Plymouth Street, Missoula, Mont. *Woodland GMC*: Robert R. Taylor, 110 College St., Woodland, Calif. *Williamsport GMC*: Hervey M. Wendle, 909 Arch St., Williamsport, Penna. *South Jersey GM Airplane Assn.*: Frank P. Hernandez, Jr., 208 Edgewood Avenue, Audubon, N. J. *Cleveland Balsa Butchers*: George Reich, 4809 East 85th St., Cleveland, Ohio.

If you live in the vicinity of one of these clubs, their representative will be very glad to hear from you and tell you how to join.

Forty-one directors have recently been added to the list of N. A. A. model contest directors. If you cannot locate one

in your territory, send your request to the National Aeronautic Association, Dupont Circle, Washington, D. C., and the N. A. A. will be glad to give the names of any director living in your locality.

### INTERNATIONAL COMPETITION IN NORWAY

It is encouraging to note another international meet on the horizon, this time in Norway. The following letter has been received from the Norway Aero Club:

National Aeronautic Association of U. S. A. Washington, D. C.

The Norsk Aero Klubb begs to invite the members of your club to take part in the international model aeroplane competition at Kjeller near Oslo on Sept. 3 at 12 o'clock. The competition will be held according to the rules of F. A. I.

The competition will have one class only with wingspan from 70 to 3.5 meters.

There will only be rise-off-ground start. The average time of three flights decides the order of prizes.

There will be a wandering cup for the best members. The cup must be defended in Norway every year and must be won three times before it becomes the winner's property. There will also be a second and third prize.

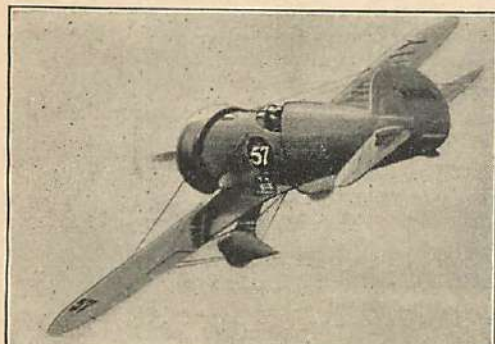
The last date for inscription (entry) is August 1, 1939.

The number of competitors from each club is unlimited.

The Aero Club of Norway will help to find lodging for guests.

Very truly,

Norsk Aero Klubb



25c

Wedell-Williams-1934



25c

Gee Bee-1931



35c

Bell Pursuit P-39

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Curtiss P-37... 35c

# HAWK

## MODEL AEROPLANE CO.

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## THE FLYABOUT

(Continued from page 42)

through the longeron and into the cross brace. Cement the joint liberally before pressing together.

During the process of joining the two side panels, continually check the shape of the fuselage. Line it up with your eye, stretch a piece of thread from front to rear through the center of the fuselage to make sure both side panels have the same curve, and check the sides with a square; these are a few methods to guarantee true shape.

Pin holes through the balsa or other weak spots resulting from too severe bending can be strengthened by coating the wood with cement.

**Nosing** is cut to conform with the shape outlined in the drawing. Its edges should fit flush with the edges of the front of the fuselage. The plug insert (#16) should fit snugly inside the fuselage. Cement #16 to #6. Make sure the two are accurately lined up to insure proper fit of the nosing when the plug is inserted. Insert the bearing eyelet (#9) into the nosing.

**Rear hook** is anchored by inserting it through a piece of sheet metal (#7, ordinary tin-can metal). The corners of this piece are notched to fit against the longerons.

**Landing gear** is bent from a single piece of piano wire. One end fits up inside the fuselage, where it is cemented to the longerons and the braces. Wheels are slipped on the ends of the gear. Hold the wheels in position by bending the ends of the axles.

**Covering** is applied with the grain of the tissue running lengthwise. (Determine the direction of the grain by tearing the paper—it will tear along the grain.) The cabin windows are covered with cellophane. A portion of the fuselage back at the rear hook is left uncovered for attaching the rubber motor to the rear hook. Check these details on the photos. Spray the tissue with water, using an ordinary insect spray gun. Allow the tissue to dry thoroughly before doping. Model-supply companies sell prepared dope of the right consistency in a variety of colors.

**Wing** is shown half size in the drawing. This drawing can be reproduced full size by following the dimensions. The curved tip can be drawn by plotting the corresponding points on a piece of paper which has been ruled off into half-inch squares.

The full-size wing-rib shape is shown atop the fuselage—at approximately the same position the wing will occupy in actual flights. Cut fifteen ribs to this shape. Build the wing flat and in one piece. The dihedral is added by cutting the edges and spars on each side the center and raising each tip two inches. Cement the joints carefully and allow

ample drying time before removing the block supports from underneath the tips. The wing tips are built up from three pieces of flat balsa cemented as shown by the directions of the grain in the drawing.

The wing is attached to the fuselage by a rubber band extending around the fuselage and over the top of the wing.

**Elevator** is built flat, using  $\frac{3}{32}$ " material throughout. Make a full-size layout from the dimensioned drawing and pin the material directly to it. Round off the edges with sandpaper. Cover the elevator on both sides. Spray and dope before cementing it in place atop the rear of the fuselage. Pin to a flat surface to prevent warping.

**Rudder** can be built directly from the drawing. Construction is identical to the elevator. Cement the rudder atop the elevator. Make sure it is set perfectly straight—that is, in line with the center line of the fuselage. Lower portion of the rudder is a piece of  $\frac{3}{32}$ " sheet balsa cemented to the bottom of the fuselage.

**Propeller** is cut from a balsa block of medium weight. Mark off the block as shown in the drawing. The propeller is the same size as the one used on the stick model presented in the Little Junior in the August issue. If you built this model you'll be able to use the same propeller. However, it is worthwhile practice to carve a new propeller, since this item is usually a weak spot in the beginner's technique.

**Freewheeling** is helpful in giving the model a better glide. It is a simple matter to add it to the model. #14 is a piece of piano wire with a hook bent in one end. The straight end is anchored to the model with two small wire U pieces pressed into the propeller and cemented. Piece #14 engages the loop bent in the end of the shaft (#13) when the rubber is unwinding. The propeller shaft slips out the loop in #14 when the propeller is freewheeling.

**Rubber motor** is six strands of  $\frac{1}{8} \times \frac{1}{30}$ ". This amount should be increased if your model seems underpowered. The fuselage is strong enough for additional strands without excessive twisting.

**Winder** can be used by attaching the loop in the end of the propeller shaft directly to the winder and stretching the motor through the front opening. Hold the model tightly at the rear hook and at the front.

**Wing position** on the fuselage can be changed to accommodate any distribution of weight. Move the wing until the model balances in a normal flying attitude when supported with your fingertips underneath the wing on the spar. If you add additional strands of rubber, check the balance. It will probably be

necessary to move the wing back. Naturally, all balancing should be done with the model completely assembled and ready for flying.

**Wing angle** is taken care of by the natural slope of the top of the fuselage. It will not be necessary to insert any blocks of wood underneath the leading or trailing edges.

**Warp** or twist should be taken out of all the surfaces before flying. The wing and the elevator should be true throughout their length. It may be necessary to give the rudder a slight turn to help the model in making turns. Make these adjustments as test flights prove them necessary.

### BILL OF MATERIALS

(Part numbers refer to those tabulated on drawings)

- (#1) 2 fuselage longerons (lower),  $\frac{3}{32} \times \frac{3}{32} \times 18\frac{1}{2}$ "
- (#2) 2 fuselage longerons (upper front),  $\frac{3}{32} \times \frac{3}{32} \times 6$ "
- (#3) 2 fuselage longerons (upper),  $\frac{3}{32} \times \frac{3}{32} \times 11\frac{3}{4}$ "
- (#4) 2 fuselage longerons (upper rear),  $\frac{3}{32} \times \frac{3}{32} \times 4\frac{1}{2}$ "
- (#5) 6 fuselage braces,  $\frac{3}{32} \times \frac{3}{32} \times 12$ " (cut to varying lengths)
- (#6) 1 nose block,  $\frac{1}{2} \times \frac{3}{4} \times 1\frac{1}{4}$ "
- (#7) 1 rear-hook support,  $\frac{1}{16} \times \frac{1}{2} \times 1$ " (sheet metal)
- (#8) 1 rear hook, .040" dia.  $\times 1\frac{1}{2}$ " piano wire
- (#9) 1 front bearing (small metal eyelet)
- (#10) 1 landing gear, .040" dia.  $\times 16$ " piano wire
- (#11) 2 wheels, 1" dia.  $\times \frac{1}{4}$ " thick
- (#12) 1 propeller,  $\frac{7}{8} \times 1\frac{3}{8} \times 8$ "
- (#13) 1 propeller shaft, .040" dia.  $\times 3$ " piano wire
- (#14) 1 freewheeler, .040" dia.  $\times 2\frac{1}{2}$ " piano wire
- (#15) 3 washers
- (#16) 1 nose plug,  $\frac{5}{16} \times \frac{5}{8} \times 1$ "
- (#17) 1 rudder outline,  $\frac{3}{32} \times \frac{5}{8} \times 11$ " (varying lengths)
- (#18) 1 rudder ribs and leading edge,  $\frac{3}{32} \times \frac{3}{32} \times 7$ " (varying lengths)
- (#19) 1 elevator leading edge,  $\frac{1}{8} \times \frac{3}{32} \times 7\frac{1}{2}$ "
- (#20) 12 ribs,  $\frac{3}{32} \times \frac{3}{32} \times 1\frac{1}{16}$ "
- (#21) 1 spar,  $\frac{1}{8} \times \frac{3}{32} \times 8\frac{1}{4}$ "
- (#22) 1 trailing edge,  $\frac{3}{32} \times \frac{3}{8} \times 7\frac{1}{2}$ "
- (#23) 2 tips,  $\frac{3}{32} \times \frac{3}{8} \times 4\frac{1}{2}$ "
- (#24) 2 wing leading edges,  $\frac{1}{8} \times \frac{3}{16} \times 11\frac{1}{2}$ "
- (#25) 2 spars,  $\frac{1}{16} \times \frac{1}{4} \times 11\frac{3}{4}$ "
- (#26) 15 ribs,  $\frac{1}{16} \times \frac{1}{2} \times 2\frac{7}{8}$ "
- (#27) 2 trailing edges,  $\frac{1}{8} \times \frac{1}{2} \times 11\frac{1}{2}$ "
- (#28) 2 tips  $\frac{1}{16} \times \frac{5}{8} \times 10$ " (varying shapes)
- (#29) 8 ft. rubber motor,  $\frac{1}{8} \times \frac{1}{30}$ "

### Additional Items:

Cement, dope, 2 sheets of tissue, pins, and thread.



## CARRIER PILOTS

(Continued from page 17)

skin. If it gets tight, tell the skipper you recognized me. The crate's in tip-top shape, so don't worry."

"We'd better stick to our story—unless they've got something on us. Sit tight till you hear from me." Belden hurried after the orderly.

"Come in!" a gruff roar answered his knock on the captain's door.

Belden adjusted his tie, polished his shoes on the back of his trousers legs and straightened his leather jacket. He took a deep breath and stepped into the skipper's office. "Lieutenant Belden reporting as ordered, sir." As he stood at attention before the gray-haired veteran flier's desk, he got a glimpse of a very-ill-at-ease army major seated across the room.

"Lieutenant Belden! Major Griffith suspects that you deliberately allowed a prisoner to escape after arresting him for insulting an officer! Can you explain satisfactorily why you, an officer on shore patrol, did not carry out your duties and have the man returned to his ship under guard?"

Belden couldn't be sure, but he thought he could detect an amused glint in the captain's eyes.

"I'll try to explain, sir," he answered, determined to stick to the truth as near as possible. "I arrested the man on Major Griffith's complaint. While I was telephoning for the guard—I had to use both hands to hold the receiver and dial the number—the man ran out on me. When my watch was relieved, I turned over the complaint to Lieutenant Thorne and returned to the ship—"

"Would you know the man if you saw him again?" the skipper interrupted.

"Yes, sir. I'm quite sure I would."

"And you, major"—the captain turned to Griffith—"would you know the man if you saw him again?"

"Well . . . er . . . I think so," the major stammered. "I didn't get a very good look at him, but I think so."

Belden could hardly suppress a grin. The major had been pretty high himself. He probably wouldn't remember his own brother. He was in civilian clothes and at fault in the argument—he had been noisy and guilty of conduct unbecoming to an officer. Both he and Mike were too tight to know what they were doing. If the skipper knew the real details, the major would have a tough half-hour. The major was in a ticklish position—he was assigned to the *Saratoga* by the war department for familiarization with naval tactics. If he were charged with disorderly conduct while ashore, he would probably be court-martialed—and no army officer relishes a naval court.

"Well," the captain decided brusquely, "both of you keep your eyes open for the man. He probably isn't attached to

this ship, or Belden would have recognized him."

Belden kept his silence, but the major spoke up hurriedly. "That's right, sir. If he'd been attached to this command, I'd have recognized him instantly. We'll keep our eyes open for him!"

"Very well, gentlemen. Settle it between yourselves." The captain turned to his papers in dismissal. Major Griffith seemed at ease for the first time since Belden entered the room.

"Lieutenant," the major called when they were clear of the captain's quarters. Belden waited respectfully for him to speak.

"About last night," the major began gruffly. "Thanks for not telling the skipper I was tight myself. I didn't complain to him at all. He called me in after reading the report from shore patrol. He suspected there was more to the affair and accused you on his own hook. He thought if there was anything more, you might give it away."

"Well," he went on brusquely, "what are we waiting for? You know the schedule this morning. Be ready to leave when I get there!"

"You're going with me, sir?" Belden asked in surprise.

"Yes—I'm supposed to learn how the navy handles a problem of this sort."

"Yes, sir!"

Belden's plane came up on the forward elevator just as he stepped out onto the flight deck. Mike was there by the plane, anxiously watching for Belden.

"How's it, lieutenant—thumbs down?"

"No, up. But watch yourself. The major is going with us today for familiarization. I don't think he'll recognize you—he was too tight himself. Just keep quiet—"

"I'm afraid it's too late to keep quiet, Lieutenant Belden," the major's voice answered directly behind him. Belden spun on his heel, his heart thumping sickeningly. The army man had heard every word he had said.

Major Griffith's face was an apoplectic red. "So you let him go deliberately because he was your mechanic. You place the dignity of an officer rather low, lieutenant, or is it just because I'm an army officer?"

"You misunderstand, sir," Belden stammered. "I—"

"I understand perfectly, lieutenant! Shall we go below to see the captain?"

"Aye, aye, sir." Belden saluted resignedly and started toward the deck door as the loud-speaker burst forth in raucous command:

"2-B-3, man your plane! On the double—flight quarters, all hands!"

The two officers eyed each other a moment doubtfully. Then the major shrugged his shoulders and headed toward the plane. "We'll see about this later."

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Belden rushed to the cockpit and Griffith seated himself in the twin control forward. Mike—a very worried-looking Mike—took the gunner's pit aft and went through his own check-off and then "thumbs-upped" the pilot. Belden passed the signal and received the "rev-up" sign from the bridge. Within forty-five seconds from the order over the speaker the bomber was in the air.

Belden passed the controls to the major and spread out his flight chart on his knee. He leaned over to the army officer's ear and explained their mission.

"The destroyer *Barker* has launched a radio-equipped lifeboat. We don't know where that boat is, but it's up to us to find them by radio compass. We're in a land plane and can't effect a rescue, but we can drop them provisions and radio the boat's position to the *Saratoga*. She will then proceed and pick up the men in the boat."

The major nodded his understanding, but the storm clouds on his brow continued to remain. Belden put the worry of the skipper's reaction from his mind and concentrated on his problem. The air was full of static, but he managed to contact the lifeboat and get a bearing. He checked the bearing on his chart and changed the course of his craft ninety degrees and flew for ten minutes. He took another bearing and plotted a cross bearing. The lifeboat would be where the cross lines intersected. Belden explained and the major merely nodded his understanding. Fifteen minutes passed and the procedure was repeated. This determined the course and speed of the boat. Then Belden radioed his findings back to the *Saratoga*.

"*Saratoga* to 2-B-3. Changing course to effect rescue of lifeboat crew. Drop your provisions and radio any discrepancy in position."

Belden dropped a smoke flare and checked it minutely with peloris and stop watch to determine the wind direction and velocity. He set his course two points to the left to allow for the crosswind.

"A little different from army flying, major," Belden explained. "We have to continually check our course—these waves all look the same when you're out of sight of land."

Major Griffith grunted but said nothing. He fished a cigarette from his pocket while Belden answered the interphone from the gunner's pit.

"Lifeboat directly abeam, sir, on the port," Mike reported. "Slight oil leak in the right motor—not bad enough to worry about, though, lieutenant."

"Right," Belden acknowledged, spotting the lifeboat. He swung toward the surface craft and sniffed. Smoke! He looked around quickly and glared at the major. The army officer was calmly puffing on a cigarette.

"Put that cigarette out!" Belden snapped.

The major's chin drooped slightly. "You forget yourself, lieutenant," he snapped. "You can't give me orders!" Deliberately he drew a deep drag on the cigarette and exhaled luxuriously. "I've been smoking in a plane for fourteen years—why stop now?"

"I'm in command of this plane, major," Belden stated calmly. "You know the regs about smoking. Put out that cigarette at once. If you wish to complain later about me, that's quite all right, but *put it out!*"

"Oh, all right!" the major snapped. "You navy pilots are crazy! Landing on decks instead of fields makes you overcautious. You know I can't complain—but you'll hear more of this later." He flipped the cigarette carelessly through the cabin window.

The propeller caught the butt and showered a cascade of sparks over the oily motor.

"Look out!" Belden yelled too late and cut the switch and sideslipped. The sparks ignited the oil from the leak and spread rapidly.

Belden pulled the right-motor fire extinguisher control, but the fire continued to spread over the oil-drenched nacelle and wing.

"I'm used to the motor in front," the major spluttered, then calmed down gradually. "Do we bail out or try to get back?"

"We try to get back!"

Belden snapped into the interphone to Mike, "Break out those rations we were to drop—sop a blanket with water and pass it up to me." He turned to Major Griffith. "Hold her in a slip to the left. I'm going out on that wing. The fire is still only surface oil, and if I can put it out we can get back."

Griffith nodded and took over the controls. Belden glanced at the altimeter. Nine thousand feet. It would be close going to keep off the water long enough to get the fire out. "Keep near that lifeboat in case we hit!"

Belden released the safety hatch and climbed up. He kicked out of his 'chute and hooked a hand fire extinguisher to his belt, wrapping the soggy blanket around his waist. He inched out onto the wing. The wind ripped at him viciously, a loose end of the wet wool snapping at his legs whiplike. The crack stung viciously, but he needed both hands to reach the motor cowling. The acrid smell of burning oil and hot metal stung his nose and lungs and eyes. He slipped the pin from an inspection hatch and wedged his foot in the opening.

The metal was blistering hot on his bare hands. Smoke engulfed him momentarily. The major increased the slant of the slip and the smoke blew away. Coughing, eyes watering until he could hardly see, Belden grasped the hot cowling in front of the fire line and loosened the extinguisher. He wedged the extinguisher between his knees and

tried to play the stream on the fire, but the wind lifted the pitifully small amount into a spray and the fire continued to spread.

He threw away the extinguisher and made motions to the cockpit with his free hand. The major finally understood and brought the controllable prop to full feather and locked it. Belden edged his way forward on the motor nacelle. His foot slipped and he nearly fell. Gasping from the exertion, he wedged himself between the prop and the hot motor and unwound the wet blanket. Laboriously he fastened the corners to the push rod housings and signaled the major to straighten into a slow glide with flaps down. The major obeyed and the speed of the plane slowed to fifty. The straight wind again drove the flames back along the wing.

Belden played the blanket back over the cowlings toward the trailing edge of the wing. It held in a straight line, whipping above the fire. He signaled again to the major to rock the wheel. With the up-and-down motion of the nose of the plane the blanket slapped the wing and cowlings noisily. The major grinned triumphantly from the pit, then his grin faded. The strain was too much for the blanket. It ripped loose and flapped toward the tail assembly. It snagged on the right tab and streamed out over the flipper, slipping slowly, maddeningly along the rounded surface until it snagged again on a fitting. With a resounding snap it ripped free and went sailing astern.

Belden groaned. That was his last chance of extinguishing the fire on the motor. They would have to bail out anyhow—but he would have to crawl back to get his parachute. He looked down—the water was too close—he wouldn't have time. He looked back along the wing. There was only one small patch of oil left burning. The blanket had slapped it nearly out, with the exception of this one spot out of range of the flapping wool.

The plane lurched mightily as the major kicked it into a right sideslip. Belden watched the burning spot hungrily, holding tightly to the motor. The wind tore at him with vicious force, but that same wind tore at the burning patch and literally lifted the fire right out of the oil. The major grinned triumphantly and straightened out. He held the bomber in a minimum glide while Belden inched his way painfully back into the pit.

The major pulled the prop control as soon as the lieutenant was safely back in the plane and turned on the switch and gas to the motor. The prop turned over with the slipstream, the engine coughed and spluttered a few times, then caught with a roar. The white, foamy liquid from the Lux fire extinguisher cascaded out on the wing from inside the motor nacelle, completely covering



the oily surface behind the motor nacelle.

Belden settled himself wearily into his seat and smeared burn emollient from the first-aid kit on his scorched hands. He took over the controls from the major and snapped into the interphone. "Mike! Prepare to drop emergency rations to the lifeboat when I pass over. What there is left of them!"

"Aye, aye, sir."

He set his course directly over the lifeboat and flew at five hundred feet. When he was nearly over the surface boat he cut the throttles and lowered the flaps and looked back. The bundle dropped from the belly, and its parachute opened instantly. He snapped the flap control and gunned both motors, hauling the plane into a climbing turn with prop advanced to high pitch. The bomber pulled up away from the reaching waters while Belden watched the lifeboat maneuver to be under the dropping bundle.

He watched until he saw the parachute settle over the boat and grasping hands pull it in. Then he turned on his radio and contacted the *Saratoga*.

"Mission accomplished—no discrepancy in position of lifeboat. Returning to carrier at once. Belden."

He put the plane on course and passed the controls to the major. He closed his eyes wearily, and for the first time since the take-off found time to worry over what would happen when he and Mike faced the skipper to answer Major Griffith's accusations. He was roused from his worries by the major's hand on his knee. Belden glanced ahead. The *Saratoga* was looming above the horizon. He sat up and took over the controls.

"2-B-3 to *Saratoga*. Approaching on starboard beam. Come into the wind, please."

As he watched, the big carrier swung to head into the wind for the convenience of the landing plane. After

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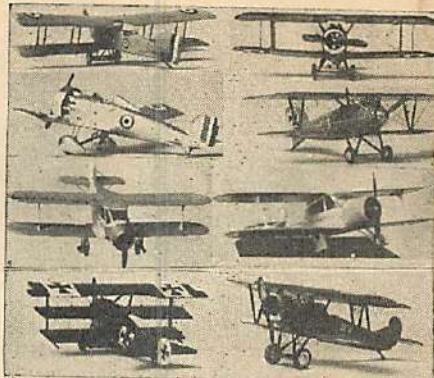
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the bomber was aboard she would change again to her rescue course.

Belden glanced at the major when he cleared his throat noisily. The army man's face was red and his eyes were thoughtful.

"Lieutenant," he began uneasily, then spoke quickly, as though he wanted to get it out in a hurry and over with. "We army men, I suppose, hate to admit the navy is any good. It's an old saying in the army that navy men are crazy or they wouldn't land on soap boxes at sea. But there's another expression in the army, too." He looked

at Belden closely before he continued, "A good soldier knows when to keep his mouth shut. How about the navy?"

Belden grinned. "I don't know how the fire started, major."

Griffith smiled enigmatically. "I wish I knew who that man was the other night—guess we never will find him."

Belden turned around and winked at Mike in the rear. Mike looked at him questioningly, then grinned. His hand shot forward, thumb up. The major and Belden repeated the gesture and they all grinned.

## GLIDING AND SOARING

(Continued from page 29)

by Woodbridge (Woody) Brown when he flew his Bowlus Baby Albatross named the *Thunderbird* from Wichita Falls, Texas, to Wichita, Kansas, a distance of 280 miles. His best altitude during the flight was 7,600 feet. The previous American distance record was held by Lewin B. Barringer with a flight of 212.45 miles from Wichita Falls, Texas, to Tulsa, Okla.

The Californians seem to do things in a big way. John Robinson and Dick Essery took their ships recently to the desert region near Julian, Cal., to test

out desert thermals. On his second tow, Robinson caught a thermal at an altitude of 400 feet, and by judicious circling rose to 9,700 feet. After two and a half hours of soaring he landed at Linda Vista Airport, forty-two miles from his starting point. Dick Essery gained 9,500 feet and covered forty miles.

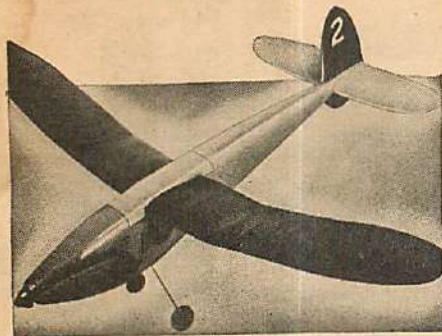
To all those interested in soaring we recommend Wolf Wirth's book, "The Art of Soaring Flight." It is one of the most interesting and enlightening books ever published on the subject, and can be obtained from the Soaring Society of America, 1909 Massachusetts Avenue, Washington, D. C.

Ted Belak spanned Lake Michigan in his *Minimoa*, the *Dove of Peace*. He took off from Sturgeon Bay, Wis., and was towed up to 16,500 feet by airplane, and from this altitude glided across the lake. Ted said that at an altitude of 13,000 feet the temperature was sixteen degrees below zero.

Briegleb Gliders, of Los Angeles, Cal., are coming out with a new utility ship specially designed for simplicity of construction, ruggedness and to sell at a reasonable price. It was flown the first time during the Western Soaring Contest and proved to have good soaring characteristics as well as stability and excellent control.



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## HOLLYWOOD GETS NEW WINGS

(Continued from page 25)

connection with the National Air Races. The first, in 1935, with five thousand dollars in Chatterton money up, attracted nine entries. The second, the following year, had seventy-five entries with ten thousand dollars for prizes. The Derbies, which were not speed races, but were won on points for navigation and efficient operation, did much to create interest in flying. Associated with Miss Chatterton were Bob Blair, who has instructed many Hollywood personages, and Leland Hayward, excellent flier, actors' agent and husband of Star Margaret Sullavan, who is a flying enthusiast and has had some instruction.

One of the main reasons why aviation today is on such a solid footing in Hollywood is because it has become commonplace. Those who toyed with wings years ago did so knowing that they would get publicity. With the exception of those I have mentioned, who really stuck their teeth into the game, Hollywood had a large assortment of dilettantes. Today, small publicity can be garnered, so it is apparent that the stars love the game.

Consider the case of Jimmy Dunn. Jimmy got his first taste of flying on dual controls in Winnipeg, Canada, in 1926. He knocked about in an old Avro Avian. This cost money, and Jimmy didn't have much—so he quit until 1935, when he got into a picture in which he was supposed to be a pilot.

"I started out again," Jimmy says, "and this time I stayed with it."

Jimmy has six hundred hours and is about to buy a Beechcraft. His first ship was a Stinson Reliant—Ruth Chatterton owned two of these—and he got most of his time on it. He eloped in it with Frances Gifford, now his wife, to Yuma, Arizona. He went on a honeymoon in it. He is a member of the Sheriff's Aero Squadron of Los Angeles County, once flew a prisoner back from New Orleans to stand trial, later used the ship to search for the degenerate killer of three little children in the hills southwest of Los Angeles.

At present he owns stock in an airplane company building the new Harlow.

"If my picture career fails," he says, "I'll get a job as a pilot."

Running neck and neck with Dunn in the matter of hours is young Bob Cummings, Universal player. Bob has been fooling around with airplanes ever since he was a kid. He owned part interest in a plane in Joplin, Mo., flew a little in college days and when he was on the stage, wound up in Hollywood with enough money to finance a course a few years ago. He soon soloed, got a license, bought a Porterfield, graduated to a Cessna, which he still owns. He has taught several people to fly, including his

wife, Vivian Janis, has been an "angel" for a flying service, and has also backed an aerial advertising company. He flies every week end, whenever he has a few days away from pictures, and has pushed the Cessna all over the Middle West as well as up and down the Pacific coast.

You can't skip stalwart Brian Aherne. Corner Chatterton and she tells you she heard people who flew talking about aviation and that got her started. She in turn talked aviation and Aherne listened intently. A short time later Bob Blair had Aherne in tow. A short time later Aherne, who is inclined to walk by himself—he is a self-sufficient sort of guy—soloed. A short time after that he bought an open Waco biplane and has been flying it ever since. That was three years ago. He numbers his hours in the hundreds. His front cockpit is covered over, and he flies alone.

Tex Rankin, international aerobatics champion, motion picture and exhibition pilot, gave him advanced training.

"He's a natural pilot," the reserved Tex says—and that, from Tex, is something.

While Aherne is hammering around at 140 miles per hour, Jimmy Stewart, who learned at about the same time he did from Blair, is getting in his time. He, like Aherne, started in 1936, but has taken it slower. He got his license last December.

"I got started," says Jimmy, "fooling around airports. I'm a camera nut. I started shooting pictures of airplanes. Pretty soon I wanted to find out what made 'em go. Then I wanted to make 'em go."

Jim is going to take time off very soon and fly to Florida. He wants to pause at Randolph, Kelly, and Pensacola and see how the army and navy do it. He doesn't know whether he'll lease a ship or buy one for the jaunt. On the screen and off, Jim is a shy sort of bird—and he's flown for fun, for recreation and the kick flying gives without any thought of getting his name in the paper. If you corner him, however, he not only confesses, but reveals that he has photographs—still and movie—of every phase of his flying, including pictures of his private pilot test flights taken by a friend.

An odd case of a flier turning actor, rather than the opposite, is to be found in the film capital. You have seen in a dozen pictures, including the first of the "Tailspin Tommy" series, a stalwart young fellow named John Trent. His right name is LaVerne Brown, and he was on the right seat of a DC-3 when Producer B. P. Schulberg first saw him. He pushed him in front of a camera. Trent then had about eleven hundred hours. Today he continues to fly for a dollar per month—the salary he gets for



making one hop to Kansas City on T. W. A. to hold his rating with that company. A United States reserve flier, he puts in time on off days by flying government equipment from Long Beach.

Single holdout against power planes is Harvey Stephens, sometimes "heavy," sometimes hero in scores of motion pictures. Harvey, gliding fan, president of the Southern California Soaring Association, built his own sailplane, *Zanonia*, in a barn on his farm near Montebello, Cal. He changed to gliders after one hundred forty hours on power ships. His one-place high-winged high-performance beauty has been flown in annual glider competitions at Arvin, Cal., and he has put in about a hundred hours to date in noon-meeting flying.

"Gliding's smoother and easier," he says, "and you have to work so hard to get into the air and stay there that you really learn to appreciate it."

Candidate for honors among the women pilots—although she hasn't done much flying lately—is Shirley Ross. An assistant director taught her how to fly, and she has about seventy-five hours to date. She never sought publicity and press agents and newspapermen accidentally stumbled onto the fact that she could handle a plane in a very excellent manner.

Hayward, aforementioned actors' agent, has done a great deal to promote flying interest. A man with a diversified career, he owns considerable stock in T. W. A., and writes a lot of advertising for that company. Other executives who actually fly their own planes are Clarence Brown and Henry King, directors, and Douglas Shearer, brother of Norma Shearer and MGM sound engineer.

In the recent boom there are many new names added to the aviation roster. Errol Flynn does a great deal of flying,

most of it with Ted Brown, operator at Los Angeles Municipal Airport. He has had straight flying instruction from Brown and aerobatics from Rankin. Charles Correll, of Amos and Andy fame, owns his own plane. Borah Minneville, famous for his harmonicas and his rascals, is another pilot. Roscoe Ates, the stuttering comedian, was afraid of airplanes the first time he came near them. He became a passenger, found out what it was all about, and also learned to fly. Tito Guizar, the singing star, has had considerable dual instruction and will solo soon. Mrs. Ray Miland, wife of the man who played one of the leads in "Men With Wings," has soloed. And Dunn is teaching his wife to fly.

One of the outstanding points in discussing Hollywood flying is that the record is so clean. No player of any importance has ever been injured, unless you count the skinning Hoot Gibson got when he piled up in his race with Maynard—and he was before the microphone a few minutes later, slightly dazed but with nothing more than a few bruises. There's scarcely a forced landing in the lot.

Another interesting angle is that these days there is a great rank and file going into the air. Archie Twitchell, with some success as an actor behind him, has come up for his private license and has passed. Cameramen Dewey Wrigley, Curly Linden and John Fulton have hundreds of hours; Andy Houghton, mail-room messenger, has a couple of hundred hours, and Peyton Watkins, in charge of fan mail at one of the studios, has flown his tiny Aeronca on a circle of the United States. These are only a few, picked at random, of the scores who rate from solo student to commercial license in Hollywood.

And it's a healthy sign for aviation.

## SECRETS OF SPEED

(Continued from page 52)

out of the thirty-foot channel. In 1938 they doubled the length of the course, making it a hundred and seventy-six feet and increasing the width to fifty feet. On several occasions my ship flew twice the length of this extended course.

Following are plans for a speed ship typical of those flown around Cleveland.

### FUSELAGE

Build the two sides of the fuselage first, using either  $\frac{1}{16}$ " square pine or  $\frac{1}{16}$ " square plus hard balsa. Don't use balsa that is too brittle. Then assemble the sides with the top and bottom cross braces. Make the nose block of three pieces of medium-hard balsa. Cement the three pieces together and drill the  $\frac{9}{16}$ " hole through the center. If a sharp drill is not obtainable, heat a

round piece of metal, about  $\frac{1}{4}$ " diameter, and burn a hole through the block, finishing up with sandpaper or a round file. After the block is drilled and cemented to the fuselage, fit the nose plug in the nose block, making the plug fit tightly, for this is very essential. Then round the corners of the nose block. The rear plug is built up of  $\frac{1}{16}$ " flat hard balsa, with a rear hook of  $\frac{1}{16}$ " diameter wire, which is so bent as to allow you to attach a winder to it.

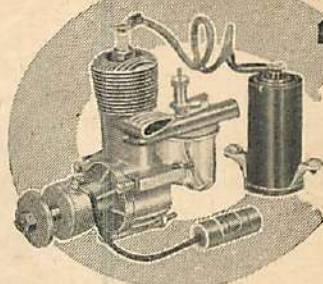
### LANDING GEAR

The landing gear is bent from .038 wire and cemented between two  $\frac{3}{32} \times \frac{3}{16} \times \frac{1}{8}$ " pine blocks. The wheels are held in place with two brass washers which are cemented to the axles.

### WING AND TAIL SURFACES

Cut the ribs from  $\frac{1}{32}$ " flat balsa, according to the rib illustration. The lead-

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ing and trailing edges and bottom spars are then pinned to your drawing, after which the ribs and top spars are cemented in place. The  $\frac{1}{16}$ " flat balsa wing tips are cemented in place next. Make the leading and trailing edges and spars of full-length pieces, cracking them, instead of cutting them through, for the dihedral.

The tail surfaces are made of medium-hard balsa.

### COVERING

I find that yellow is the best color for speed models. Be sure to use a good grade of tissue, as there are some inferior grades. The grain of the tissue runs the same as the airstream, except on the wing, where it runs from tip to tip. Use a fairly thin mixture of nitrate dope, applying a number of coats on the fuselage, but only enough to keep the tissue taut on the wings and tail surfaces. Put the wash-in in the wing when the dope is drying.

### PROPELLER AND NOSE PLUG

The propeller is the most important secret to a successful speed model.

Great care must be taken to balance the propeller accurately, to outline the blades properly and also to get a smooth finish, as all these add to torque or drag. Use a  $\frac{1}{2} \times 1 \times 8$ " hardwood block, either spruce, mahogany, cherry or poplar. First lay out the propeller on a block using a good symmetrical design. Then drill a  $\frac{1}{16}$ " hole for the shaft. Balance the prop after excess wood has been trimmed off. Carve back of propeller first, using about  $\frac{1}{32}$ " undercamber. Then carve the front, but be sure not to get the blades too thin, as they will tend to bend under full power and will also be unable to take the shocks of rough landings. The blades should be about  $\frac{1}{16}$ " thick,  $1\frac{1}{2}$ " from the tip. Sand and dope prop until you get a smooth finish.

The nose plug is turned on a lathe, using the same kind of wood as on the prop. The brass bushings with  $\frac{1}{16}$ " diameter hole may be purchased from the Cleveland Model Supply Co. One brass bushing is used on the back of the prop. The method of holding the prop to the shaft, shown in the prop-

shaft detail, is used to prevent the prop from wobbling.

### FLYING

Test model in high grass, using about eight strands of  $\frac{3}{16}$ " flat rubber, gradually increasing the number of strands until the most efficient prop speed is found. Remember, a prop that is turned faster than it is able to handle the air tends to lose its efficiency. I find that sixteen strands of  $\frac{3}{16}$ " flat rubber are very satisfactory for the hundred-and-seventy-six-foot course.

*Editor's Note: Leonard Becker is a well-known model builder around Cleveland, where he has both won and placed in a number of speed contests. In 1934 he won the speed event at the Scripps-Howard Junior Aviator Nationals with a speed of 48 miles per hour.*

*Becker modified his design for 1935, bringing out a ship that weighed one and a half ounces without rubber. It clipped off 66.66 miles per hour over an 88-foot course. Dick Korda flew a ship of somewhat similar construction in 1936 at 70 miles per hour to win the Junior Aviator Races. At the eliminations, Korda had hit 75 miles per hour. The modern course is 176 feet. Last year three fliers were tied for first. Becker placed, as he has done for the last three years.*

*He cautions builders to use hard wood for this ship and to be careful that it is not brittle.*

## SENIOR N. A. A. NEWS

(Continued from page 26)

### COLLEGE PILOT PROGRAM SUCCESSFUL

Of the 330 young men who have been training to be air pilots under the C. A. A. at thirteen colleges and universities throughout the United States, 317 had soloed by June 5th, 101 had passed their tests and had been granted licenses, and the group had flown a total of 9,157 hours without accident.

The University of Alabama, third to start, was first to finish. Her thirty students have all qualified for licenses after an average of thirty-seven hours of dual and solo flying.

The experience with the 330 students has convinced the members of the Civil Aeronautics Authority that the methods used are sound and effective, as predicted by Chairman R. H. Hinckley.

### PILOT TRAINING BILL

A report has been made by the Subcommittee on Aviation to the Commerce Committee of the Senate, approving the Lea Bill for civilian pilot training by the Civil Aeronautics Authority. Congressman Lea and Senator McCarran both had introduced bills authorizing the C. A. A. to spend \$7,300,000 in the coming school year to train twenty thousand civilian airplane pilots.

When the Lea Bill was passed by the House on April 19th, it had been amended to authorize the expenditure of

\$5,675,000 in the coming school year and to provide for training of fifteen thousand pilots—five percent at least to be noncollege. In accepting the Lea Bill, the sub-committee entered two more amendments. One limited future annual appropriations for pilot training to \$7,000,000. The other restricted the C. A. A. in hiring noncivil service people.

### LICENSED AIRMEN CELEBRATE ANNIVERSARY AND BECOME N. A. A. DIVISION

The Licensed Airmen of America celebrated their fifth anniversary in Los Angeles and the organization, which has been operating as an N. A. A. chapter, was expanded to the status of a national division of N. A. A.

Active on the anniversary program were Carl Squier, N. A. A. governor at large; and Warren Carey, N. A. A. governor for California. Features included talks by the first private pilot to solo after the Wright Brothers, Walter Brookins, and the latest pilot to solo.

The Licensed Airmen of America is different from other N. A. A. chapters in that all members must be certificated by the C. A. A. This covers all grades of pilots—including students—mechanics, parachute riggers, airline dispatchers, traffic control men, et cetera. Since its membership is composed of airmen, much of the group's work has turned to the practical side of aviation. Activities now in progress include air youth work

under the direction of P. W. Hairgrove; operation of a soaring group for boys seventeen to twenty-one years of age under the direction of H. B. Powers; and active participation in private flying programs, under the chairmanship of R. Eichhorn. Much has been done in assisting the C. A. A. to shape its relations with the industry in dealing with the problem of licensing pilots, mechanics, and planes.

On the occasion of its fifth anniversary, the Licensed Airmen of America begins expansion of its group as a national diversion of N. A. A., under the guidance of N. A. A. officers.

### N. A. A. NATIONAL CONTEST BOARD FOR 1939

The following have been named to the N. A. A. contest board for 1939:

Dr. George W. Lewis, chairman; W. R. Enyart, vice-chairman and secretary; G. Carl Adams, Major Edwin E. Aldrin, C. B. Allen, Richard S. Boutelle, Dr. W. G. Brombacher, Warren E. Carey, Commander Ralph Davison, U. S. N., Colonel Ira C. Eaker, A. C., Major Lester D. Gardner, Ben O. Howard, Louis R. Inwood, C. S. (Casey) Jones, Colonel John H. Jouett, Roger Wolfe Kahn, Albert I. Lodwick, Joseph Nikrent, Robb C. Oertel, Charles E. Parker, I. H. Shearer, Sidney Smith, James E. Webb, Fred E. Weick, J. D. Wright, and C. S. Logsdon, assistant secretary.



## PLUCKING NEWS FROM THE AIR

(Continued from page 21)

Twenty years ago saw the cameraman hoist a cumbersome box into an open-cockpit job doing perhaps a hundred miles an hour as tops. In addition to his equipment, he had to wear a heavy flying suit capped off by a parachute pack that made his every movement as awkward as a penguin on land. Today he jams on his fedora and hops into a roomy cabin ship capable of almost double the speed, easily maneuverable and piloted by one of a new crop of fliers who are experts in tossing a plane around to secure "position"—the first word an aerial cameraman learns. Twenty years ago bright sunshine was imperative for bringing back good pictures; today, better equipment and increased knowledge of lens and shutter speeds in regard to the type of film used can bring you a good picture in practically any condition of light that is not quite darkness.

None of these photographic improvements would have meant very much if it were not for the airplane itself. It gets the cameraman there "fustest" and enables him to get the "mostest" out of any given story. Its position over an object or locality enables the securing of striking and dramatic pictures which for scope and comprehensiveness are impossible to beat. Time is ever precious to the press, and the airplane gives the old man with the scythe a constant beating in making the ever-recurring "dead lines."

An instance of this time beating was found in the arrival of the new English greyhound of the sea, the *Queen Mary*, a few years ago. As the dawn of a May morning cast its first weak rays on a still-asleep world, motors were barking into life at five airports in the metropolitan area. Busy mechanics scurried away with doors which had been taken off to make the cameraman's work easier. Equipment weighing anywhere from five pounds to a quarter of a ton was stowed away. Less than thirty minutes later saw a grand total of fourteen ships of varied description, ranging from a Curtiss Fledgling to a giant Condor, beating the skies in the direction of Montauk Point, a hundred miles away. Most of the planes waited around Sandy Hook and lower New York Bay, but a daring few struck straight out over ocean for the elusive spot where they hoped the giant steamer would be. Land planes all, a faulty engine would have pancaked them down on the briny deep with perhaps a fifty-fifty chance of rescue.

One of the planes finally spotted a thin streamer of smoke one hundred and fifty-odd miles out of New York, over forty miles from shore; and a few minutes later was swooping gracefully over the almost deserted decks of the steamer

in constantly tighter circles as a newsman busily alternated with still and movie cameras to record on film every section of the huge vessel. Twenty minutes later the pilot cut the engine and jammed it on again in a farewell burst. Fifty minutes later the plane landed at Floyd Bennett Field, and a waiting automobile accepted a mass of plate holders and movie rolls for a wild ride into New York, where messengers dropped from the car at newspaper offices and syndicates like peels from a potato parer. Not long after, ship-news men and steamship-line officials boarded the incoming vessel at Quarantine, tossing on the deck newspapers bearing front-page aerial views of the boat at sea. Eager passengers snapped up the papers. That afternoon, Main Stem theaters blazoned forth with posters advertising movies of the *Queen Mary's* arrival in New York.

The disaster which befell the ill-fated *Morro Castle* was another striking illustration of a news beat accomplished by means of the airplane. Blasé editors were jolted out of their seats one September night of 1934 by the report, ticking out on teletype machines, that a steamship was on fire off the New Jersey coast. Radio stations on shore had picked up S O S signals which had immediately galvanized into action every news agency in the country crystallizing into an urgent demand for pictures. The only way to get pictures, and get them quickly, was by air. As the night wore on, already mushy weather began to turn into fog and rain.

I was kicked out of bed at three in the morning by a phone from the airport which advised me that all three of the telephones at my office were ringing like mad. On hanging up, the phone jangled again to bring the squawk of the *Daily News*, telling me to get my carcass to the airport and get a plane ready on the spot. The phones were still ringing ten minutes later as I unlocked my office door and started tossing equipment around. They all had the same story to tell, and in a half-hour a pilot was routed out of his repose and was warming up the ship in the dim light coming through half-opened hangar doors. Meanwhile, a man had left from New York by a motorcycle which was barking its way through deserted streets with a shipment of extra movie rolls.

Five o'clock saw us in the air, still in darkness, as the Waco headed seaward. We had no exact position for the burning vessel, but trusted to luck that we would be able to spot it as soon as light would come. This fond hope was soon dissipated as the plane began bucking into heavy, if intermittent, fog interspersed with sudden squalls of rain. The dim light barely filtered through the

open spots as the pilot relied solely on dead reckoning to get us where we wanted to go. A sudden bump slammed the ship upward, tearing the pilot's seat from its supports—not adding any to comfort.

Over an hour of this and then it began to break a little. As we dived out of a fog bank, the pilot noticed a coast-guard cutter plowing steadily through heavy seas. Taking our bearings on this vessel, the ship sped along and in a short while we were over the *Morro Castle*, in time to see and record pictorially the last lifeboats leaving the burning steamer. The slightly listing, crackling *Morro* presented a grim scene of horror, but to the impersonal eye of the cameraman it made a striking picture.

Before the day's end, the same plane and pilot had carried me three times back and forth to the scene of disaster to garner over two hundred still pictures and close to three thousand feet of movie film. There is nothing deader than yesterday's headlines, but I can still get a chill when I come across one of these pictures in some magazine. And personally, I hope never again to see such an event as they represented.

An alert news cameraman takes all things in stride in the effort to turn out unusual picture reportage. He checks his cameras and airplane with equal care and trusts to luck for the rest. He must keep pace with the constant changes taking place in planes and equipment. He must learn "news value" which will tell him which picture is saleable and which one to pass up. Most important of all, he must learn never to overestimate his flying equipment, and foolishly try to accomplish the impossible in airplanes not adapted to or capable of being employed for presswork. Trying to snap a squadron of fast-moving airplanes constantly changing position, or a plane wrecked on a frozen hillside with the outside temperature more than twenty below zero, is not the same thing as taking a picture of Aunt Susie's ancestral mansion in the suburbs. The airplane is the most important factor in this type of work; but, being only a piece of machinery, it needs somebody to think for it, with a minimum of brain cerebration of the wrong or doubtful kind. Good aerial cameramen are not "born," but they can easily be killed.

So the next time you open your favorite gazette and gaze at some picture of a big event that has been photographed from the air, give yourself pause and consider these things. And next time you air-mindedly try to better your aerial photographic work, don't do it as a hobby, but as a serious-minded business.



## AIR FIGHTING BEATS PESTS

(Continued from page 27)

prop blast forces the dust through and past the vegetation. To dust close to trees while dodging them, the plane should not "mush" on climbs or turns—that is, should not have a tendency to continue far in the line of flight before obeying its controls. For the dusting may be done at altitudes of less than twenty-five feet, and if the operator hits any obstacle it is a long, wet walk back home.

If the job is far from the air base, a bigger, faster plane may carry a bigger payload, even though it is less maneuverable on the work. Like any air war, a variety of planes is needed for best results.

The dust has a tendency to pack in the hoppers, and so must be agitated to loosen it. Agitators are driven by wing-mounted impellers, through gear reductions of about fifty-to-one ratios. Furthermore, the dust must all go into the air and not into the cockpit with the flier—for if he were to breathe much of it he would be decidedly uncomfortable.

The hopper discharge is adjustable to various openings by fixed-lever positions, so the flier can control the rate at which the dust goes out. Give a good pilot a slightly damp, windless dawn and he can slay nearly one hundred percent of the anopheles wigglers on his beat for a net cost of about forty cents per acre. Anybody who has ever had malaria will tell you that that money is well spent.

Air-borne submarine war is made on anopheles by toting specially bred minnows from Savannah, Georgia, to the infested waters. Each female of these little fish is capable of producing from two hundred to four hundred little baby minnows every four to six weeks, and

every one of those babies wants mosquito wigglers for nursing bottles. It does not take them long to clean out a bad body of water. And they adapt themselves, being able to live in almost any water.

The minnows—*gambusia affinis* is their right name if you want to be introduced—are carried in specially made cans in which the gentle sloshing of water en route releases oxygen for the fish to breathe. Carrying them by air express gets them onto the job quickly when the mosquitoes threaten to gang up on a community. And after all, speed is the main advantage of any air attack.

Speed is the advantage of air war in carrying the enemies of the pests which attack farm crops.

Those pests are peculiar. Nature herself can grow food plants which resist the pests. But men like better-tasting crops than those which grow naturally, and take a lot of trouble to develop them. The trouble is, the pests prefer those better-tasting varieties, too. They also like the best kinds of cotton and other nonedible crops.

Every pest has its natural enemies, if the scientists can only find them. The enemies may be wasps to sting the pests, beetles to eat them, larvae to use them for baby foods, or fungus to give them athlete's foot. But bring the enemies and the pests together—and *presto pesto finis*—to invent our own Latin.

Airspeed gets the pest enemies there before they can die en route. And those enemies may have to come from halfway around the world. In California, the red-scale pest was doing millions of dollars' worth of damage to oranges, lemons, grapefruit, et cetera. And the necessary enemy was a delicate, wasp-like insect found way off in South Africa. The wasp larvae were packed in

ordinary banana squash which was infested with red scale for them to eat en route. They had been shipped this way before, but before air express speed was available, most of them died on the journeys. Now they get there alive and rarin' to get at that pest.

Scientists go all over the world to find the enemies which pester pests. It is a tricky job. After the necessary enemy is found, the scientists have to be sure to ship none which have with them their own enemies—or pests to pester the pests of the pests.

The sugar-cane borers of the Island of St. Kitts—this is the island where the colored population speaks with a rich Irish brogue learned from their original masters—were fought with dusts, sprays, and even by burning whole acres of infested fields, all to no avail. But in the grasses of the upper Amazon was a fly which just doted on a diet of borers. A million of those flies, in regiments of ten thousand, were flown to St. Kitts. And the pest of St. Kitts was soon on the fritz.

Air war is made on diseases which attack within bodies, too.

When an epidemic of a kind of infantile paralysis threatened farm horses, the hens' eggs needed for embryos to make serums were flown to a New Jersey laboratory, and the serum was flown back to the horses.

In thousands of cases, serums, anti-toxins and medicines have been flown to halt epidemics among human beings, or even to cure snake bite and other illnesses of individuals.

But the great air war which goes on against pests is the biggest and most neglected news of the day. For in time the air war against pests may even create as much wealth and happiness as the air wars against human beings have destroyed.



## About the SOLO CLUB and how to become a member

Feeling that there is a definite need for a means of recognizing those pilots who have experienced the supreme thrill of their first adventure alone into the blue on man-made wings, Air Trails has formulated and founded the SOLO CLUB.

This club is open only to those who have actually made a solo flight in heavier-than-air craft, either motorless or powered. It does not matter when or where such flight was made. Applicants must furnish the membership committee with satisfactory proof of their qualification for acceptance. There are no dues. Once a member, always a member.

To obtain your sterling silver SOLO CLUB lapel wings and life membership identification card, comply with any of the following requirements and sign. Send with fifty cents to the SOLO CLUB, Membership Committee, Air Trails, 79 7th Ave., New York City.

**Proof of Qualification as a SOLO CLUB Member**

1. Dept. of Commerce license and number if held

2. F. A. I. license and number if held

Or attach any of the following:

3. Evidence of military or naval air corps service.
4. A letter from your instructor testifying to your solo flight, giving his rating and license number.
5. A notarized statement, preferably with witnesses, giving all details and data of solo flight and plane used.

In submitting the above for membership in the SOLO CLUB, I certify my willingness for the Membership Committee to investigate my application.

Applicant \_\_\_\_\_

(please print)

Age \_\_\_\_\_

Street \_\_\_\_\_

City or Town \_\_\_\_\_

State \_\_\_\_\_



## NO HEROES NEEDED

(Continued from page 18)

letting the ship fly itself off. Landings are harder, but given good air, even a poorly taught student can get away with a lot without getting into trouble. Flying is simple, yes. Stick back to climb, forward to dive, push it to the side and the plane will bank and turn. You can even get along pretty well without the rudder if you want to.

The catch is in co-ordination and air conditions. The average beginner, used to cars, doesn't realize that fingertip control is sufficient usually. He over-controls badly. And if air conditions throw a ship into a steep bank there's trouble—or maybe the student flies into laminar air and the plane is in a stall. What then? The C. A. A. answer is more careful training, not less. Eight hours dual, then thirty minutes dual for every hour of solo until thirty-five hours have been logged. The idea is not to make flying more expensive, but to make a simple matter as safe as it should be by providing training for various circumstances.

Even if the student gets away with it, what about civil air regulations? No one may solo, say they, without eight hours' dual instruction. If he does, he and the plane owner are each liable to a thousand-dollar fine, which is collected by the department of justice through its G-men. Those headlines aren't the kind the student is after.

What about the tour idea?

Usually the experience the pilot offers is far too little. He may join the Lightplane Cavalcade to Florida and by staying with his own squadron get along beautifully on ten hours' solo, or in territory he knows well he may fly from town to town, checking a dubious compass course by landmarks that are familiar or by following the trusty railroad until he learns to follow a compass efficiently.

When he takes a plane out to tour unknown country he has a job. In the West it is somewhat easier than in the East. Section lines form an angle with the fuselage of the plane, so one may check his angle of crossing against the angle his course makes with the meridians on his map. By that method drift can be checked adequately. In many parts of the East or completely unsettled parts of the West, these lines are missing and railroads and roads and fences blend into a bewildering maze that is hopeless. Drift in a light plane is worse than in a faster plane, too. Assume a quartering headwind that holds the plane back to fifty miles an hour, and drifting it ten miles per hour off course, the pilot will be ten miles off at the end of fifty miles. At a hundred miles per hour he'd be only five miles off course. At a hundred and fifty miles per hour he'd be off a little more than three miles. The

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**SKYWAY MODEL AIRCRAFT SUPPLY CO.**

383 Seventh Ave., Dept. A, Brooklyn, N. Y.

faster the ship the oftener he can check known points and correct for drift.

Not that flying a light plane is difficult. It is, relatively, a safer plane for the beginner to fly. He can set it down almost anywhere—in the road if necessary. He can use automobile gas from roadside stations. He can even crack it up in trees without injury to himself if worst comes to worst.

The point is that flying any plane, when it becomes a day-to-day, all-over-the-country, in-any-kind-of-conditions job, demands training. Don't forget crack-up headlines are easy to get, too. Why should a company risk that publicity? That point applies even more to the girl. She can get more publicity than a boy because she is rarer. Good publicity? Fine! But if she cracks up, she continues to get bigger headlines. Not so good.

Further, flying involves so many things that a beginner would be swamped by questions before clubs. Flying is a profession, not a game.

In the third place, only the pilot who has toured the country realizes how expensive such a tour is. Considering that, if a company sponsors such a tour, they send a proven pilot and probably a salesman or someone from the advertising department who knows the policy of the company.

But what about ocean flights and long-distance land flights?

Their ultimate value is questioned by many aircraft officials now. Lindbergh on his epochal solo flight convinced people that flying might be practical. Post and Earhart kept aviation foremost in the public mind in the developmental era when airports and air aids were being set up and air lines started. Howard

Hughes, Merrill, and Lambie dramatized the idea of transocean flying in passenger-carrying planes. Corrigan came at a time ripe for publicity because of the contrast of his ancient crate with the Hughes transport.

The "firsts" are past now. The light plane, because of its ease of flying and low cost, will probably be the basis of private flying with power added as increased production makes them possible without raising price. But even though that is true, there is nothing very dramatic about a relatively slow plane buzzing along for so long that the public has almost forgotten about it before it lands. When it does catch public attention, the advertising is apt to be general. Johnny Jones made a transcontinental flight in an Aeronca—but later in St. Petersburg the papers ran a brief notice that "Johnny Jones, who flew coast to coast in a Cub, is in town." On the whole, the public notes that somebody in some airplane did something—and forgets about it.

If for some reason the company looks at a proposed flight with favor, they choose a pilot they know. Johnny Jones was known a long time by Aeronca officials. Eldred was a Taylorcraft dealer. Kress and Englert were test pilots for Cub before Lenape Motors backed them in a Lenape Cub flight to Miami and back to New York nonstop.

Usually the publicity is too uncertain, for the public is becoming discriminating. They know that airliners are suited to transocean flight, and light planes are for pleasure or shorter business flights. By the time a light plane were loaded for a transatlantic flight that had a possibility of success, it would have to take off with twelve hundred to fourteen hun-



dred pounds overload, or an overload of more than twice its own weight. The pilot would have to know celestial navigation and meteorology perfectly to take advantage of every favoring factor, and minimize the unfavorable. Even then, drift off course enough to need four or five additional hours—and the fish have fresh meat for breakfast.

Then what is the answer?

Ask the Sea Hawks of Wildwood, N. J. They started in February with seventeen cents in their treasury. They raffled off a radio, gave roller-skating parties and dances. By early April they had the down payment on a light plane.

Ask Tom Davis. He and Al Amola decided that they wanted to fly. Tom had fifty dollars. Amola borrowed a hundred dollars. That was enough for a down payment on a good used plane. Before they took delivery they had signed up their milkman, the soda clerk, a taxi driver, the mailman, and a bus driver. They learned on the profits. Profits? They made three hundred dollars the first month and still operate four years later at Atlantic City.

Ask Layton Bailey, who planned on organizing a club one subzero night. No one showed up, so he organized a school instead, signed up nine students in advance, learned to fly in two days at the factory, and flew the plane home with his newly hired instructor.

Bailey's method, incidentally, is similar to what is known as the "operator's club plan." The operator collects an initiation fee of around thirty dollars from each member. Then he collects a dollar a week dues from the members and sells them time at three and a half dollars an hour. Over a year's time the initiation fees and dues have bought him his airplane, and when the club is not using it, he can rent it to outsiders for his profit. The students, even with initiation and dues, have saved approximately fifty percent on learning to fly if they fly as much as a hundred hours a year, and have none of the responsibility for the ship. They who want to fly cheaply should investigate the plan either with the idea of starting a club or selling an operator on the idea.

Sometimes you can find a field where the operator will let you work out fly-

ing time. And it is surprising how hours mount if you simply fly occasionally on pennies saved from some other hobby.

There's not much chance for a job until you get a limited commercial at least, and the jobs go to those who have shown the instructor that they are level-headed. It will help, too, to have something besides just the flying ability—salesmanship or photography, for instance.

The fun? The thrills? How about a purely stunt flight or record?

Sometimes pilots go up and set spin records or loop records or upside-down records. So what?

They're usually done in the same spirit as the small boy walks a board fence, just for the dickens of it. There's no point either in walking the fence or the number of spins you can do.

Howard, Murphy, Peterson, Rankin, the Graneres are not heroes. They are artists in stunt work. They know to a breath what the plane will do. If you don't believe knowledge makes a difference, go up with them if you get the opportunity. They slide through the stunts smooth as honey. Then try it yourself. Unless you have been trained, too, you'll feel the plane shudder. The light plane is sturdy, but it should be flown correctly.

To many, flying spells adventure. Most of the pilots get it out of their systems early. If not, they may fly several years in light planes, build a nest egg of money and ability, then find a backer for racing in the Thompson or Greaves or Bendix. More than one has that dream tucked away.

But there is plenty of heroism in plain everyday flying of many who would be miserable at the idea that anyone called them heroes. There's good-looking Gren Hollins, game commissioner in Alaska, who goes on long flights beyond Point Barrow in game checking. For weeks, with only the occasional lone Eskimo for brief company, he flies from one gas cache to another, the northern lights slashing like beacons across the sky. If adventure means pitting yourself against nature, go to Alaska and get a job like his. He uses light planes both because they are cheap (they cost no more than a dog team), and because they can out-

ride a storm that would batter a heavy plane.

There's Clare Hartnett, now Wally Peery's private pilot, who spent one Christmas week flying through storm and ice to carry food, blankets, medicine and doctors into the district around Wallace, Idaho, where several towns huddled miserably in flood waters.

There's Roy Shreck of Spokane, Washington, who "flies the weather" every night, bucks winds and freezing sleet, meets static that sometimes blanks his radio. He would grin at the idea of being a hero, but last winter, when storms forced him down in the mountains for four days he struggled through snow to his armpits before he reached a trapper's home, while national guards and private fliers hunted. His was a hero's welcome with dinners and newspaper reports, and with national networks shouting bulletins in answer to public interest in an everyday job heroically done.

Alden Williams, at Bend, Oregon, is no hero, he would say. Over fifty CCC boys will swear differently when they remember a dozen trips he made through murk, churning currents, and floating ashes to carry them water, food, and tools to fight the fires sweeping down the Cascades. No pack train could reach them, but Williams, in his heavily loaded little plane, did.

But perhaps that isn't heroism. That's work. No one held a parade for him. His little two-place tandem fifty-horsepower plane doesn't look like a hero's chariot. No, he couldn't be a hero. He doesn't fit the pattern.

So go ahead and write to the aircraft companies and tell them your ideas. They'll have heard them before, probably; not a new idea has been broached in the past two years to any aircraft company advertising managers with whom I discussed the problem. Their answers will be as usual: No heroes needed today. Thanks.

But ask the people at Wallace, Idaho, whom Clare and his fellow pilots fed in the floods. Ask the people at Spokane what they think of Shreck. Ask the CCC boys whom Williams saved.

And then, learn to fly, stick to your job, and—maybe—

This hero business is funny, isn't it?

## WHIRLING WINGS

(Continued from page 22)

helicopter consisting of two propeller-like sets of lifting vanes which were mounted one above the other and rotated about a central, vertical shaft. Sarti failed because, like most of his contemporaries, he depended upon man power to operate his machine.

In 1843, Sir George Cayley, "Father of British Aeronautics," brought a scientific mind to bear upon the problems of

heavier-than-air flight. His "Aërial Carriage" combined the features of the airplane and helicopter in a strikingly modern concept. A pair of outriggers protruded from either side of an inclosed body containing a light steam engine. Upon the outboard ends of these structures were mounted vertical shafts around each of which two sets of vanes revolved. Forward propulsion was fur-

nished by a pusher propeller and the machine was controlled by means of vertical and horizontal tail surfaces. A model built from Cayley's plans by the Smithsonian Institution proves that had he put his theories to the test, mankind might have flown much sooner and the development of aeronautics might have followed an entirely different path.

Somewhat similar to Cayley's machine, but designed on a grander scale, was the "Steam Air Liner" proposed by Gabriel de la Landelle (Turn to page 72)





# MODEL MART

The purpose of this department is to provide our readers with the most complete directory of Manufacturers of Model Airplanes, engines, parts and accessories. Your name and address will be listed in this directory for \$1. per listing. Your name may be shown under any or all divisions as you request. Copy for your listing must reach us not later than the fifteenth of the second month preceding the month of publication. In all cases cash must accompany order and new advertisers are asked to give references. Advertisers whose display advertisements appear in other parts of this issue are indicated by capitals and are listed without cost.

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(Continued from page 70)

in 1863. His ship had two masts, about each of which revolved four huge air-screws. Atop both masts were umbrella-like parachutes which were to be carried folded except in time of need. The hull of the vessel was fitted with wings and control surfaces and was equipped with a lifeboat. A pusher propeller was provided.

### MODERN HELICOPTER DEVELOPMENT

Since the close of the War, the problems of helicopter flight have engaged the attention of designers in many countries. A number of successful machines have been built and the record of flight duration has slowly but surely increased. Pietro D'Ascanio, an Italian engineer, constructed and flew a rotating-wing craft which rose vertically, remained in the air eight minutes and traveled over a mile.

A Spanish designer, Raoul Pescara, designed a number of helicopters which he flew with excellent results. One of his disciples, a Belgian named Florinne, further improved the Pescara designs and set a new world record by remaining aloft ten minutes. Louis Breguet, noted French aeronautical engineer, designed a successful vertical-flight ship which had a forward speed of more than a hundred miles per hour. In England, two young Austrians named Hafner and Nagier test-flew a machine they called the "Hover-plane."

American designers have been equally busy. LePage and Platt experimented extensively with a succession of helicopter designs. Wind-tunnel tests at the Guggenheim School showed very promising results. The Curtiss people are said to have spent over a million dollars and four years of effort developing the Curtiss-Bleeker helicopter. This interesting machine was unusual in that it had four deep-chord, rotating wings, each driven by its own tiny propeller. It was powered by a P. & W. Wasp mounted horizontally.

### THE AUTOGIRO

During the early 1920s, a Spanish aeronautical engineer by the name of Juan de la Cierva became disgusted with the shortcomings of fixed-wing airplanes. After witnessing the stall and crash of his latest design during a test flight, he determined to discard conventional aerodynamic theories entirely and to start a fresh search for a fundamentally different means of heavier-than-air sustentation. Out of this decision was born the only basic advance in the science of aeronautics since the flight of the Wright Brothers at Kittyhawk. The fruit of the young Spaniard's quest was the discovery of a new and original principle of support by autorotational force. Combining the first syllable of the name he

had bestowed on the new force, with the gyroscopic action of his machine's propellerlike wings, Cierva christened his odd-looking aircraft the Autogiro.

The main point of difference between the autogiro and the helicopter is that the giro's vanes are not driven by the engine, but are operated by the natural autorotational force developed by the weight of the body of the machine acting upon the freely turning vanes. The engine merely starts the vanes whirling before a take-off and then furnishes forward propulsion sufficient to keep the craft in level flight. The minimum forward speed required for this purpose is about fifteen miles per hour. Below this limit, the giro commences to slowly lose altitude. If the engine is cut off entirely, the machine sinks vertically at a rate of descent somewhat slower than that of the standard parachute.

Cierva's early giros had one serious fault. The original models were of a bastard design, combining the sustaining force of rotating wings with the control surfaces of a conventional airplane. In order to accommodate ailerons, elevators and rudder, his giros were fitted with stub wings, a fin and a stabilizer. Being dependent upon forward motion for sufficient airflow to function efficiently, the controls became sloppy at low speeds and were practically useless in vertical descents. This made no great difference in smooth air. Under gusty wind conditions, however, the loss of control in landing resulted in a number of expensive crack-ups.

Cierva's solution of this problem was the development of the direct-control giro. He eliminated the stub wings, ailerons and elevators and controlled his new model by means of a tilting rotor head which altered the plane of support created by the whirling rotors. As the blades are designed to revolve at a wing-tip speed of over two hundred miles per hour, positive control is assured right up to the moment that the machine comes to rest on the earth.

In 1934 Cierva announced the final step in autogiro development. This was the "direct take-off" device that permits the machine to leap into the air from a standstill. By means of a sort of aerial gear-shift arrangement, the pilot speeds up his rotors at a neutral angle of attack. When he shifts to a high-lift angle, the kinetic energy developed lifts the giro directly into the air. This improvement enables the autogiro to take off as well as land on the proverbial dime.

A further refinement by the Pitcairn Co. of Willow Grove, Pa., added a hook-up between the engine and the landing wheels that permits the pilot to fold back his rotors, unclutch his propeller and drive his machine home like a car. This "roadable giro" comes very close to being the ideal light plane of the

future. It can be parked in the home garage, take off from any back lot, and land beside a highway if the weather gets too thick for flying. No special clothes need be worn in its comfortable cabin and no parachutes are required as the machine is sustained in the air on its own mechanical 'chute. That dangerous old bugaboo of flying, "engine failure," is relegated to the status of a minor annoyance.

### RECENT TRENDS

Despite the high degree of development reached by the autogiro, rotary-wing engineers are now inclining back toward the engine-driven wings of the helicopter. The great success of the twin-rotored Focke-Wulf machine in Germany has convinced many of our experts that the more flexible control characteristics of the helicopter give it a fundamental advantage over the giro.

The helicopter also possesses a theoretical advantage over both giro and airplane in that it requires only a single-stage translation of power from the engine to its supporting surfaces. As every translation of power inevitably results in a considerable loss of energy, it can readily be seen that the helicopter is the more efficient form of aircraft.

This higher performance from lower power is further increased by an absence of fixed-wing surfaces, which permits an almost perfect streamlining of the helicopter body. It also permits a compactness of design suitable for a combination air-road vehicle. The element of safety possessed by the autogiro is, of course, also a characteristic of the helicopter. In the event of engine failure, the rotors automatically disconnect and the machine, in effect, becomes a giro.

Most of the basic problems of vertical flight seem at last to have been licked, and the helicopter is now in the stage of development that the airplane went through just prior to the World War. The main job now is one of simplification and refinement. Due to the incomparably greater knowledge of aerodynamics that we possess today and to the highly efficient power plants now available, progress in helicopter development should be far more rapid than in the case of fixed-wing aircraft.

Some of America's greatest aeronautical engineers have come to believe that the conventional airplane of today may be displaced completely during the next few years. Several of them even envisage the development of huge four-hundred-miles-per-hour helicopters, capable of carrying one hundred or more passengers on transoceanic runs. If ships of this type ever appear, they will combine high speed with safe, slow, vertical take-off and landing characteristics, which will afford a degree of comfort and safety now unknown in aerial transport.



## THE PRIVATEER

(Continued from page 36)

consecutive coats of cement applied at their junctions with the bulkheads. Allow at least forty-five minutes to elapse between the applications of the cement.

Our attention is next focused on the construction of the landing gear on Plate 2. The true length of the landing-gear member is indicated. From this scale a full-size layout is made, over which you bend the landing-gear struts to their proper angle. Both members are made exactly the same, with the exceptions that the axle is incorporated in the front member, and the rear member is bent as illustrated on the side elevation of the ship. It is best to bind both members to the landing-gear supports before completing the final bending of the rear strut. The rear strut is finally bent, bound, and soldered with fine tinned or copper wire.

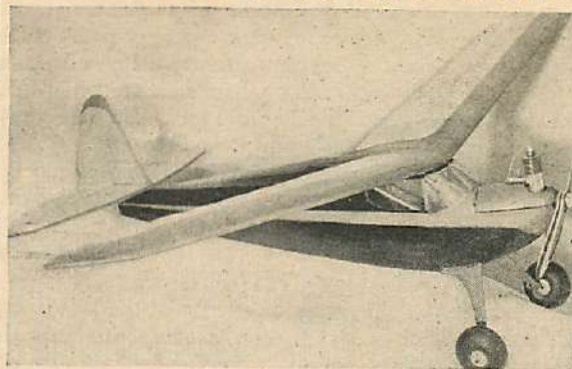
Our next step is the affixing of both the coil anchorage and the battery case. The ship's cross section being brought down to minimum contest requirements allows room for only pen-light cells. It is absolutely necessary to make provisions in this case for booster batteries. Note the booster connections on Plate 1. The ignition system is the very heart of the motor. Therefore give every effort to a painstaking job of wiring. It will surely pay its rewards.

The wing mounts are next laminated together, and after being allowed to dry, they are shaped and sanded smoothly as illustrated. Before affixing the wing mounts in place, sew the birch dowels to the wing mounts. The mounts can then be notched to the corresponding thickness of the bulkheads and inserted in place. After checking the alignment of the wing mounts both fore and aft, they can be given several coats of cement. This leaves our fuselage ready for planking.

In selecting the planking, be sure to select the proper grade for this purpose. A soft, pulpy balsa is most desirable. You will note that stringers are only used to the rear of the planking, where the fuselage is covered with tissue. It is best to use a tube of cement which is refillable from the bottom for the planking operation. The planks are laid side by side and are held in place with pins until the cement dries. After all the planks have been applied, the ends may be trimmed off and the entire surface sanded smoothly. The planked portion is covered over with paper, along with the rest of the fuselage. Our nose blocks of  $\frac{1}{2}$ " soft plank can now be cemented in place. Do not attempt to trim until the blocks have thoroughly set. The hatch cover over the ignition unit should be fitted to the fuselage to a snug fit.

The hatch is best held in place by

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rubber bands anchored on the inside of the hatch and fuselage. This tends to snap the hatch in place when pulled out of position.

### TAIL SURFACES

Both tail surfaces should be sealed to full size before attempting any of the construction. All the component parts of both the rudder and tail should be cut out first and then assembled over your full-size layout. Assemble the entire tail unit on the fuselage that is both the rudder and elevator before affixing the leading edges to either surface. Note that the tail skid is embedded in the rudder outline. Because of the extreme thinness of the trailing edges, it is important that they be laminated to resist warpage and dope distortion. Fill in with a soft grade of balsa wherever indicated on the plans.

From a standpoint of trim it is of utmost importance if you are using the standard Smith coil pen-light cells and an engine under 3.5 ounces, that you give the elevator three degrees positive incidence. For engines between 3.5 and 4.5 ounces, two degrees will suffice. Finer adjustments can be made with your horizontal trim tabs. The entire tail assembly is covered with a light grade of bamboo tissue and given several coats of dope. Be sure to check against distortion after each coat of dope.

### WINGS

As in the tail assembly, a full-size drawing is required. This should be sealed up accurately and laid out on a level work board. Cut out and notch all the required parts from a good grade of balsa. Note the recess at the leading edge of each rib to accommodate the sheet-balsa covering. It is recommended to those having a limited amount of power available that the sheet covering on the lower surface of the wing be left off.

The best general procedure to follow on this type of wing is to lay your lower front and rear spars over their proper locations on the drawing. The ribs

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should next be inserted over the spars, at the same time keeping an eagle eye on their perpendicular alignment. After the check they can be cemented together. The upper spars are then placed in the rib notches and adhered to the ribs. Be certain to incorporate the proper angle at the butt rib, so that the correct amount of dihedral will result when both panels are put together.

Our spars are next boxed to act as surface for the wing joiner, which is shown in full size on Plate 2. The leading edge of  $\frac{5}{32}$ " square balsa, which can be generally stripped from oversized  $\frac{1}{8}$ " medium-hard sheet, is next cemented in place. The trailing edge, which has been roughly shaped before attachment to the ribs, can next be adhered in place and finished off after the cement has been allowed to dry.

The wingtips of bamboo are usually shaped over some hot object. A good method is to shape the tips over an open gas flame. Be sure to keep bamboo far enough away from the flame to prevent charring. Bend the tip a little at a time until it conforms exactly to the full-scale tip. Enough bamboo should be shaped so as to permit the piece to split in two, thus insuring two identical tips.

After the tips have been cemented in place, the sheet covering over the leading edge and center section should be cemented in place. Be sure to select the

proper grade of wood for this step. The balsa should possess good bending qualities. Before applying the sheet covering to the lower surface, the panels should be cemented together and the plywood wing joiner cemented in place against the boxed spars. Be sure that both panels are aligned to one another. The woodwork should be given a smooth sanding before covering with a light grade of bamboo paper.

### TEST-FLYING

The center of gravity of the Privateer, all ready to fly, should run through thirty percent from the leading edge at half the span. Glide-test the ship from an elevation. Be sure that the nose shows no tendency to come up during the glide. The model may now be given its first power flight. Be sure to set the timer for not more than fifteen seconds for the initial flight. The trim flaps are for minor adjustments only. If the stall or dive is too critical, check the balance and alignment of wing and tail surfaces.

### BILL OF MATERIALS

**Fuselage**  
 3 sheets  $\frac{1}{16} \times 3$ ", bulkheads  
 12 pcs.  $\frac{1}{16} \times \frac{3}{16}$ ", stringers  
 4 pcs.  $\frac{1}{8} \times \frac{3}{16}$ ", longerons  
 1 pc.  $\frac{5}{16} \times \frac{1}{2} \times 7$ ", motor mounts, (bass or spruce)  
 $\frac{3}{16} \times \frac{3}{16} \times 10$ ", landing-gear mounts

1 pc.  $\frac{1}{8} \times 2$ " and  $\frac{3}{16} \times 20$ " birch dowel, wing mounts  
 1 pc.  $\frac{1}{2} \times 2 \times 12$ ", nose block  
 30 pcs.  $\frac{3}{32} \times \frac{3}{8} \times 18$ ", planking  
 1 pc.  $\frac{3}{32} \times 2 \times 8$ ", battery-box and coil compartment

### Wing

2 pcs.  $\frac{5}{32} \times \frac{5}{32}$ ", leading edge  
 3 pcs.  $\frac{1}{16} \times 3$ ", ribs  
 2 pcs.  $\frac{7}{32} \times \frac{3}{4}$ ", trailing edge  
 5 pcs.  $\frac{1}{20} \times 2$ ", sheet covering  
 8 pcs.  $\frac{1}{8} \times \frac{1}{4}$ ", spars  
 1 pc.  $\frac{1}{16} \times 1 \times 5$ " birch ply, joiner  
 1 pc.  $\frac{1}{16} \times \frac{1}{4} \times 15$ " bamboo, tips

### Tail Assembly

1 pc.  $\frac{1}{16} \times 2 \times 18$ ", ribs  
 2 pcs.  $\frac{1}{3} \times \frac{1}{4}$ ", spars  
 1 pc.  $\frac{3}{16} \times 2 \times 18$ ", fill-in  
 1 pc.  $\frac{1}{20} \times 2$ ", trailing edge  
 1 pc.  $\frac{1}{8} \times 2$ ", leading edge

### Skid and Landing Gear

2 pcs. .0625 piano wire  
 3 ft. light copper wire generally found in transformers

### Motor Plates

1 pc.  $1 \times 2$ " 17 S. T. Aluminum  
 2 sheets light bamboo tissue covering

### Accessories

1 pt. clear dope  
 $\frac{1}{2}$  pint cement  
 1 small spool fine silk thread  
 2 3-48 bolts and nuts for booster connections

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These are just a few of the authoritative articles in the current issue of

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# AIRPLANES AND ELEPHANTS

(Continued from page 19)

Khan, head of Moslem faith in India—is perhaps worth mentioning. He spends most of his time in Europe and his bath water is carefully bottled and corked and sent back to be retailed to the faithful in India. It is rumored that he bathes three times a day. Who wouldn't? Once a year, at an impressive ceremony in India, he is presented with his weight in gold. As his figure isn't particularly willowy, the result is usually very gratifying. In fact, both these systems have much to commend them.

Money, therefore, being no object, the reception of the airmen and their accommodation are on a truly princely scale. On landing, the party is invariably greeted by a deputation of magnificently arrayed officers of the State, and the first impression is that one has strayed into a lion tamers' convention. Champagne is immediately served on the airfield to the airmen, a horde of servants seize hold of 'chutes, suitcases and map boards, and the whole party moves toward the tents where the airmen are to be accommodated.

A large, triple-lined tent is at the disposal of each member of the crews. The inner lining is of silk, the floor covered with priceless Oriental rugs, and to cap off the appointments, there is an individual servant for everyone. Native officers trip over each other seeing that everyone is made comfortable, and being assured on this point, everyone is led to a large marquee, where a banquet of Bacchanalian proportions is set out. The prevailing impression is that the air force works best when fortified with copious quantities of liquor. Attention is drawn to the fact that two barrels of beer will be permanently on tap to take care of emergencies.

The first day is usually devoted to artillery observation. Before the take-off, the airmen are treated to an inspection of the battery. Drawn by bullocks, the battery ambles into position, under the direction of the battery commander who, more often than not, is mounted on a camel. The equipment is antediluvian, but nobody cares. What your Indian wants from his artillery is noise, and lots of it. Accordingly, then, the aircraft take off and circle the target preparatory to sending back radio observations to the battery. The usual method of doing this is to consider the target as the center of a clock. Thus a report of "100 yards at 12 o. c." would indicate that the guns are overshooting by a hundred yards. Whoever invented the system could never have had in mind that one day his method might have to register errors of miles instead of yards. In fact, half the airmen's difficulty is to find the bursts at all, so freely are they

scattered all over the country. However, as the results are quite shamelessly fabricated, miles read as yards and the air is thick with messages of approval.

At the end of the day the results are tabulated and everybody is supremely content. The senior air force officer congratulates the battery commander on the extraordinary quality of his shooting, the battery commander has a message from the G. O. C. that another banquet is ready, at which the whole party hotfoots back to marquee and the barrels.

In the meantime, preparations are under way for the more important phase of the maneuvers. The military resources of the State are divided into two armies, an invading force and a defending force. The airplanes are divided equally between both armies, and an armistice is decided on from twelve o'clock onward each day, when both sides fraternize with each other, it being an unthinkable hardship to allow the afternoon siesta to be interfered with.

The ruler of the State assumes command of the defending force, and his chief of staff that of the invaders. The ruler conducts the campaign from the howdah of a gayly caparisoned elephant, and his aids-de-camp are mounted on elephants of lesser magnificence. In fact, the whole military hierarchy has some sort of quadruped, ranging through horses, camels and donkeys. The privates travel on their own flat feet, but they are few in number; indeed, judging by the number of generals around, one gets the impression that military genius gets early recognition in India.

The invading force hies itself off to a position fifteen or twenty miles away, the airplanes going through the pantomime of searching out the terrain for lurking warriors. Camp is finally struck and a courier is dispatched to the defenders with an ultimatum. The defenders reject the ultimatum, the courier returns to his camp, and the war is on.

Providing everyone bears in mind that under no circumstances must the ruler of the State be on the losing side, everything goes along beautifully. The attacking airplanes take off to reconnoiter the enemy's position. The rôle of both attacking and defending airplanes is strictly partial. The defenders bring back full and accurate information as to the invader's strength and position, while the invading airplanes, though they practically trip over the ruler's army, it being difficult to camouflage elephants under any circumstances, monotonously repeat "enemy unobserved."

Both sets of planes then indulge in a one-sided dogfight, the noisier the bet-

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<b>18" Balsa</b> 1/16x1/16x100—5c 1/16x1/16 35—5c 1/16x3/16, 18—5c 3/32x3/32, 30—5c 1/4x1/4 30—5c 1/4x1/4 10—5c 3/16x3/16 8—5c 1/4x1/4 6—5c 1/4x1/4 3—5c	<b>BAMBOO</b> 1/16 sq. x 14 4 oz. for 28c 1/16x1/16x1 1 doz. for 8c <b>COLORLESS CEMENT</b> 1 oz. 5c; 2 oz. 8c 4 oz. 10c; 1 pt. 50c Clear dope, ba- nana oil, thinner, same price as cement. <b>COLOR'D DOPE</b> White, yellow, orange, blue, red, green, olive drab, black, silver, gold or gray. 1 oz. 6; 2 oz. 10 4 oz. 19; 1 pt. 65 <b>HIGH GLOSS</b> 1 oz. 9c; 2 oz. 16c 4 oz. for 28c <b>RUBBER-LUBE</b> <b>MICRO-FILM</b> <b>WOOD-FILLER</b> 1 oz. 10; 2 oz. 15 <b>WHEELS per pr.</b> Breh Bha Celu 1/2" .01 .03 3/4" .02 .04 .05 1" .03 .05 .07 1 1/2" .04 .08 .10 1 3/4" .07 .10 .16 2" .15 .15 .30 2 1/2" .24 .24 .50 3" .40 .40 .75c	<b>TISSUE, AA</b> All col., doz. 19c Superfine, white, 1 doz. 15c <b>ALUM. TUBING</b> 1/16, 3/32, 1/4, 3/16, 1/2, 1 ft. 10c <b>PROPELLERS</b> Balsa Paulo- Mach Cut wina 5" 4c 10c 6" 5c 15c 7" 6c 20c 8" 7c 25c 9" 8c 30c 10" 8c 35c 12" 10c 45c 14" 14c 15" 15c 60c <b>RUBBER</b> .045, 25 ft. 5c 1/16 sq. 15 ft. 5c 1/4 flat 15 ft. 5c Statin for 50c 3/16, 10 ft. 5c <b>THRUST BEARINGS</b> Small, 1 doz. 10c Large, 1 doz. 15c <b>CELLULOID MOTORS</b> 1 1/2"—1 for... 10 2"—1 for... 15 2 1/2"—1 for... 20 3"—1 for... 20
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ter. Engines scream, blank cartridges in the machine guns add to the general din, until the invaders are forced in a series of graceful curves to the ground, with clouds of smoke—created by cans of stannic chloride on the bomb racks—giving an air of realism to the death throes.

The game of tag continues, and amid the deafening uproar of blank shells, trumpeting elephants, and braying jackasses, the invaders enter the trap prepared for them. At a prearranged signal the ruler's army makes its presence known to the invaders—they've been in sight of each other all morning, but who cares?—and the ability of the ruler as an army commander is triumphantly acclaimed.

More congratulations are exchanged, the airmen being sure of only one thing, and that is of the heartening presence of the barrels and the fact that there is another banquet in the process of preparation.

To the uninitiated, the complete absence of women is a marked factor, until it is borne in mind that women of the Zenana, as the harem is called in India, are never seen by anyone save the eunuchs and the prince himself.

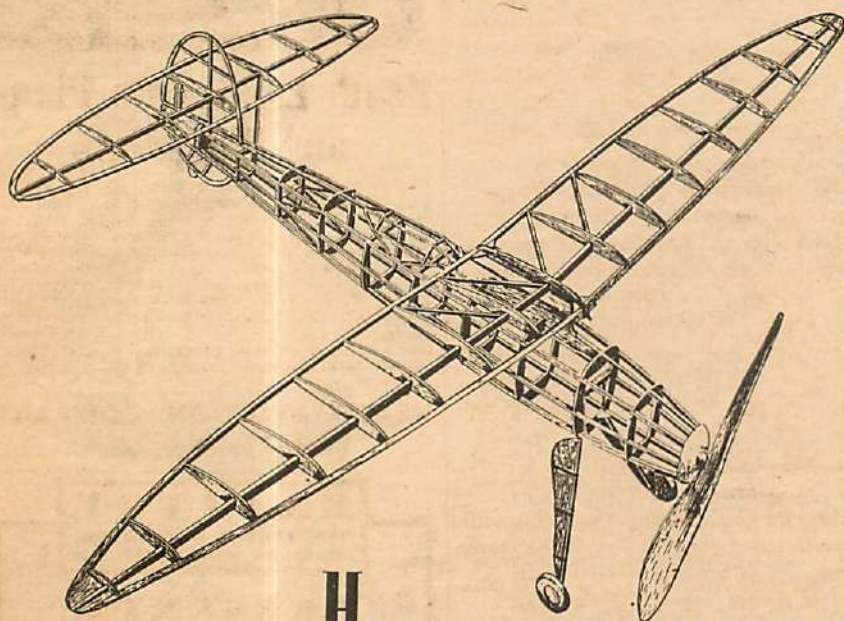
The author recalls when, on one occasion, he was attached to the Maharajah of Patiala when that ruler asked the flight commander if we would give a display of aerobatics to the women of the household. A portion of the airfield was fenced off and a fleet of cars with opaque-glass windows drove into the inclosure. The drivers left the cars and the inclosure before the women got out, and the only glimpse the airmen got of them was their upturned faces as they watched the display.

The day before we left Patiala, a shoot was arranged for us, it being a Sunday. Rifles and shotguns were distributed, and we were invited to shoot wild pig, which abound in that region. Before leaving, the barrels did yeoman service and everyone was feeling at his best. The whole secret of wild-pig hunting is stealth; one creeps up on the quarry and hits or misses, as the case may be. In this case it was miss all along the line; shots and shell were going off in all directions, and the only pig that was successfully assaulted proved to be a domestic one which, in a spirit of self-sacrifice, offered himself as a target. The rest of the bag consisted of three chickens and one hundred and thirty-

six sparrows. The author's contribution was three sparrows.

Invariably, before their departure, the airmen are taken on a conducted tour through the palace of the ruler with whose army they have been operating. No Western standard of luxury can be applied to the splendor of these palaces. The author has personally seen a bed made of solid gold, a set of gold billiard cues with the ruler's initials inlaid in diamonds, precious stones by the sack—and whole strong rooms just crammed with the stuff.

There is a princely munificence in most of their actions. During the World War the Nizam of Hyderabad gave a whole squadron of Bristol Fighters to the British government as a "gesture" of his loyalty. Gestures of this nature are not hard to take, and the British government is careful to maintain the friendliest relations with these rulers. Hence the readiness with which it permits the inclusion of part of its air power in war games that are of little military value. Such considerations do not worry the airmen who provide the entertainment one iota. It is a gala occasion for everyone concerned, and the universal regret is that all war maneuvers are not similarly inspired.



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## DETAILED WORKING PLAN OF MODEL AIRPLANE

# DOC SAVAGE

MAGAZINE ON SALE AUG. 18th



## THE WOODEN AIRPLANE RETURNS

(Continued from page 23)

repaired at the front, the more intricate all-metal ships must almost invariably be returned to some large depot far behind the lines for even minor repairs.

The aircraft industry in this country, as abroad, has suffered greatly in the past two or three years from a lack of trained and skilled metal workers, a trade requiring not only a high degree of skill, but considerable experience in actual construction before any degree of proficiency is attained. Woodworkers have been master craftsmen for hundreds of years, and in most cases can turn out as good a job on an airplane wing or fuselage as they can on a fine piece of furniture.

Anyone who has ridden in a wooden airplane will attest to their quietness as compared with a metal ship of the same specifications. Of course, the latest American metal ships are excellently soundproofed, and do have a relatively low decibel rating in this respect, but the wooden airplane seems to absorb rather than transmit vibrations, and has none of the "canny" sound or feel of some modern metal types.

To recommend a return to the wooden airplane of yesterday would be sheer folly, but there does seem to be a definite trend toward the use of wood and synthetic materials in aircraft construction, not only in this country, but abroad as well. As yet the larger companies have not contemplated a departure from ordinary metal construction, but many new companies are springing up that may herald the dawn of a new day for the private owner. Such airplanes, of the wooden or synthetic type, are certainly cheaper to build and should go far toward providing the average pilot with a dependable, moderately priced ship.

Allan Lockheed, long a champion of wooden airplanes and builder of perhaps one of the most famed of all wooden ships, the record-breaking Vega, built his new Alcor C-6-1 Junior Transport for feeder line and fast personal flying. For this ship he chose Bakelite-processed plywood for fuselage, tail and wing. Steel tubing was used for the nose section which included engine mounts, landing-gear fittings and wing fittings. Hard luck dogged the Alcor when, during a test power dive, a severe aileron flutter set up, causing one entire aileron to snap off and finally whipping the speeding ship into a spin which the pilots were not able to stop. Luckily both men took to their chutes and landed safely, while the once-beautiful Alcor plunged into San Francisco Bay and was completely demolished.

In the true fashion of a pioneer, Allan Lockheed announced that production would begin on the Alcor soon with improvements incorporated that would

prevent flutter. The Alcor showed a good turn of speed during test flights, cruising at over two hundred miles per hour, with six passengers and baggage. Test Pilot Eddie Allen expressed particular delight over the manner in which the Alcor performed with either power plant cut out.

Another unusual wooden job is the Lockheed Unitwin-powered ship, using the unique Menasco twin-engine unit which drives one propeller. This ship is now in production in the Vega plant, and it is rumored that the army is particularly interested in the power plant.

The new Bennett experimental twin-engined transport uses a new and unusual method of construction. Aircraft plywood, such as used in skinning bodies and wings, is unusually liable to warpage and deterioration, so an entirely new method of preforming and protecting this material was evolved. Instead of gluing the separate sheets of wood before bending to final shape, sheets of dry glue are placed between the sheets of wood, which are bent to the desired shape in a form, then heated and pressed in the mold under a terrific pressure. The heat melts the glue, and as the resulting veneer hardens it takes on the exact shape of the mold it is in, forming a tough and very strong shell. Over this shell, Bakelite enamel is applied to give the ship a metallike finish, unmarred by rivet lines or tacks.

The Bennett transport uses two three-hundred-horsepower Jacobs L-5 engines. In general design it is reminiscent of the Lockheed 12, but has a single rudder, placed well forward of the stabilizer. Designed as both a commercial transport and light bomber-attack ship, the Bennett was originally planned to sell for about thirty thousand dollars, much cheaper than conventional airplanes of the same capacity.

All these companies may be termed "new," and are all more or less experimental factories, testing new materials and methods of construction, rather than actually entering into active manufacture. However, when such a large and successful builder as the Fairchild Aircraft Corporation undertakes the design of a new wooden commercial plane, you may rest assured that there is definitely something to this method of construction.

Fairchild started in with their extensive research and experimental program incidental to the new 46 over two years ago. Coupled with this research program on impregnated-wood-fiber construction, one experimental airplane was built, powered with a Ranger inverted V-12 engine. It was found that the extra capital needed and the large amount of experimental work involved did not

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1/16x1/2 .....15.10

1/16x3/4 .....6.10

3/32x3/32 .....30.10

3/32x1/2 .....25.10

3/32x3/4 .....12.10

3/32x1 .....10.10

1/2x3/4 .....6.10

1/2x1 .....4.10

1/2x3/4 .....3.10

1/2x1 .....2.10

## 36" Balsa SHEETS

1/8x22 .....2 for .05

1/32x22 .....2 for .05

1/16x22 .....2 for .06

3/32x22 .....2 for .06

1/2x22 .....2 for .10

3/16x22 .....2 for .10

1/4x22 .....1 for .07

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5 foot lengths, or 3" widths, may be had by doubling the above prices. Specially Selected Stock for Gas Modelers.

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1/2x3x6 .....6 for .05

1/2x3x7 .....3 for .05

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## Rubber "Lube"

1 oz. Bottle .10

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1/2x3x5 .....30 for .10

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3/16xSkein (225') .....50

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Silver " .03 ea.

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6"-.04 12"-.10

8"-.06 14"-.12

10"-.08 16"-.15

12"-.10 18"-.20

14"-.12 20"-.23

16"-.15 22"-.26

18"-.18 24"-.29

20"-.20 26"-.32

22"-.23 28"-.35

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.028-.3" for .02

.034-.3" for .03

.040-.3" for .03

1/16-.3" for .03

3/32-.3" for .03

1/2-.3" for .03

5/16-.3" for .03

3/8-.3" for .03

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5/8-.3" for .03

3/4-.3" for .03

7/8-.3" for .03

1-.3" for .03

1 1/8-.3" for .03

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## MODEL MATTERS

(Continued from page 47)

Meet in Milwaukee. His control apparatus proved effective and he promised to have all the "bugs" ironed out in time for the National Meet. . . . Bill Effinger, of Brooklyn, New York, has another promising radio-control job. We saw the model at the recent Eastern States meet at Hadley Field, where a demonstration flight was made.

Ted Booth, for many years national secretary of the Model Aircraft League of Canada, is back in active competition. And to prove he still knows how, he won the number two position on the Canadian Wakefield team at the Eaton Company contest in Toronto.

A cyclone (not a model motor!) passed twenty miles south of Jackson, Michigan, the night before the Jackson Gas Model Club contest. The next day the wind was still howling between twenty-two and twenty-six miles per hour. Walter Good averaged 1:36.3—requiring only two flights to beat his nearest competitor's three-flight average. Good's "Guff" is one of the best designs that ever came down the model road, in the opinion of Pete Dillon, who is a mighty capable judge of such things. Incidentally, Guff won the Junior Aviator Contest last year at Akron. . . . National Contest Director Irwin Polk was at the Jackson meet and demonstrated the new Atom motor.

The Chicago Gas Model Marathon sounds like a good way to keep up the contestants' interest throughout an entire contest. It does away with the lag between official flights—the inevitable lag when they are limited to only three. And it reduces the chances of luck and fluke flights winning contests. In case you haven't heard, the Marathon is a contest to turn in a maximum number of flights of more than one minute, using only a fifteen-second motor run. Joe Konefes logged thirteen to win the first Chicago Marathon. Not bad for one day's flying! (More about this contest farther on.)

We'll be back again next month, saturated with new ideas and viewpoints (not to mention soda, ice cream, and sunburn) garnered from the national meeting of modelers as they sit among their balsa-and-tissue creations on the Wayne County Airport discussing the hobby of model airplanes. See you then.

**20,000 AT MILWAUKEE GAS CONTEST.** Earl Popp, eighteen, of Milwaukee, won the first State-wide gas-model meet held in Wisconsin. He averaged 4:08 for three official flights with a model of his own design powered with an Ohlsson motor. Earl won an expense-paid trip to the National Meet made possible by the Milwaukee Journal and the Milwaukee Exchange Club. Clifford Andre, also of Milwaukee, won second place

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with a 3:18 average. Howard Carlson had the third highest time of the meet and first highest in the Open Class—the winners of the first two places being in the Senior Division.

An estimated crowd of 20,000 watched the contest at the Curtiss-Wright Airport, north of Milwaukee. Every inch of parking space in the vicinity of the airport was taken. A detachment of national guard infantry handled the traffic and policed the field. Contest Director Harold Auler and members of the Milwaukee N. A. A. Chapter handled the flying and timing details.

Following are the high-place winners:

**Open.** 1. Howard Carlson, 2:39; 2. Leonard Melking, 1:37.4.  
**Senior.** 1. Earl Popp, 4:08; 2. Clifford Andre, 3:18.  
**Junior.** 1. Jack Glassen, 1:08.9.

About 1928 the Recreation Department of Milwaukee began to teach model-airplane building at the various social centers throughout the city. Since 1928, thousands have been taught modeling. The classes of instruction are better attended now than ever before. About three hundred are attending weekly sessions in the twelve model classes throughout the city. Ages range from six to twenty-three—with a few girls and older men also included.

The two large model clubs in Milwaukee draw most of their members from the students who have learned modeling at the social centers.

**M. A. E. OF HARTFORD, CONN.** Members of the Model Aero Engineers of Hartford took nine places in addition to the Junior and Senior State Champion Awards at the 11th Annual Connecticut Model Aircraft Meet on June 3rd. This contest is sponsored by the United Aircraft Corp.

Edward Rosen won the major award in the Senior Class. Oscar Boyajian was the champion of the Junior Class. In the outdoor events at the New England Championship Meet last June 11th, Edward Rosen won first in the glider and first in the fuselage events. Another M. A. E. H. member, William Purtell, took sixth in the outdoor fuselage event.

Club members turned out in full strength for the 3rd Annual Greater

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**Hartford Model Airplane Meet on July 4th.** It was sponsored by the Board of Park Directors and conducted by the M. A. E. H. Incidentally, this club's program calls for a course in model building whereby the novice will be trained in the fundamentals of modeling, and is offered to anyone interested. Contact Alfred W. Schmidt, 14 Hungerford Street, Hartford, Conn.

#### CONTEST CALENDAR

**Kiwanis Model Airplane Contests.** Monroe County, Pa. Rubber-powered elimination contests open to students of grades 4-12 inclusive, in Monroe County. Local eliminations to close by September 30, 1939; final county meet October 16th-21st. Rules are same as those determined by the N. A. A. for the 1939 Wakefield Contest. Complete information from Elmer Kiefer, Chairman, Kiwanis Model Airplane Club, 108 N. Sixth, Stroudsburg, Pa.

**Regular Monthly Gas Model Contests.** Creedmore, Long Island, N. Y. Sponsored by the Metropolitan Model League. Information from Irwin Polk, 429 Seventh Avenue, New York, N. Y.

**Regular Monthly Contests.** Philadelphia Gas Model Association, sponsor. Open to all N. A. A. members. Information from Jack Schwartz, 1742 N. Peach Street, Philadelphia, Pa.

**Tri-State Area Contests.** (Eastern Ohio, Pennsylvania, West Virginia.) To be held throughout summer. Sponsored by the Aero Club of Pittsburgh, Post 531, American Legion, and the Boys Club of Pittsburgh. Attractive awards have been pledged for all meets. Outdoor contests include gas-powered events in all three classes; rubber-powered, fuselage and stick; glider, hand-launched, tow-launched and catapult. Remaining contest schedule is as follows: August 19th, Tri-State Competitions, Butler Airport; September 16th, Tri-State Championships (outdoor), Butler Airport; October, Tri-State Championships (indoor), Hunt Armory, November 18th, Scale Model Competition, Boys Club of Pittsburgh.

Information about these contests or about model work in the Pittsburgh area may be obtained from Harry Vogler, Jr., 4412 Butler Street, Pittsburgh, Pa.

**Annual Southern New York Model Airplane Contest.** August 20th, Tri-Cities Airport, Endicott, N. Y. Sponsored by the Binghamton Exchange Club and the Binghamton Aëros; N. A. A. sanction. Outdoor fuselage and gas-powered events. Entry fee of 25 cents. Prizes will consist of trophies and merchandise. Full information

from contest director, R. N. McCollom, 84 Court Street, Binghamton, N. Y.

**Seventh Annual Outdoor Flying Meet.** August 26th, Lebanon, Pa. Sponsored by Exchange Club. Complete schedule of outdoor events, both gas and rubber. Information from Contest Director, Lebanon Exchange Club.

**Canadian National Model Aircraft Championship.** August 28th-30th. An annual feature of the Canadian National Exposition. Indoor and outdoor events open to all modelers. Information from the Model Contest Director, Canadian National Exposition, Toronto, Canada.

**Model Exhibition, 2nd Annual Wisconsin Hobby Exposition.** Milwaukee Auditorium, November 30th, December 1st, 2nd, 3rd. Exposition office, 590 West Kilbourn Avenue, Milwaukee, Wis.

**BOWLING GREEN, OHIO, MEET.** Richard Korda, of Cleveland, Ohio, resumed his usual championship contest work by taking first in Class B and third in Class C at a gas-model contest held in Bowling Green, Ohio, June 11th. Korda flew his Class B job 5:59.5 (average) for an easy first. Eldred Hoopengartner, of Cleveland, won the Class C with 3:32.5. A high wind discouraged many of the fliers. And to make conditions even more uncomfortable, occasional showers kept the entrants on their toes.

Bowling Green Model Airplane Club sponsored the meet. Contestants came from six neighboring States. The meet was a distinct success—not only because of the long flights turned in, but the refreshment counter reported a bang-up sale of ice cream, candy, and soda. Since the concession was handled by B. G. M. A. C., full expenses for the contest were realized, thus taking the strain off the club treasury.

**GAS MODEL MARATHON** is the name given to a unique type of contest first held at the Westchester Airport, Chicago. The Marathon was run under the following rules: motor run limited to fif-

teen seconds, minimum time for an official flight one minute; the contestant making the greatest number of official flights to be the winner. The object of the contest is to provide the opportunity to keep flying all day long rather than stopping after making only three flights. Another feature is to bring out ruggedness and reliability of design. Many models not capable of great duration nevertheless furnish their owners with considerable amusement because they can be flown all day without servicing and repairs. This type of meet is amusing and exciting to watch—since there is a great increase in the number of flights turned in.

Contestants found considerable difficulty in consistently beating the minimum flight of one minute—probably because of the fifteen-second motor run. Joseph Konefes, in the Open Class, headed the fliers with thirteen official flights. His brother Ed was first in the Senior Class with ten flights. George Ahlander was tied for the lead throughout most of the contest. His ship was making beautiful flights, one after another, when a rudder tab turned and the model crashed beyond repair. Ahlander placed third in the Open Class with six flights.

The contest was originated and sponsored by the Chicago Park District Model Airplane Association, composed of the various Chicago Model Clubs. Bernard Schwartz directed the meet with the assistance of members of the Chicago Park District.

Winners in the Marathon:

**Juniors.** 1. Donald McShane, 2 flights; 2. Fred Childs, 1 flight.  
**Seniors.** 1. Ed Konefes, 10 flights; 2. Alvin Anderson, 7 flights.  
**Open.** 1. Joe Konefes, 13 flights; 2. M. C. Burley, 8 flights.

## PLOTTING AIRFOILS

(Continued from page 50)

reference to the chord line; positive (+) implying above the reference line, and minus (—) below it.

The first step in the plotting of an airfoil section is to establish the chord length. This will depend upon the design of the model in question. Using five (5) inches as a chord length, we will proceed to plot the N. A. C. A. 4415 section from the ordinates given in the illustrated figure.

Laying off the chord line A-B equal to five inches, we next locate the various vertical stations given in the first column, along the chord. The first station 1.25% is located;  $.0125 \times 5 = .0625$  inches away from the leading edge. The second station 2.5 is located;  $.025 \times 5 = .125$  inches away from the leading edge. The third station 5 is located;  $.05 \times 5 = .25$  inches. And so on down the 100% station as illustrated.

In many instances the chord length will not be as easily divided as in the case of five inches; for example, if the chord were equal to  $5\frac{3}{4}$  inches. When such is the case, the stations along the chord can be easily located by the simple geometrical procedure illustrated.

From point A draw line A-C at any convenient angle with respect to the chord line A-B. Measure off A-C to any length that can easily be divided and subdivided into all the stations given in column one. As a typical example, A-C will be assumed equal to six (6) inches; thus each 10% interval equals .6 inches. After A-C is marked off into all the stations as though it were the chord, connect B-C as shown. With the aid of a ruler or a triangle, through each station point along A-C draw a line parallel to B-C, intersecting A-B as shown. The point of intersec-

tion on A-B designates the locations of the stations with respect to the chord.

With the various stations located along the chord line, the next step is to locate the contour points on the stations above and below the chord line as given in the second and third columns. Locating the upper camber point at the 30% station: From the second column, the point along the upper contour is given as 11.25% of the chord length, or  $.1125 \times 5 = +.563$  inches. At the 70% station the point along the upper contour is located 7.63% of the chord length, or  $.0763 \times 5 = +.382$  inches above the chord line. In like respect, the ordinate points for the lower contour line are computed. Thus, for the 50% station the ordinate point as given in column three is located  $-2.72\%$  of the chord length, or  $-.0272 \times 5 = -.136$  inches below the chord line. It is ad-



visible to use an engineer's ruler (inches divided into tenths) throughout the laying out of an airfoil section, as the dimensions will be determined in decimals.

Before connecting the various points to obtain the completed contour of the section, there remains a very important step with regard to the leading-edge contour which is usually neglected—that of properly fairing the upper and lower cambers at the leading edge.

The earliest types of airfoils left this fairing to be worked in by gracefully blending the upper and lower contour lines at the leading edge. Because today it is a well-established fact that the leading-edge contour is one of the most important properties affecting the aerodynamic characteristics of an airfoil, the modern section of N. A. C. A. origin definitely establishes the leading-edge curvature as a portion of a circle whose radius, like all other dimensions, is proportional to the chord length.

Below each set of ordinates for airfoil sections, those of N. A. C. A. origin in particular, is given a leading-edge radius in percent of the chord and a slope through the end of the chord. As will be noticed for the section in question, the leading-edge radius is given as 2.48% of the chord length and the slope through the end of the chord as 4/20. Exactly what purpose the slope serves is to establish a line from which the leading-edge radius is swung.

The sloped line, as stated, passes through the end of the chord at zero station. The slope which the line assumes with reference to the chord is given as  $4/20$ , which means that the line assumes its slope by passing from the zero station through a point D located 20 units from the zero station and 4 units up with respect to the chord as illustrated. The point from which the leading edge is swung is then along the

C. A. V. U.

(Continued from page 6)

test flights by the Boeing test gang. All indications are that this new addition to the Boeing family will surpass even their most optimistic hopes. Various new and important improvements over the B-17 have been made, such as special engine superchargers for peak performance at high altitude, as well as many refinements that add to the comfort and convenience of operation. Assembly-line production makes possible a steady flow of these new weapons for Uncle Sam's air corps.

★ ★ ★

The other day a chap whose word we have no reason to doubt dropped in for an aerial gabfest and told, among other things, a story of Italian flying we'll pass along.

Recently a load-carrying record was

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line A-D at a distance  $.0248 \times 5 = .124$  inches from point A, as indicated.

With the leading-edge curvature properly laid out, the points are then connected accordingly with a French curve. The upper and lower camber lines should blend into the leading edge as illustrated.

established by an Italian transport of a certain class. According to all reports, the load carried was terrific, but according to our visitor, a few short cuts were used. Among these were: all the fabric covering of the fuselage was removed and replaced with doped silk, all but the barest instruments needed were removed, the interior completely stripped of all except essential bracing, and the—don't look now, but the pilots were forced to fly in their underwear! The result was that while a "load" of say 10,000 pounds was carried, the increase in weight to the ship was only about 4,000. Ho-hum and all that.

★ ★ ★

What's all this we hear about the Swiss air force building factories on rails that can be rolled into underground caverns during air raids? These are said to be built in units, each with its own railroad, so that if one is damaged the

Before closing this article, it might be stated, as a point for information, that the angle of attack of a section is always measured with respect to the chord line unless otherwise stated. This is illustrated and should be borne in mind when setting a wing for a particular angle of incidence.

★ ★ ★

Who hasn't heard of Mr. W. T. Piper, the genial president of Piper Aircraft Corp.? But have you heard that he learned to fly after he was fifty, and has five youngsters who are all pilots? This certainly speaks volumes for the ease of learning to fly at any age. Incidentally, at the time of going to press, we have just heard that Miss Alma Heflin, who has an important position with Piper and is a versatile writer of light-plane articles (see page 18), has just established what is expected to be a new national record for light planes. She reached 21,050 feet altitude in seventy-four minutes in her Lenape-powered Cub, which proves she pilots a mean ship as well as typewriter.



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## IT'S STILL A NEW GAME

(Continued from page 4)

this infant colossus. And so, along with Air Trails, I wish for all of you C. A. V. U.

### MEET CHUCK KERWOOD

By Tracy Richardson

Every now and then someone wants to do something or start something in aviation, and it's a pretty even bet that before long they'll be asking Colonel (Chuck) Kerwood what to do about it. Chuck will scratch his head for a few minutes and dig out an answer that just about suits the situation.

Congress put him on its Aeronautical Advisory Committee for Aircraft Safety, which at first glance might seem rather remarkable, for if any flier has constantly sought out the danger spots in flying it's this same Colonel Kerwood. Chuck says he believes a man will do a better job of flying if somebody's shooting at him.

There's no record of any man having a more intimate knowledge of the air lines of the world than the colonel. He's flown over every air line, inspected every airport, air-line maintenance and manufacturing plant both in the United States and abroad. That alone represents a lot of mileage flown and a right smart bit of time put in looking over things aeronautical.

Charles Wayne Kerwood was born in Chicago, Ill., August 1, 1897. He was educated in the Western Military Academy, New York University, and Columbia University, and that was as long as they could hold him down. In 1916 he completed a course in civilian aviation at the Curtiss Flying School at Newport News, Va., and soon thereafter finished his military aviation training in the French Army Bleriot School, being detached from the French Foreign Legion for the purpose. He served on the Western Front during 1917-18 as a member of the famous Lafayette Escadrille. Twice he was wounded in aerial combat, and the third time was brought down behind enemy lines and made a prisoner.

The discipline, poor food, and Chuck's

own sense of impatience made him anything but a model prisoner, and he made five attempts to escape, during the last of which he was wounded by a German sentry. That should have been just about enough for any man to think back on for the rest of his life, but since that time he has—

Served as aeronautical engineer and chief test pilot for the Franco-Rumanian Lines and as colonel commanding the Greek Royal Air Forces during reorganization in the Greek-Turkish War; organized and commanded the Volunteer American Squadron during the French-Riff campaign in north Africa; acted as aeronautical officer for the Escadrille de la Garde Cherifienne in Morocco; and as a field director for the American Relief Association in Russia and the Balkans.

Kerwood liked the adventurous life, but he wasn't after adventure alone. Behind his war activities there was a sound reasoning along lines aeronautical. He was accumulating a mass of information that today is being applied to the aviation industry through his business as an advisory engineer on aviation.

Kerwood is a member of the Caterpillar Club, which means he's had to take to his parachute to save his life. He's on the board of many aviation clubs, and president of the American Croix de Guerre Association and the International League of Aviators.

But the thing most near and dear to the colonel's heart is to have returned to America the original Wright Brothers' plane, the one they first flew at Kittyhawk. To this end he has formed and is president of the Association of Men with Wings. If and when the first plane to fly is brought back to its home country from England, it will be due to the efforts of Colonel Kerwood and his association. At the present time it looks very much as though their efforts were to be crowned with success.

Chuck is an early member of the Quiet Birdmen and a past commander of the oldest aviation post in the United States, Air Service Post No. 501 of the American Legion. Probably no flier is better known internationally or has more friends scattered throughout the world wherever there is aviation than Charles Wayne Kerwood.

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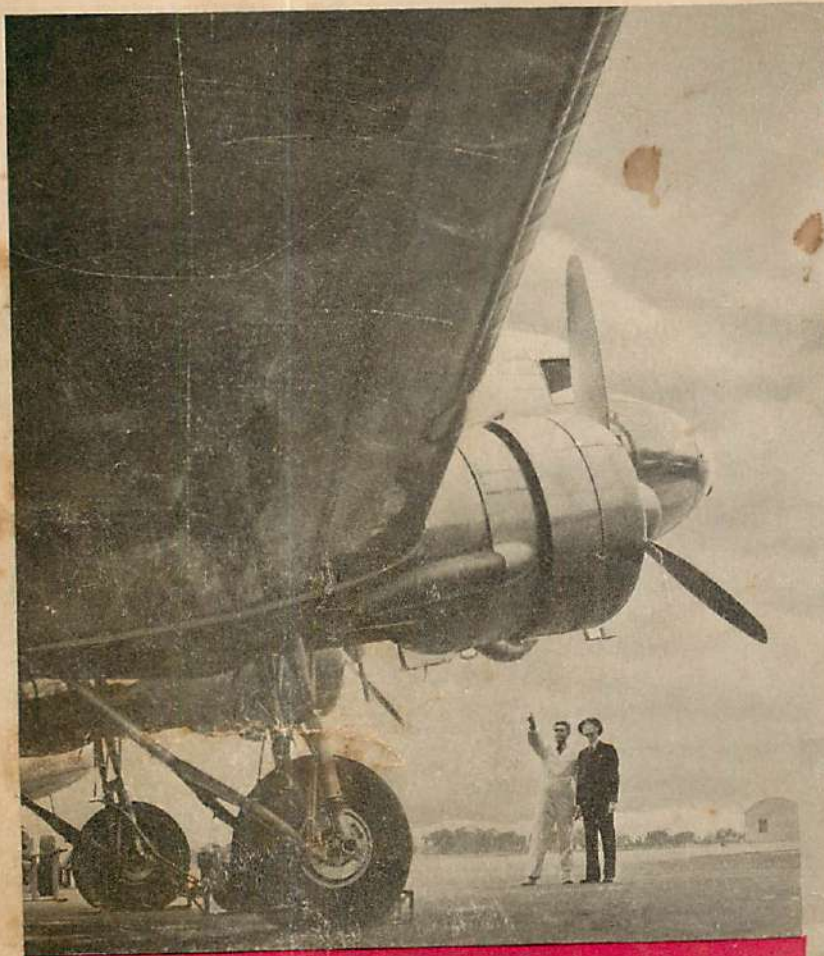
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